Commercialization of research from the social sciences, humanities and arts (SSHA) at universities

- **A scoping study: existing insight and current practices**

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By

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1. Introduction

Commercialization of knowledge developed in universities is usually associated with the fields of science, technology, engineering and mathematics (STEM). There is, however, a growing interest in fostering utilization and commercialization of research associated with the fields of social sciences, humanities and arts (SSHA) among universities, academics, knowledge exchange practitioners and funders (Ulrichsen and Athanassopoulou 2024).

The SHAPE taskforce on commercialization of SSHA research was initiated in early 2022 by the business unit managers from Open Entrepreneurship and Spin-outs DK – two initiatives aimed at bolstering the commercialization of research from the eight Danish universities. During 2022 the taskforce extended from five university representatives to eight. In early 2023 the taskforce applied for funds from the InnoTech Group (Universities Denmark's working group on innovation and technology transfer) to establish a project to assess the potential of strengthening the utilization of SSHA research from Danish universities. The project is driven by the SHAPE taskforce with support from the Open Entrepreneurship Central Unit at DTU.

As part of this project, the Danish Centre for Studies in Research and Research Policy (CFA) at Aarhus University was commissioned to undertake a preliminary study of existing knowledge on the commercialization of SSHA research, also referred to as Social Sciences, Humanities and the Arts for People and the Economy (SHAPE) research. The overall project, including this report from CFA, was funded by the InnoTech Group, Universities Denmark's working group on innovation and technology transfer.

1.1 About the study

This report presents an overview of existing knowledge about commercialization of SHAPE research, gathered through a literature study as well as directly from experts and practitioners working with commercialization in the SSHA field. The report aims to provide insight into the distinctive features of, as well as good practices for, the commercialization of SHAPE research – with focus on enabling Danish universities to take the first steps towards the development of a common language and efforts to bolster the commercialization of SHAPE research in Denmark.

To denote research from the social sciences, humanities and arts fields in the report, we use the term SSHA interchangeably with the SHAPE acronym which originated in the UK and is increasingly used as an SSHA-based counterpart to the more established STEM acronym.

The report builds first and foremost on *a scoping review* of scientific and gray literature, guided by three questions, which are moreover mirrored in the structure of this report:

- What characterizes SSHA-based ventures?
- What particular challenges and opportunities characterize the commercialization of SSHA research, as they are experienced by individual researchers?
- What recommendations can be provided to institutions and business developers who wish to promote commercialization of research and startups within SSHA research?

This scoping review consisted of literature searches on Web of Science, Elicit and Google. This was deemed the most efficient way to explore both scientific and grey literature on the research questions listed above. The Elicit searches resulted in over 300 scientific publications, however, most were not relevant for the purpose of this study. After a review of the identified literature, nine publications were used in this study. Of these, five were scientific publications

and four grey literature, and they were published between 2004 and 2024. The four most recent studies were published between 2021 and 2024, and three of these were grey literature. All the identified literature is focused on Western countries, with five focusing on the UK (primarily Britain), three on Australia, and one on a number of European Union members, which at the time also included the UK.

The report also draws on the following data sources:

- *A baseline study of SSHA-based startups from five Danish universities* based on existing register data and conventions as used in a previous study by the consultancy IRIS Group (2022). The aim of this part of the study was to generate a very preliminary baseline of current activity related to SHAPE startups, in order to help frame discussions of how to promote increased SSHA commercialization at Danish universities.
- *Semi-structured interviews with eight experts from the Danish SSHA ecosystem.* The aim of these interviews was to uncover current perspectives and practices related to commercialization of SHAPE research in Danish universities.
- *Semi-structured interviews with five experts from the UK SSHA ecosystem.* The UK has engaged in public debates and dedicated initiatives to foster commercialization of SHAPE research for almost a decade. The purpose of these interviews was to gain insight into the background, development and lessons learned from UK efforts.
- *Semi-structured interviews with three experts from the Swedish knowledge transfer ecosystem.* The aim of these interviews was to draw on long-standing Swedish experiences with research commercialization which is not based on IP.

Respondents and focus countries for the interview study were selected by CFA based on suggestions from the SHAPE taskforce on commercialization of SSHA research.

For more information on data and methods used in the study, please refer to Appendix 1 of this report.

The report is structured as follows: Chapter 1 examines the characteristics of SSHA-based ventures, drawing on both the scoping review and baseline study as well as insights from interviews. Chapter 2 outlines challenges and opportunities associated with research commercialization for academic researchers, based on the scoping review, supplemented with insights from interviews. Finally, Chapter 3 presents recommendations for how to promote and support commercialization of SHAPE research in Danish universities, based on insights from the scoping review and interviews.

1.2 Executive summary

The growing interest in fostering utilization and commercialization of SSHA research among universities, academics, and knowledge exchange practitioners and funders has initiated the project to assess the potential of strengthening the utilization of SSHA research from Danish universities. The resulting outcome is the present report which includes a scoping study of existing knowledge on stock and characteristics of, and processes, incentives and obstacles for, commercialization of SHAPE research from the SSHA field. Through a literature study as well as directly from experts and practitioners working within the SSHA field, the report aims to provide insight into the distinctive features of commercialization and enable Danish universities to initiate common efforts to bolster commercialization of SHAPE research in Denmark.

SSHA-based companies cover a broad range of fields and characteristics. This points to many opportunities for possible SHAPE ventures but also that heterogeneity makes it harder to communicate and grasp the nature of these research-based ventures. For example, the field and its research still have many acronyms, such as SSHA, SHAPE, HASS among others, which illustrates the ongoing cultural as well as organizational maturation of how to contextualize commercialization of research in the SSHA disciplines.

Commercialization of SHAPE research is less tangible, i.e. IP based, and more embedded in the researchers' intangible personal knowledge. This fact requires other mechanisms for protecting rights than e.g. patents. Hence, while SHAPE research is less expensive to develop and scale, the researchers' expertise and time becomes essential for commercialization of their research. This also means that many SHAPE ventures struggle to generate income as well as funding and startup capital, and that it can take a long time before scaling and sustained impact becomes an issue. Furthermore, SHAPE commercialization is not necessarily characterized by profit-seeking commercial activities.

