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Resilience of New Space Firms in the UK during the Early Stages of Covid-19 Crisis: The Case for Strategic Agility

Background

The outbreak of a novel coronavirus (SARS-CoV-2) causing the Covid-19 disease, had a profound effect on the global economy in the first half of 2020. Having started to spread from China's Wuhan region in December 2019, it led to a global pandemic, formally declared by the World Health Organisation on 11th March 2020 [1]. As of end of June 2020, there were over 10m cases of infection with Covid-19 globally, with over 500k deaths, of which over 300k cases and 43,575 deaths were in the United Kingdom (UK) [2].

In response to the outbreak, most countries introduced restrictive public health measures, ranging from compulsory use of face coverings to banning people from leaving their homes [3]. Following a series of relatively mild guidance on hygiene and travel, the UK entered a period of "lockdown" on 23rd March 2020 [4], effectively stopping all non-essential social and economic activities that require human contact. These restrictions began to ease in May 2020, though many of the social distancing measures remained in place, including work-place regulations limiting economic activity.

These and similar restrictions in many countries around the world led to a profound impact on global and the UK economy. For instance, UK recorded an unprecedented drop of 22.1% in gross domestic product (GDP) in the first six months of 2020 (i.e. comparing to the fourth quarter of 2019) with significant drop in manufacturing output, though service industries were also affected [5]. Though government introduced a raft of measures supporting businesses through this period, providing furlough finance, bridging grants and loans and payment delays [6], significant uncertainty remains over the scope and pace of economic recovery. It is likely the crisis will be more pronounced than the most recent recession following the 2008 financial crisis or past pandemics [7].

Experiences from past downturns may be helpful in mitigating the long-term impact and facilitate economic recovery. In particular, research pointed to the role played by small-to-medium-sized enterprise (SME) and the development of organizational resilience, i.e. the ability to foresee opportunities and threats from emerging trends, adapting and changing constantly, surviving in a turbulent environment and recovering from crises [8–11]. Moreover, entrepreneurial firms represent just 6% of UK firms but generate about 50% of all new jobs and provide much of the country's export and productivity growth [12], which will be vital for economic recovery.

Early rapid response research with the context of Covid-19 outbreak support this premises [13], arguing for entrepreneurs' ability to bricolage limited resources with emerging opportunities [14], though highlight the reliance on existing entrepreneurial ecosystems attributes [15]. Hence, understanding better the form(s) of organisational resilience within SMEs during the early stages would be vital for supporting the economic recovery, as well as being an opportunity to test existing (and competing) hypotheses about its sources. This paper focuses on the interplay between firm agility and strategic planning as a source and examines the case of fast-growing New Space firms in the UK.

Research Rationale and Methods

Organisational Resilience – Between Agility and Strategy

Past studies suggest that organisational resilience entails the capacity to quickly re-deploy technical, organisational, financial and human resources to respond to unpredictable changes within the operating environment [16–18], forming a dynamic capability [19]. Organisational resilience leads to better performance in times during and after crises, as firms gain access to, re-organise and re-deploy existing and new resources, allowing them to deal with threats or exploit opportunities that are transient, changing and temporary. Resource recombination to serve changing purposes as well as learning how to achieve such recombination affect chances of survival and recovery [17,20].

On one hand, empirical studies examining agility show the importance of spontaneous adaptation and ‘wayfinding’ [21] rather than strategically planned responses [8,22]. This is symptomatic of leaner and more flexible structures: easier and quicker to reconfigure whenever needed, favouring agile adaptation to changing conditions. Flexibility and agility are embodied in entrepreneurial skills and dynamic capabilities and help SMEs to absorb and adapt to external shocks. Their agility - rapid geographic relocation [23]; rapid diversification [24] and innovation capacity - make them more resilient [25,26].

On the other hand, while some now see the superior agility and flexibility of entrepreneurial SMEs as an advantage [27], others contend that they are an ‘anathema to organisations that put true resilience at their heart’ [28]. Here, strategic planning in particular, has been shown as a critical asset in improving knowledge management, innovation and competitive capabilities of SMEs [29–31]. Despite some endorsements, in addition to a uneven uptake of these tools amongst SMEs [32–34], some studies point to little effect of strategic planning on actual SMEs’ performance [35]. However, international comparison showed that flexible strategic planning proved successful in “unstable” environments [36]. In fact, recent systematic review of literature [37] places strategy at the core of (sustained) high growth paradigm, even though it concludes the mechanisms of such strategic management are underdeveloped.