The interviews with representatives from the Danish universities confirmed that there is a wide spectrum of SSHA-based ventures and firms emerging from Danish SHAPE research and that they illustrate the many ways to commercialize SHAPE research. Especially the ARTS field were in favor of a broad concept of commercialization and also rated the SHAPE acronym highest. The varieties in and between the universities indicate that there might be a potential for expanding the SHAPE commercialization activities through increased mutual learning.

The contextual frame, i.e. SSHA ecosystem, for commercialization seems significantly important, and challenges as well as opportunities are common across systems and countries although with different importance, i.e. depending on how developed the SSHA ecosystem is in a certain dimension. Among the identified challenges is the 'lack of commercialization skills and knowledge', researchers' 'perceived incompatibility of SSHA research with commercialization', and 'culture, values, and ethical and moral considerations', the differences in 'language and terminology', and the present 'university structure and its lack of incentives', cf. section 3.2. Among the identified opportunities is the potential of 'financial rewards', importance of 'network and influence', and the acknowledgement in 'academic careers and university reputation', cf. section 3.3.

Roughly, the interviews collectively confirm and underpin the findings, and broadly confirms that challenges and opportunities in the Danish SSHA ecosystem does not seem to be contextually different from what is found in other countries. Although the Danish ecosystem seems less mature and developed than the UK and Swedish ecosystem it is progressing and promising along a positive path. Based on the fact that the identified literature in the scoping review mostly covered UK and Australia and not e.g. US or EU, the Danish SSHA ecosystem does seem to be among the most organized, matured and developed worldwide, cf. section 3.3.

The scoping review and expert interviews resulted in a number of recommendations and key takeaways. While an assessment reveals many similarities across SSHA ecosystems, the recommendations need to be evaluated and fitted to the ecosystem at hand. Hence, the recommendations need to be tailored to the purpose they must support.

It is important to build and expand knowledge and skills in SHAPE research commercialization to the entire SSHA ecosystem, thereby securing both a common understanding as well as a common language allowing the ecosystem to pursue the same objectives. Networks can in this respect ensure a better and more aligned coherence, e.g. diffuse good practices, and also

raise awareness of the value and impact of bolstering the commercialization of SHAPE research.

However, effect and impact measuring pinpoints a need for metrics that are better than the current (STEM based) metrics in measuring the impact of knowledge exchange and research commercialization, i.e. key activities and impact of SHAPE commercialization. A better understanding of how to measure commercialization of SHAPE research will strengthen the visibility of the activities and support the ability to finance and fund commercialization activities. Furthermore, it can also strengthen incentives for SSHA researchers to commercialize their research as it becomes easier to document purpose and progress.

The interviews underline the importance of a holistic view, i.e. a complete SSHA ecosystem, in successful commercialization of SHAPE research, there are also more specific recommendations that can be prioritized, cf. section 4.3. They need to be tailored to the SHAPE challenges in order to promote SHAPE commercialization but can be summarized as appreciate 'champions', maintain or expand 'networks', build an efficient 'infrastructure', acknowledge other 'non-profit spinouts', and identify 'appropriate metrics' to describe SSHA commercialization.

2. What characterizes SSHA-based ventures?

This first chapter sets the stage for the remainder of the report by reviewing alternate definitions of SSHA-based commercialization and describing key particularities of SSHA-based commercialization as compared to STEM commercialization, before examining characteristics of SHAPE ventures, based on data and insights from the UK, which has been leading the way in efforts to support SHAPE commercialization. As will become evident from the chapter, SSHA-based companies cover a very broad range of fields and characteristics. On the one hand, this points to the many opportunities for possible SHAPE ventures. On the other hand, the heterogeneity observed in SHAPE companies makes it harder to communicate and grasp the nature of these research-based ventures, as well as to reliably document their numbers and progress.

The chapter concludes with a preliminary characterization of SSHA-based ventures that have emerged from Danish universities so far, as a baseline reference point given the growing interest in strengthening support for such ventures at Danish universities.

2.1 Defining SSHA-based commercialization

Formal, systematic efforts to stimulate and support the commercialization of SSHA research remain rare (Ulrichsen and Athanassopoulou 2024). As such, it is not surprising that there is limited consensus on how to define SSHA-based commercialization or ventures.

For inspiration, we can look to the UK, which has seen a growing professionalization of the field over the past decade. Many universities and organizations in the UK refer to SSHA using the aforementioned term SHAPE, which stands for 'Social Sciences, Humanities and the Arts for People and the Economy' and which has recently been expanded to include the environment also (i.e. 'Social sciences, Humanities, and the Arts for People and the Economy/ *environment*'). The term was proposed by Julia Black, Strategic Director of Innovation and Professor at LSE and President of the British Academy, in a collaboration between a series of institutions, including the British Academy, the Arts Council, the Arts and Humanities Research Council, the Economic and Social Research Council, the Academy of Social Sciences, and LSE. The SHAPE acronym was introduced as a counterpart to the more established STEM acronym and to better encapsulate the role of SSHA subjects as actively operating on peoples' relationships to each other and the world around us.

The SHAPE acronym is also used by Aspect, a UK-based network which brings together institutions working on commercialization, entrepreneurship and societal transformation based on SHAPE research. It is also used by the associated initiative the ARC Accelerator, which helps researchers build and scale SHAPE ventures, which they define as ventures *"where the product or service is primarily built on SHAPE research. This mostly means a researcher from a SHAPE discipline is building a venture based on their research".*

Cambridge University employs a different definition of SSHA commercialization. Focusing on the social sciences, the knowledge exchange and technology transfer organization Cambridge Enterprise defines it as *"...market-based solutions to channel academic expertise in solving real-world problems and addressing societal challenges. Market-based solutions comprise many arrangements, including licensing innovative ideas and tools, consulting or creating new companies (including social ventures), and bringing about entrepreneurial pathways to impact."* (cited in Ulrichsen and Athanassopoulou 2024, p. 7).

A recent study of social science ventures out of Cambridge University moreover states that *"We [...] deliberately do not limit our attention to social science research based in social science faculties. Rather, we were keen to include cases where this type of research is being undertaken in faculties where commercialisation is more common (e.g. engineering, clinical medicine)."* (Ulrichsen and Athanassopoulou 2024)

Despite their differences, these British attempts to define commercialization of SSHA-based ventures share a common focus on the notion of "scaling impact". At its core, commercialization and entrepreneurship based on research from the SSHA disciplines is seen as scaling the economic, societal, and environmental impact of that research by leveraging commercial pathways and market mechanisms (Ulrichsen and Athanassopoulou 2024).

Finally, it is worth noting the role of replicability and scalability in understanding commercialization of SSHA-based research, in order to distinguish it from e.g. individual researchers' ad hoc consultancy activities. Ulrichsen and Athanassopoulou (2024, p. 8) describe this distinction as follows: *"In developing innovations from social science research that can be traded in the market, the solutions need to be more than just one-off transactions involving a monetary fee. This helps us to distinguish between the often ad-hoc advisory work that many academics undertake (often involving a fee), or one-off fee-for-service consultancy projects delivered in response to a specific opportunity, and the more deliberate efforts to create activities that can be sustainable commercially – for example, the development of a consultancy-based service that allows users to leverage the expertise of academics to solve problems."*

2.2 How are SHAPE ventures different from STEM ventures?

Given that knowledge transfer and research commercialization efforts have focused for decades on inventions and discoveries from the STEM field, best practices and tools used to support research commercialization have been customized for this purpose. As such, they are not well-suited to stimulate commercialization of SSHA research, which, as international interview respondents explain, differs in several important respects from commercialization in STEM.

First, STEM-focused commercialization practices tend to be heavily centered on IP, i.e. the protection of inventions and discoveries using Intellectual Property (IP) rights (predominantly patents), which are then sold or licensed to established firms, university spinouts or other startup firms. However, IP is rarely an effective means of protecting knowledge and inventions generated through SSHA research. Although IP may play a role in some SSHA-based ventures, it will at best typically play but a small, supporting role. Other mechanisms for protecting rights to research outputs and building a viable business model around them must therefore be found.

Second, interview respondents point out that startups based on SHAPE research are less expensive to develop and scale than STEM-based startups, because they rely less or not at all on hardware and are less capital intensive. However, SSHA-based ventures typically do not scale easily or on their own. In large part, this is due to the critical role of the individual researcher. As interview respondents explain, in STEM fields, researchers often have access to a team consisting of junior and sometimes senior researchers, who collaborate on research and teaching tasks as well as tasks related to research commercialization. SSHA researchers, in contrast, rarely have research groups to draw on for added resources and expertise. Moreover, the core of the commercialization process is knowledge and insights embodied by

the entrepreneurial researcher, rather than technology or physical artefacts which can be developed independently of the researcher. As a result, the SSHA researchers' expertise and time is crucial to the process of commercializing their research.

Third, according to interview respondents, many SHAPE commercialization efforts struggle to generate and maintain income. While they may for instance help their customers or users save money or do things more efficiently or effectively, this does not necessarily translate into direct profit. SHAPE ventures are often not a good 'fit' with the criteria of venture capitalists (VCs) who invest in STEM-based startups. Conversely, many SHAPE startups are not interested in raising traditional venture capital. According to one respondent, this is because VC investors' focus on exits and profits are not seen as compatible with the broader, impact-oriented aims of most researchers behind SHAPE startups.

While SSHA-oriented venture capitalists are starting to emerge, most SHAPE ventures therefore have to explore alternative financing models, incl. consultancy income, research and entrepreneurial grants, philanthropic funding, crowdfunding, long-term debt, licensing income (e.g. from licensing of questionnaires, tools, training materials etc.), digital apps etc.

It is worth noting that many SHAPE startups cater to public customers, which, according to respondents, means that it can take a long time to make a sale, as for instance schools and governmental institutions can be slow to make purchasing decisions and approve suppliers. However, this also means that sales cycles are long, as public customers tend to be loyal, long-term customers.

To complicate matters further, in SSHA-based ventures, the user or beneficiary of a product or service is often distinct from the customer who pays for it. Often, end users or beneficiaries are either unwilling or unable to purchase an SSHA-based product or service on a large scale. For instance, a venture may offer a product that provides help for a group of patients, which is recommended to these patients by their general practitioners but paid for by the municipality in which the patient lives. As such, the aforementioned ARC accelerator talks not about customers but rather about 'audiences' – which include customers but also users and beneficiaries – when helping SHAPE ventures identify suitable business models and commercial pathways. The ARC accelerator shares the tools it uses to help SSHA-based ventures develop and scale on its website, which includes SHAPE-adapted tools for idea canvassing and for developing value propositions and business models.

The tools shared by ARC stress – and cater to – the particularities of SHAPE commercialization cases as compared to STEM cases. The particular features of SHAPE cases and of appropriate processes for supporting them have also been described by Ulrichsen and Athanassopoulou (2024, see chapter 5 and chapter 8).

Finally, traditional approaches to research commercialization focus on the establishment of for-profit firms. However, research-based startups, particularly from SHAPE, can be non-profit firms or charities that apply research knowledge and tools to e.g. improve public services, health outcomes, or educational outcomes. Indeed, according to Julia Black Strategic Director of Innovation and Professor at LSE, SHAPE-oriented initiatives in the UK are about "the mobilizing of research for public good but using the mechanisms of the private sector to make it sustainable and scale", through either for-profit or non-profit ventures.

Indeed, focus on SHAPE commercialization, as stressed by international respondents, is not necessarily on profit-seeking commercial activities: SHAPE ventures can be non-profit, e.g. social ventures, independent charities etc., even using e.g. open source/open science models

for sharing data and tools. As will be discussed in the next chapter, many SSHA researchers do not respond to language focused on financial profit. Instead, initiatives in the UK have developed alternate language to address application and large-scale diffusion of utilization of SSHA research, referring to it instead as different variations of *"scaling and sustaining the impact"* of SSHA research. The most appropriate path to scaling depends on the nature of the research and preferences of the entrepreneurial academic.

In some cases, the parent university may also have an interest in retaining access to the research at the core of a SHAPE venture. As interviewees explain, SSHA commercialization is essentially about the ability to apply and scale the knowledge and skills of an academic in a systematic way that creates value. When these skills are transferred to an external firm or organization, the underlying assets, including the staff which embody these skills, are also transferred. So, when SHAPE ventures build on data, tools or other research outputs which are hard to separate from a research group without decimating it, spinning a venture out of the university can lead to the loss of a research group. This affects not only the university but also the wider research community. Hence, some universities are therefore experimenting with ways in which to retain the research group while allowing them to scale the impact of their research through research-based consultancy, by facilitating external use of research through toolkits or digital apps, or even, where relevant, impact pathways that are on the edge between dissemination and commercialization, like exhibitions, book writing, or film production.