Hence, could there be a lesson for the need for both (some degree of) agility and strategic planning and management in times of uncertainty and crisis? Specifically, in certain industries, emerging business models are attempting develop a sort of “strategic agility” as the core firm capacity. Strategic agility brings together an aptitude for both organisational reconfiguration as well as inter-organisational positioning within the value chain and on the markets [38–41]. In particular, such approaches to SME management seen in many of the most innovative sectors, like those forming around data-driven innovation, in particular the New Space industry.

Case Study: Data-Driven Innovation and the New Space Industry

Many of the high growth SMEs on the turn of the millennium have developed in the fast growing data-driven “new economy”, comprising core information technologies as well as auxiliary products and services [42]. For instance, through hardware miniaturisation with robotic manufacturing and increasing satellite data access and processing power availability, the Space Industry has expanded significantly since the 1990s alongside the advances in information technology. In particular, there has been pronounced increase of high-growth SMEs – something commonly refer to as emergence of the New Space industry [43,44].

Past research, including studies conducted by some of this paper’s authors point that in addition to technological changes, there were also significant changes in the organisational learning structures and the way innovation is carried out in New Space sector [45]. In particular, our studies within the

UK (in Scotland) show this emerging industry focusing heavily on innovation and on research and development (R&D), with loose value chain consolidation and a distinctive “agility” at the core [46]. There is in fact firm evidence that these changes originate in cognitively proximate information technology sector and have spread throughout the industry [45]. These developments were further supported by public bodies and, in particular, innovation intermediaries, whose business development support encouraged the adoption of peer networking and learning [47].

The New Space industry is particularly fitting setting in which to study the interplay between agility and strategic planning as sources of resilience, since it covers both (upstream) hardware manufacturing firms as well as (downstream) data analytics services providers. As this paper is striving to develop actionable insights to as many stakeholders as possible, proving this model in both the manufacturing and service business models. In addition, there has been a significant public and private investment in data-intensive businesses in the UK, including innovation and entrepreneurship support in the South East Scotland [48], where many of the UK’s New Space firms are based [49].

Methodology

This study examined fourteen high-growth New Space Sector SMEs. We studied key dimensions of New Space firms’ performance, in particular their financial position, their skills base, their supply chain management and their response to the crisis, with reference to developing strategic resilience.

Companies in sample covered all the business type, size and geographical categories - the sample demographics is as follows. This comprises of five young and developing (Seed), eight established and expanding (Venture) and one mature and consolidated (Growth) businesses [50]. Six of the studied firms are micro SMEs, with less than 5 employees, whilst only one is a medium-sized company with over 50 employees. Seven amongst these companies are based in England (three of which at Harwell Space Campus near Oxford), six are based in Scotland (of which four are in Edinburgh) and one is in Wales. Seven of the firms are in upstream part of the sector (manufacturing space hardware and components) whereas the other seven are in downstream (satellite data analysis). We also separately interviewed one space sector spin-off, who apply space-derived algorithms to medical image analysis.

The research examined both the immediate response of the firms to the crisis (March-April 2020), as well as their reasoning and planning for recovery (June-July 2020). This was done in two parts – an initial structured questionnaire about their position at the onset of the pandemic and open-ended discussion with a subset of ten of the SMEs, probing the details of the firms’ response and examining the wider context in which they operate. The interviews followed closely the themes outlined above, using a semi-structured approach, allowing to focus on what interlocutors found to be most significant and exploring topics outside the question parameters.

The structured data was analysed cumulatively, examining key performance indicators, as well as a small comparison between the New Space firms and a reference study [51], which was also used as a sampling frame. This was then further interpreted through open-ended interview data, which was analysed thematically, focusing in particular on cross-examining aspects of agility and strategic planning in the dimensions of financial/operational management, human resource management and relationship development with suppliers and customers. We also asked additional questions about the Government support and advice provision and management team (skills) development.

Overall Findings

New Space SMEs' Position and Immediate Response to Onset of Covid-19 Pandemic (March-April 2020)

In broad terms, New Space firms were doing well at the start of the Covid-19 crisis, as over three quarters of our informants reported similar financial situation as pre-Covid-19. Half of all the studied businesses export, though there is only a small decline in exports due to Covid-19 (only one firm reporting expected loss of revenue from exports, though drastically so, halving their export revenue). Although over half of the firms believe they have reasons for concern for their performance in the future, only one firm was considering it may not survive the crisis.