Though the terms 'SHAPE commercialization' and 'SSHA commercialization' will be used throughout this report, they refer to the full spectrum of possible mechanisms for realizing the impact of SSHA research at scale.

2.3 Heterogeneity among SSHA-based ventures: a UK perspective

Ulrichsen and Athanassopoulou (2024) published a study of research commercialization projects that have emerged from social science research at the University of Cambridge, which sheds light on the many forms that SSHA-based commercialization efforts can take.

Their study documents great variety among social science research commercialization projects along multiple dimensions: the departments from which the projects emerge, the nature of the knowledge assets that are commercialized, the pathways or mechanisms by which they are being commercialized, and the characteristics and capabilities of the demand environment (e.g. target users and sectors).

With regards to the underpinning *knowledge assets* being commercialized, Ulrichsen and Athanassopoulou (2024, p. 12) found that, out of a total of 142 cases of social science research commercialization projects from the University of Cambridge, 49% were based on *knowledge and understanding* gained from research. This includes research that provides media and content for user engagement, as well as insights and tools to inform decisions and make assessments. The second most common knowledge asset, accounting for 22% of cases, was *software algorithms or AI-based technologies*. The remaining three key types of cases were focused on *social/professional networks and connectivity* (e.g. facilitating network connections and/or knowledge exchange), *product designs and hardware* and *data provision* (including systematizing and expanding data collected through research, making it accessible e.g. to support decision-making, or providing social science-based tools for collecting information).

It's interesting to note that 43% of the cases examined in the Cambridge study emerged not from social science or humanities departments, but from other departments specialized in e.g. technology, business, biological sciences, physical sciences, and clinical medicine. This underlines the importance of looking for potential SHAPE ventures not only in SSH faculties but across universities, wherever SSH research is undertaken (Ulrichsen and Athanassopoulou 2024).

The study moreover documented a broad variety of commercialization mechanisms pursued in the projects studied – ranging from products and tools to various forms of services and events – and in the intended demand environment. The main target markets for Cambridge-based commercialization projects were the education sector (23% of cases) and cultural activities (21%). Financial, legal and IT services accounted for 13% and the public sector and public services for 12%, respectively, while the health sector (9%) and manufacturing and corporates (8%) follow as other target sectors for the university's social science commercialization projects (Ulrichsen and Athanassopoulou 2024).

UK universities and initiatives have shared a number of cases and examples of SSHA-based ventures, which can provide further inspiration, cf. links in section 2.1 above.

2.4 Status for SSHA-based companies in Denmark

While the UK ecosystem for SSHA commercialization is young in comparison to the decades of experience and infrastructure built up around commercialization in the STEM fields, it is the most advanced national example to date of dedicated, institutional efforts to strengthen commercialization of research from the social sciences, humanities and arts.

In this section, we turn our attention to Denmark. While there have as of yet been few dedicated Danish institutional efforts to support commercialization of SHAPE research, a small number of SSHA-based spinouts and startups have emerged from Danish universities. For instance, IRIS Group (2022, p. 11) finds a total of 106 researcher-initiated STEM- or SSHA-based startups (including university spinouts) emerged in 2019 from five of the eight Danish universities. Hence, the annual number of purely SSHA-based startups by university researchers in Denmark must be low, which is also confirmed in the Danish interviews.

A few examples of some of the Danish SHAPE-based commercialization cases are listed. Some of them do not yet have publicly available descriptions.

Box 2.1 Examples of Danish cases of SSHA commercialization

- https://ethnote.org/ EthNote, Copenhagen University, is a digital tool for the collection, processing and analyses of qualitative field data. See also https://sodas.ku.dk/projects/distract/distract-news/ethnote-rejsegilde/
- InterPro, Copenhagen University, is a tool for automated training and evaluation of interpreters (no link available).
- Travel Enterprise, Copenhagen Business School, is a B2B marketing agency for travel-related businesses (no link available).
- https://mindapps.dk/apps/minplan/ Minplan, Copenhagen Business School, is an app to help prevent suicide for patients in psychiatry.
- Labour Analytics, Copenhagen Business School, offers data tools that make it possible to exploit digital data in a transparent, secure and legal way (no link available).
- 15 ENTRE cases. Centre for Applied Artistic Innovation (CAKI) is a knowledge center for the seven arts educations under the Ministry of Culture. https://caki.dk/entre/entre_case-samling/

To help frame discussions of how to promote increased entrepreneurship within SSHA in Denmark, this section further examines current SSHA-based startup activity after being established at Danish universities. This should be seen as a brief, preliminary examination of startups based on existing (register-based) data and approaches for defining startups (and not data or approaches tailored to suit a study focused specifically on SHAPE ventures). A subsequent and more comprehensive study could cover all Danish universities and take a broader and more inclusive definition of startups. For now, the register-based data limits the possibilities to find e.g. small but still important low growth firms, importance of mergers and buy-ups, or simply to perform sensitivity analysis of the found results as the registers are established for administrative purposes and not for research or investigations as ours, see more below.

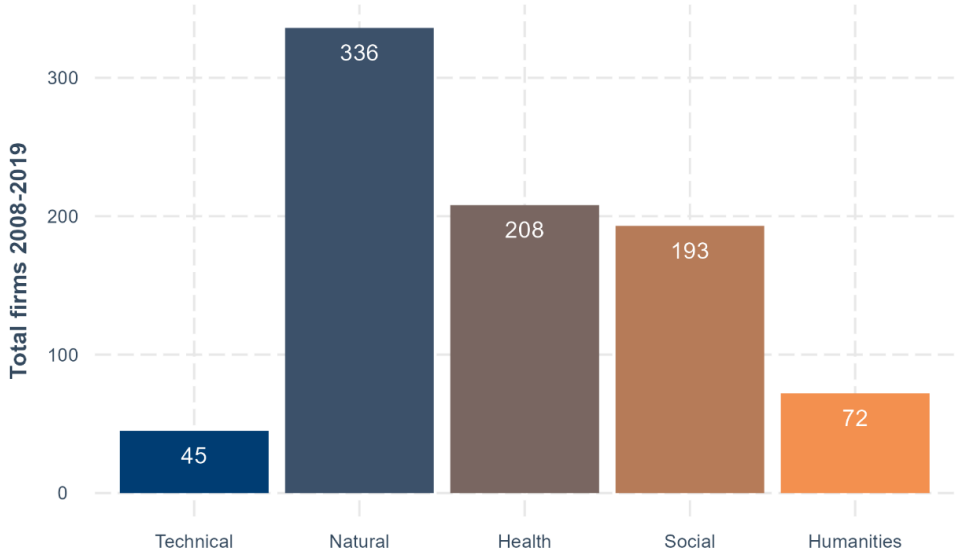
This preliminary baseline study draws on data collected for an analysis conducted by IRIS Group (2022) to identify and describe all startups from five Danish universities (Aalborg University (AAU), Southern Denmark University (SDU), Copenhagen University (KU), Danish Technical University (DTU) and Copenhagen Business School (CBS) over the period 2008-2019.

The data used here only includes startups established by university employees, and thus excludes startups created by students or recent graduates. We apply the same conventions as used in IRIS Group (2022), where university employees must have been employed at the university within two years of the registration of the startup and must have had at least activity corresponding to ½ FTE at some point in time since its establishment. The data used here

exclude spinout companies registered within and fully or partly owned by a university (and not a person). The reason for this is the inability to determine which faculty the spinouts originate from, i.e. its faculty belonging in e.g. figure 2.1.

Figure 2.1 shows the number of startup firms established by the five universities during the period. Over 30 percent of the startups are within either the social sciences or humanities, indicating that SSHA already comprises a significant part of academic startup activity.

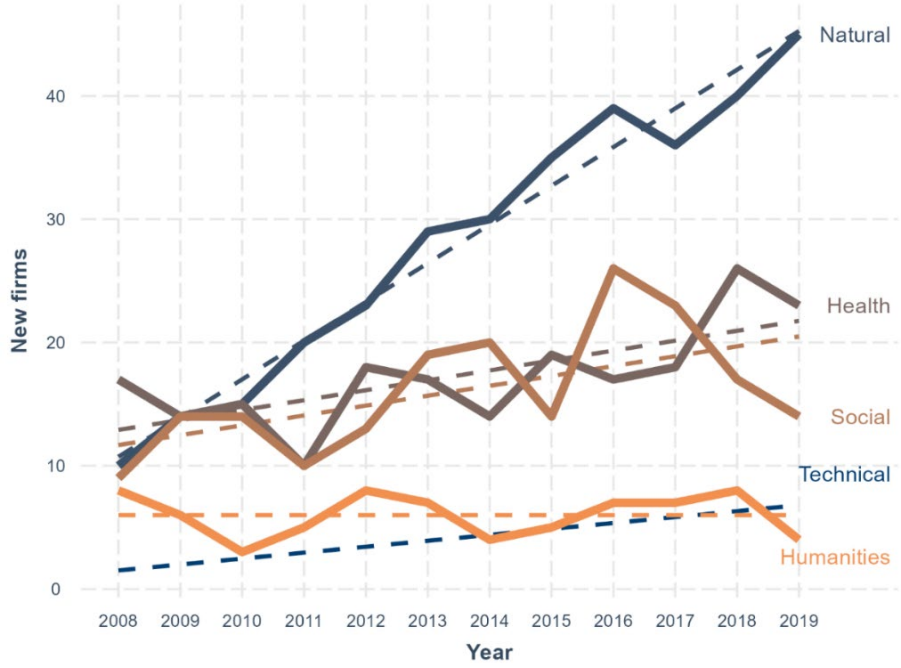
Figure 2.1. Total number of startup firms established during the period 2008-2019, by faculty



Source: own calculations.

The data reveals that there has been an increase in the number of new startup firms over time. This is particularly the case within natural sciences, though also with a more moderate trend within health and social sciences. In contrast, the annual number of startups within the humanities has been relatively stable over time (Figure 2.2).

Figure 2.2. Annual number of startup firms established, 2008-2019, by faculty

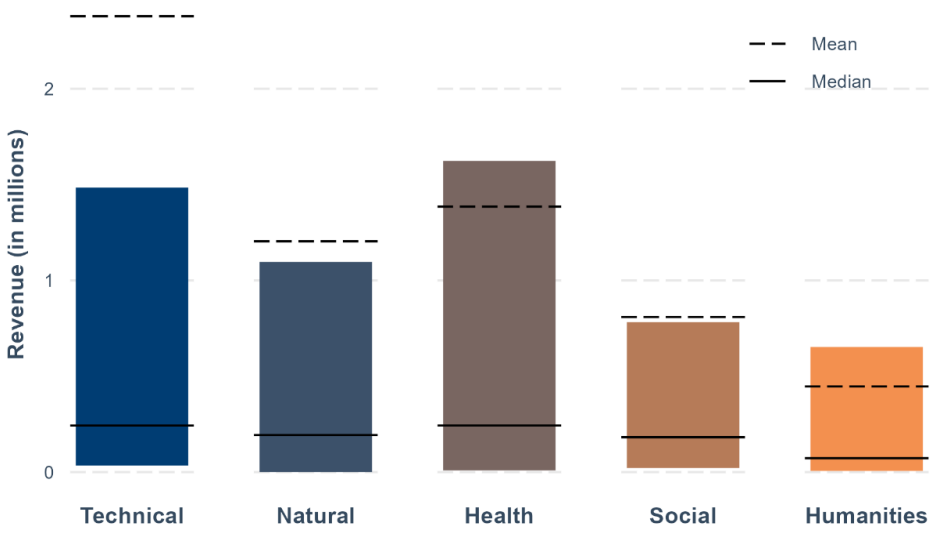


* Note: solid line shows number of startup firms, and dotted line shows trend over time. The actual number of startup firms within technical sciences is not shown due to discretionary concerns.

Source: own calculations.

There are also differences in the size of startup firms across faculties. Figure 2.3 shows the distribution of startup firms according to annual revenue three years after establishment. The boxes show the 25th to 75th percentiles, while the dotted line shows the mean value, and the solid line the median value. In general, the startups within SSHA are smaller in size than STEM-based startups. Note also that mean values are typically much higher than median values, showing that there is a small number of firms that are relatively much more successful.