By and large, New Space firms seem to hold on to their skills base, with a net gain of one full-time job between them though, four firms did report reducing staff numbers. As early as April, one company already introduced pay cuts, two implemented some degree of furlough, as well as two contracted staff thought to be permanently let go. However, all companies believed they will return to pre-Covid-19 staff levels in time. Nearly three quarters of the firms believe their supply chain will be disrupted in some way, though none believe it will be permanently wound up.

Regarding their response to the crisis, in addition to the change in staffing described above the most critical response is to pause investment, with one quarter of the firms doing so. In addition, one firm slowed or stopped operations, one tried to reduce rental costs and one used cash reserves. We asked about the UK Government support schemes, too.

New Space SMEs' Strategic Response for Long-term Recovery (June-July 2020)

When asked about their strategic planning and long-term recovery, Agile New Space businesses again seem to be doing quite well. Most firms report to be in good financial condition and whilst experiencing delays (in sales, R&D and supply), these seem not critical yet. Many have highlighted that their issues may arise later (a common horizon seems to be end of the calendar year) since their funding cycles are often tied with big contracts or investment and hence operate on roughly yearly cycles. There is significant uncertainty about prospects for 2021 and beyond, compounding the Covid-19 challenges is the looming end of Brexit transition period and potential loss of markets and investment.

Almost across the board, they implemented various forms of organisational learning – on management level and amongst staff - and have developed new processes to deal with challenges of homeworking, supply chain disruption and a more difficult trading environment.

Firms have largely easily moved to home working. In fact, firms report a lot of upskilling in management processes and use of digital technology – surprised by the robustness of the existing infrastructure and ease of use. Firm managements' leadership has been highlighted as the key for successful maintenance of motivation and organisational cohesion whilst the teams are physically dispersed. New routines and engagement strategies were developed by many firms to address team morale (on line social events, one-on-one check-ins, etc.) as well as informing and involving all firm staff in decision making. Many companies managed to continue with recruitment, and furlough was only implemented where absolutely necessary – in office management, apprenticeships, or when the job was no longer needed (in line with bigger strategic changes unrelated to Covid-19). Furloughed or re-assigned staff was mainly apprentices and auxiliary/support staff in manufacturing/operations, in some cases redirected to Covid-19 relief efforts. Manufacturing facilities were kept open with minimal staff, but all offices were closed (some permanently as staff took to homeworking and it cuts costs).

Supply chain and customer relationships seem to hold by and large better than anticipated (including in comparison to early assessment at the onset of the crisis). Those in manufacturing have found ways to deal with the uncertainty and have become more resilient with alternate suppliers and/or components. Sales and exports seem to hold up, even though there is concern about sourcing new contracts and most importantly closing the deals without in-person contact, site visits and demonstrations. Loss of large conferences and trade shows has also been highlighted as a particular challenge in a relatively closed industry. However, several entrepreneurs report development of new interpersonal skills – such as use of social media and on-line tools – as well as new opportunities to both learn about best practice and interact with prospective partners and customers via webinars and other on-line networking platforms. Social aspects of customer relationships needed reinvention, which is still taking shape through trial and error.

There is uncertainty about government strategy and commitment to invest in innovation and high growth SMEs, with particular frustration with slowness, lack of transparency and clarity of messaging. In the end, not many of the firms accessed Government support, apart from the furlough scheme which was used by seven out of the ten companies. One firm also prepared all paperwork for tax deferral (yet to be submitted), and one applied for a grant and was not successful. Many would like to see a firmer commitment to post-Covid-19 R&D investment and requirements for spill over when government support is pledged to large public contractors/procurement. There is also frustration that lack of clarity on regulations is stopping strategic decisions from being taken – Covid-19 is here only adding to existing uncertainty about post-Brexit trading relationships. Many companies evolved their own policies in lieu of lacklustre government guidance, though Scotland-based firms have found Scottish Government support useful, however, somewhat dependent on the individual support account manager, rather than policy per se.

Discussion, Conclusions and Future Research

The combined findings from the immediate response questionnaire and strategic planning interviews indicate a significant degree of resilience amongst New Space firms, including a slightly better (or at least more optimistic) prognosis than an average high growth SME [51]. The reasons for this could perhaps be found in the patterns of organisational learning and value chain configuration, leading to a degree of both strategic planning as well as agility.