Figure 2.3. Size distribution of startup firms in terms of revenue three years after establishment, by faculty

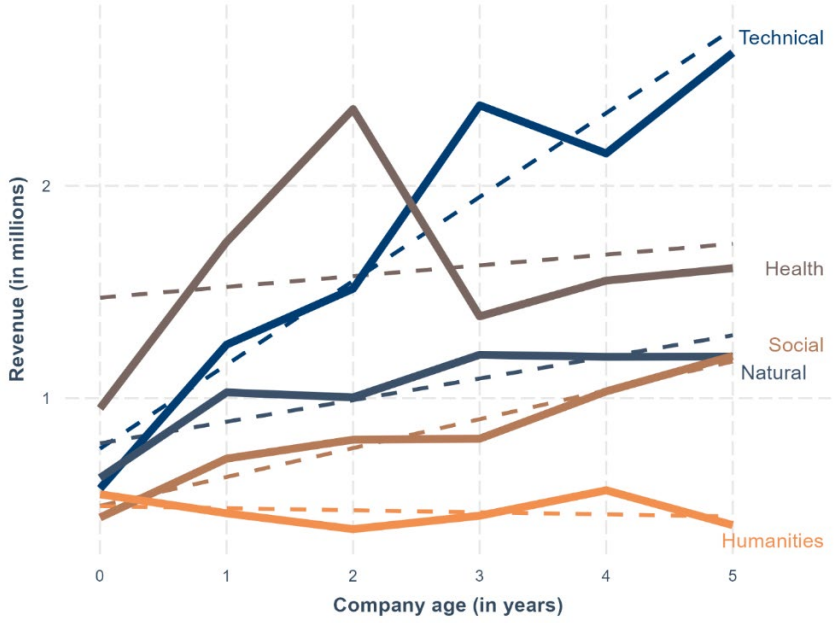


* Note: box shows revenue for 25th to 75th percentile.

Source: own calculations.

While it should be kept in mind that average values are thus not representative of startup firms overall, we have also examined developments in revenue over time. Figure 2.4 shows average revenue by company age. The figure does not show growth in average size over the first five years for humanities, while growth rates within natural and social sciences are similar.

Figure 2.4. Average revenue for startup firms in the first five years of establishment, by faculty



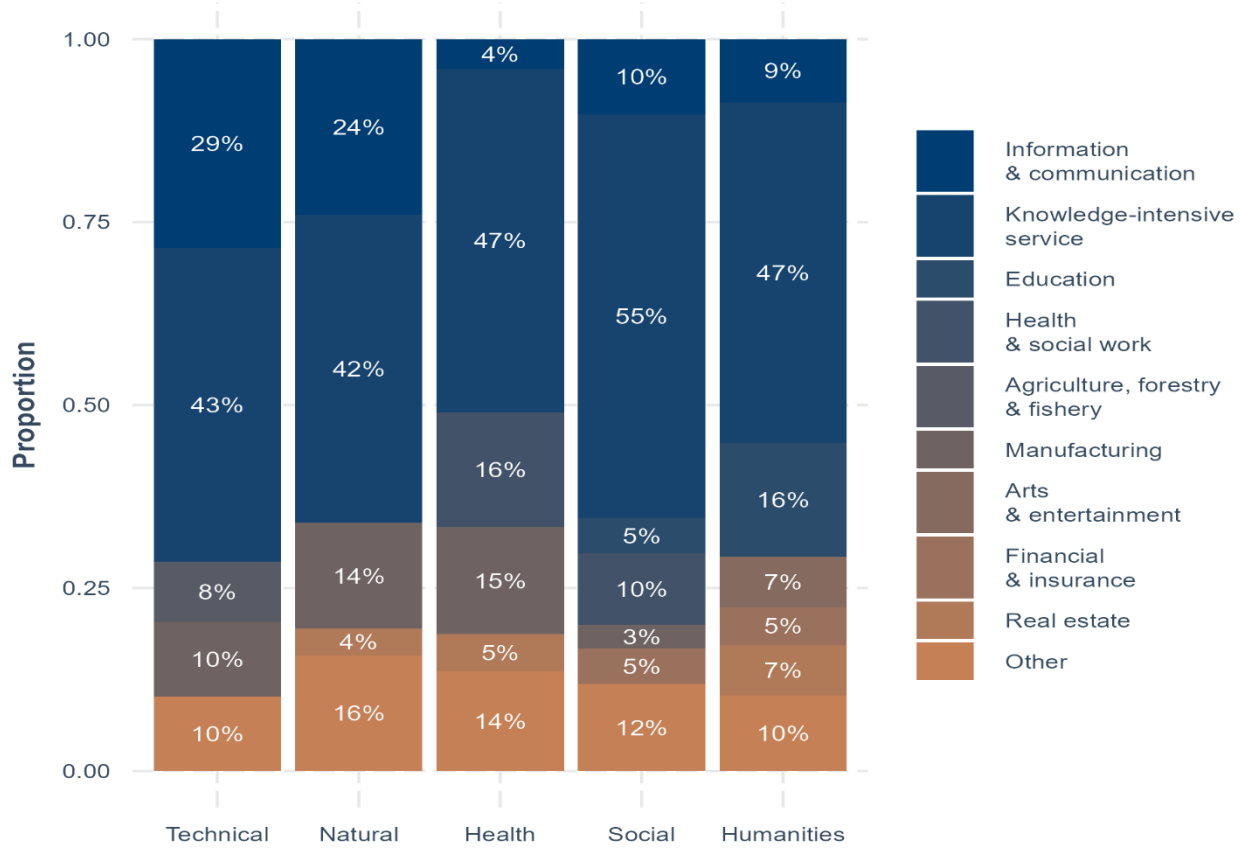
* Note: solid line shows actual average values, while dotted line shows trend over time.

Source: own calculations.

Researchers from a given field can start companies within a diverse range of industries. Figure 2.5 shows the distribution of startups across industries, using broad NACE Rev2 classifications. First, in all faculties, the highest share of startups is found within knowledge intensive services, which includes R&D services, technical and engineering consultancy, and management services. Shares range from 42% to 55%, with the highest share within social sciences. Around 10% of startups from the social sciences and humanities are within ICT services, which is lower than for the technical and natural sciences.

In contrast to other fields, both social sciences and humanities startups are found within the education sector, particularly for humanities with 16% of firms. In addition, both the social sciences and humanities have around 5% of startups in the financial sector.

Figure 2.5. Distribution of startup firms by industry and faculty



* Note: based on broad NACE Rev. 2 classifications. "Other" includes all industries with less than 3% of firms.

Source: own calculations.