In particular, past research has shown downstream (data analysis) New Space firms had learned from the information technology colleagues the models of open innovation, as well as entrepreneurial culture [45]. In addition, the space industry's deep and complex value chain, covering anything from advance (heavy) manufacturing to consumer (data) applications, makes emerging SMEs far more strategically minded and resourceful. Specifically, a new paradigm has emerged around "Agile Space" business model, combining a loose value chain integration and continuous engagement of various stakeholders [46]. The former requires firms to actively and dynamically strategically positioning themselves as part of a larger consortium of players and the latter makes them far more attuned to operating in a unpredictable environment.

The significance of the "strategic agility" developed on the back of these new skills and operational conditions was noted in several interviews. Interlocutors mentioned their careful strategic positioning within and outside the space industry as well as constantly seeking new opportunities for application of their (technological) solutions. This varies from a data analytics firm carefully expanding the network of offices to locations where new markets or development resources can be obtained, to a rocket manufacturing firm quickly changing part of their factory floor to make personal protective equipment (using otherwise idle 3D printers) and sanitiser (based on

components of their otherwise rocket-fuel-making apparatus). Importantly, management leadership in these adaptations has been followed by consensus building through continuous social interaction and open forum presentations.

Moreover, though there is indication that financing is more difficult to obtain due to Covid-19 crisis [52], which was confirmed in experiences of the seed companies in the sample, the New Space industry is somewhat insulated from this challenge. Though some firms report delays to obtaining funding and subsequent delays to R&D projects, by and large Agile New Space firms have enough resources to continue existing R&D projects. This is likely due to the need for larger up-front investment in New Space manufacturing (hence funding being in place prior to crisis) and low entry cost in the data analytics businesses (not requiring multiple seeding investments). In addition, slow entry to market for many New Space firms has actually benefited the newer companies as they are less reliant on revenues (seen as a weakness by venture capitalists before the crisis).

This mixture of firms' agility – being flexible in organisational and product terms – and capacity - in particular having financial backing to deal with any immediate cash-flow issues - has been found to be particularly useful in times of crisis [27]. As per past studies of strategic agility [40], critical dimensions for resilience combine technology capability, collaborative innovation, organizational learning, and internal alignment. In the studied example of UK New Space firms responding to Covid-19 crisis, these dimensions came to the fore (as seen on Figure 1).