2.5 Insights from interviews with Danish university representatives

The interviews with representatives from the Danish universities confirmed the picture drawn by the baseline study, namely that there is a wide spectrum of SSHA-based ventures and firms emerging from Danish SHAPE research. Services, products and research-based knowledge are traded in many different set-ups, depending on the characteristics and market context of the venture. Danish SHAPE ventures for instance pursue both market-based, supply-driven classical firm set-ups and, more often, person-embodied knowledge and abilities traded through sole proprietorships.

Especially the interviewees from the Arts field were in favor of a broad concept of commercialization, including person-embodied knowledge, and could illustrate such commercialization approaches with many examples, e.g. CAKI. They also had a positive perception of the SHAPE acronym. In contrast, the interviewees from social sciences had a more heterogeneous view on the use of the SSHA versus the SHAPE acronym to characterize their activities and struggled more to cover commercialization activities with just one term.

The variety and experiences with SSHA commercialization at the individual universities also indicate that universities may have unexplored potential for expanding SHAPE commercialization activities through increased, mutual learning. Many of the existing commercialization activities based on Danish SHAPE research take the form of single person companies, i.e. typically individual consultancies, lectures or counseling – and thus would not apply under the more restrictive British definition included earlier. Nonetheless, most of these single-owner companies go under the radar of the university technology transfer (TTOs) or knowledge exchange offices (KEOs).

3. Challenges and opportunities for academic researchers in commercialization of SHAPE research

In this chapter, we turn our attention to the growing body of knowledge that has emerged on the challenges and opportunities faced by SSHA researchers interested in pursuing commercialization of their research. Given the importance of the individual researcher in deciding whether or not to pursue research commercialization, understanding the obstacles and incentives to research commercialization is a necessary starting point for any effort to bolster the commercialization of research.

3.1 Challenges

The challenges identified in the scoping review are varied and by no means scarce. The studies considered here (Abreu and Grinevich 2013; Benneworth and Jongbloed 2010; Braesemann and Marpe 2023; Gascoigne and Metcalfe 2005; Hardy 2023; Hearn et al. 2004; Komp 2018; Rahman et al. 2021; Ulrichsen and Athanassopoulou 2024) all point to different challenges concerning commercialization of SSHA research, however, the ones discussed here are mainly the most frequently discussed across the full set of studies examined. These include challenges relating to the skills and knowledge of SSHA researchers, SHAPE's perceived incompatibility with commercialization, values, ethical and moral considerations, language and terminology, and the current university structures, i.e. (structural) context. As most challenges identified in the literature are described as reversible, addressing these barriers can foster increased or improved SHAPE commercialization.

Lacking commercialization skills and knowledge

Several papers and reports (Braesemann and Marpe 2023; Gascoigne and Metcalfe 2005; Hardy 2024; Komp 2018; Rahman et al. 2021) point out that SSHA researchers lack knowledge and skills for commercializing research, and that this is a significant challenge that deters them from engaging in commercialization work.

In some cases, this may reflect insufficient skills and knowledge of SHAPE commercialization in the TTOs or KEOs that support academics in efforts to commercialize their research. Like researchers, professional support staff in universities and other institutions of higher education may lack knowledge and experience with SHAPE commercialization (Braesemann and Marpe 2023). In other cases, researchers may simply be unaware of the help that is available. It is also possible that researchers have received help, but still find the commercialization process difficult to navigate.

One example of lacking knowledge has to do with how to adjust to the changed role of intellectual property (IP) in SHAPE. Established technology transfer practices in the STEM fields have traditionally been dominated by IP-centric approaches, i.e. commercialization efforts built on patenting of research-based inventions and then the subsequent sale or licensing of these patents to established firms or startups. IP plays a very limited role, however, in the commercialization of SHAPE research, as underlined in interviews with both Danish and international experts and practitioners.

Indeed, in a study conducted among 144 members of the Council for Humanities, Arts and Social Sciences (CHASS) networks in Australia, Gascoigne and Metcalfe (2005) found that many participants saw IP as a "minefield" (p. 30). They reported not knowing how to best protect their ideas, whether for instance the best route being taking a patent, being first to

market, or applying it for the public good. Furthermore, a lack of consistency concerning IP policy in general, not specifically for SHAPE research, across different institutions, combined with the researchers' lack of legal expertise, discouraged them from engaging in commercialization work. Almost twenty years later, while exploring a specific case of commercialization of tourism research in Australia, Hardy (2024) reached similar conclusions about the challenges posed by IP.

The aforementioned lack of knowledge and skills related to SSHA commercialization was a recurring theme in the literature identified in the scoping review. For instance, Hardy (2024) described how a team of tourism researchers, who later went on to commercialize their work and start a business, were so untrained in the commercial process and knew so little about it, that when they initiated their research, they had no intention of designing a commercial product, nor the imagination to recognize that their work could in fact be commercialized. This may be related to another one of Hardy's findings, namely that SSHA researchers working with commercialization experienced a lack of support from peers and, ultimately, their university, as so few SSHA researchers have gone through this process.

Similarly, building on the experiences of 35 individuals (junior and senior researchers in sociology, social psychology, economics, and theology in different EU countries; employees of innovation and commercialization services and of a chamber of commerce in different EU countries; members of the university administration at the departmental, university, and national level in different EU countries; and representatives of the German Research Foundation, the European Sociological Association, the European Alliance for the Social Sciences and Humanities, and the European Commission's Directorate-General Research and Innovation), collected through expert interviews and participant observations, Komp (2018) identified one of the disadvantages of a commercialization of sociological research as being "a lack of knowledge on research commercialization" (p. 656). Respondents described this as including knowledge of which products could be developed, how product development works, and where information on product development can be obtained.

Along the same vein, Braesemann and Marpe (2023) carried out two focus group workshops at Oxford University, one of which included seven members of the professional support staff, while the second consisted of seven social scientists from the university with hands-on innovation experience. These focus groups identified social scientists' lack of relevant business experience as posing a challenge to their engagement in commercialization work. More specifically, they described how social scientists are often experts within their respective fields and may be suited to drive their visions forward but are hampered by their lack of business experience. This is further complicated by the finding that a lack of success stories relating to the commercialization of SSHA research limits how researchers perceive their future possibilities relating to commercialization.

Based on 19 semi-structured interviews with senior academics and professionals involved with championing and supporting commercialization of research out of the social sciences in the UK, Rahman et al. (2021) also described a lack of commercialization knowledge in these disciplines. More interestingly, the authors touched upon the consequences of this lack of knowledge, arguing that it not only disincentivizes researchers from engaging with commercialization processes, but it also creates preconceived interpretations of incompatibility between SSHA research and commercialization. These are discussed in the next section.