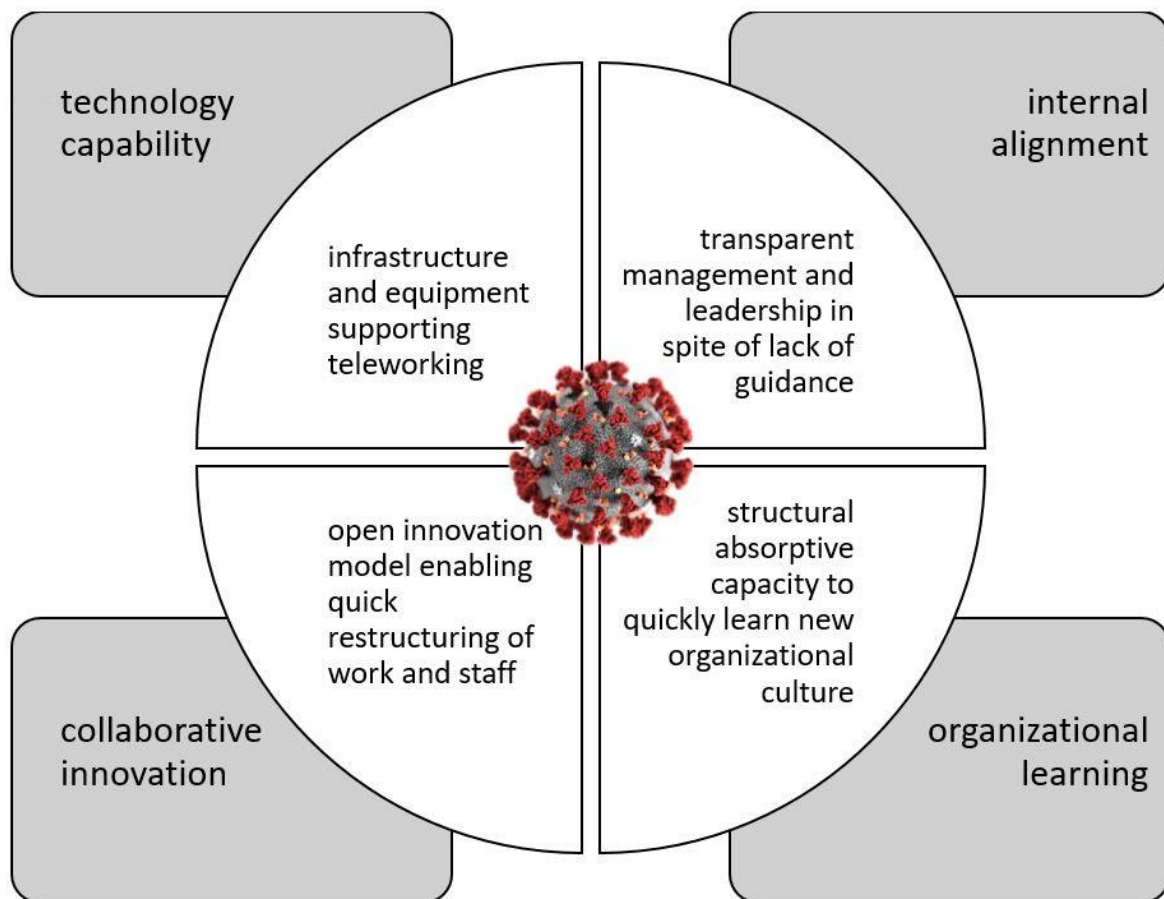


Figure 1 - Schema of strategic agility within UK New Space SMEs at the onset of the Covid-19 pandemic, based on the four key dimensions [40] and our research findings. (Coronavirus image credit: Centre for Disease Control (CDC) / Alissa Eckert, MSMI and Dan Higgins, MAMS)

Firms have by and large been well equipped technologically, to deal with homeworking and restructuring manufacturing operations. As noted earlier, managers were also pleasantly surprised by the overall capacity within the UK telecommunications networks, which enabled these transitions. As studied elsewhere, New Space firms also have a significant capacity for collaborative work within an open innovation R&D model [46]. This allowed for quick realignment of activities (as seen in the case of reallocating workforce and overnight developing Covid-19-relief project) and mitigating impact of supply chain disruptions. Furthermore, their ability to learn as organisations, previously examined as instances of structural absorptive capacity [45], allowed firms to establish productive work culture with dispersed staff – as noted by many examples of new formal and informal routines and engagement strategies. Finally, it is clear these conditions can only be achieved with proactive and inclusive management developing a degree of internal alignment. Here, inclusive and transparent governance combined with leadership led to New Space firms being one step ahead of the UK Government’s advice, quickly making timely (i.e. early) critical strategic decisions.

The importance of such strategic agility is particularly significant as it seems firms perceive public policy response inadequate or unsuitable to meet the challenges they are facing. Many of the interviewees have highlighted this as a persistent challenge and have put in place measures to develop strategic plans for the future on the basis of self-reliance. Though calls have been made for more public support, both in terms of UK Governments’ instruments as well as bodies such as space agencies (UK Space Agency and European Space Agency were particularly highlighted), the main desire seems to be for providing certainty in the trading environment – Brexit is a particular concern - and commitment to the pre-Covid-19 R&D and innovation investment.

This rapid response study is of course limited in scale and scope. Future research should perhaps examine in more detail the features of New Space and other SMEs as well as precise tools and processes used in development of strategic plans and the application of agile decision-making. Research is also needed to understand better the (eco)systemic conditions conducive or prohibitive to develop resilience. In particular, understanding the effect of size, scale and heterogeneity of firms’ networks of partners may elucidate on the interplay between internal dynamic capabilities to adapt to the crisis and availability of resources in the environment to make good on such strategic agility. Furthermore, different sectoral and geographical contexts may prove fruitful for comparative studies to determine the general impact of strategic agility on SMEs organisational resilience. Other rapid response studies find or predict similar phenomena [53–56].

Nonetheless, this study demonstrates the significance of the New Space businesses and their potentially important contribution to post-Covid-19 recovery on the basis of their strategic agility – born out of Space Industry’s looser but consistent value chain integration and the lean business models adopted from the Information technologies firms.

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