The main takeaway from the studies cited above, which was echoed in the interviews with international experts and practitioners, is that a key barrier to SHAPE commercialization may be that researchers simply do not see the commercial possibilities of their research and/or lack the business skills with which to pursue such possibilities. While this is not limited to SSHA researchers, it is likely to be more common within the social sciences, humanities and arts than in STEM disciplines, which have a much longer tradition of encouraging and supporting research commercialization efforts.

Interviews with international experts and practitioners also underlined the challenges associated with lacking knowledge of tools and critical factors for SHAPE commercialization in both university innovation and entrepreneurial support structures and among SSHA researchers. Respondents therefore stressed the importance of building portfolios of successful cases of SHAPE ventures, identifying effective SSHA-suitable commercialization tools and making them widely available, promoting knowledge exchange among support staff and researchers, and offering training and courses for both support staff and researchers. Indeed, these have been key focus areas in for instance UK-based efforts to promote more SHAPE commercialization through e.g. the aforementioned Aspect network and ARC Accelerator.

A perceived incompatibility of SSHA research with commercialization

According to the literature, one of the challenges faced by SSHA researchers in the commercialization of their work has to do with a perception that the nature or underlying values of SSHA research are fundamentally incompatible with the process of commercialization. For instance, Rahman et al. (2021) stress that currently used metrics of research impact are not well suited for capturing the value of social science research. They go on to argue that most social science research is more abstract than applied, making it difficult to find commercial value. This perceived incompatibility, according to Rahman et al. (2021), creates a "mind-set barrier" which increases the difficulties for researchers to see commercial value in abstract social science research (p. 6).

Komp (2018) echoes this sentiment, arguing that sociological research specifically does not easily lend itself to commercialization, and that the sociologists who do participate in commercialization activities primarily work outside their core area of expertise.

International interview respondents described experiences which resonate with these findings from the scoping review, notably that many SSHA researchers lack awareness and good examples or role models of how their research can be applied and scaled using commercial mechanisms.

Culture, values, and ethical and moral considerations

Another challenge faced by SSHA researchers in relation to the commercialization of their research has to do with the culture in which they find themselves, as well as their own and peers' values and interests. This is directly related to different ethical and moral considerations having to do with the process of commercialization.

For instance, the aforementioned study by Gascoigne and Metcalfe (2005) found that researchers have different opinions about commercialization. Some of the respondents viewed their primary role as being teachers and researchers, and therefore did not seek out commercial opportunities. Others viewed commercial work as being "beneath them" and as having the potential to negatively affect the integrity of their research (p. 28). Furthermore, Hearn et al. (2004) raised the concern that the commercialization process results in the privatization of publicly funded research.

Along similar lines, Komp (2018) argues that the commercialization of sociological research raises ethical concerns, including whether such commercialization may increase social inequalities and social exclusion. The arguments presented by Komp reveal a concern among some researchers that commercialization may reduce the status of, in this case, sociological knowledge as a public good (2018, p. 656). Komp (2018) even argued that research commercialization may "endanger the scientific discipline of sociology", as sociology stresses subjectivity and the lack of one universal truth (p. 656).

Rahman et al. (2021) found that the mindset of many social scientists reflects a negative attitude towards the term 'commercialization', as it is seen to clash with the morals and ethics of social scientists. Interview participants described a perceived aversion to profit-making and the clash with the more "socially conscious" motivations that social scientists tend to embody (p. 6). Similar sentiments were described by Braesemann and Marpe (2023), who found that some researchers hold the view that "it is morally wrong to profit from your research in the humanities" (p. 14).

Language and terminology

As the discussion of values and ethical and moral considerations suggests, some researchers have negative associations with business-related terms such as 'commercialization'. In their interviews with individuals working with knowledge exchange and commercialization, Rahman et al. (2021) found that those interviewees working with social scientists avoid using such business-related terms. These interviewees also explained that they spend much of their time "explaining to social scientists that commercialization does not have to be a capitalistic endeavor that clashes with their moralities and ethics as academics and individuals" (Rahman et al., 2021, p. 6). This demonstrates, the authors argue, the important role played by language in openness towards commercialization among social scientists.

The role of language surrounding research commercialization is also addressed by Braesemann and Marpe (2023), who found that researchers in the humanities have a different language for innovation and commercialization. Participants in their focus groups stated that there is "a mismatch between the language used by commercialization and innovation-versed colleagues versus the understanding of people working in the humanities" (p. 14). Hence, when some SSHA researchers engage in commercialization work, they are faced with using a language that is not used in their respective fields.

This challenge was also described by international interview respondents who have learned through trial and error the importance of adapting their language to fit the preference of most SSHA researchers. This is crucial in order to discuss how to scale the impact of their research rather than to generate economic value from it.

University structure and lack of incentives

Some of the more concrete challenges experienced by researchers wishing to commercialize their work have to do with the university structures within which these researchers find themselves, including a lack of incentives to engage in commercialization. While not singular to the SSHA disciplines, such disincentives are likely to be more pronounced than in STEM disciplines, given the lack of policymaker and university focus on commercialization in the social sciences, humanities and arts.

Researchers employed at a university tend to have a broad range of obligations including e.g. participating in teaching and research activities. Ulrichsen and Athanassopoulou's (2024) study of SSHA commercialization at the University of Cambridge stressed that a

commercialization journey requires significant motivation, commitment and energy, which can be challenging to find when already working full-time.

Braesemann and Marpe (2023) also found that individual researchers are less likely to engage in commercialization work because they experience it as conflicting with other priorities, such as research, teaching and committee work. Similarly, through focus group interviews, Gascoigne and Metcalfe (2005) found that balancing commercialization activities with student and staff interests was identified as a problem by their participants. In fact, they found that the time constraints and amount of work imposed on full-time academics was the biggest impediment to engaging in commercial work, but also in their traditional academic work. Hence, many of the participants felt it unrealistic to take on additional work. Gascoigne and Metcalfe relate this to another finding from their focus groups, namely that a widespread view that the structure and frameworks of universities are "not conducive to commercial activities" (p. 31). Participants perceived universities as being unresponsive to the pace of commercial activity, with rigid legal and financial systems impeding collaboration with external parties.

Several of the studies identified in the scoping review also uncovered a perception that traditional career mechanisms in academia do not reward commercialization experience, further reducing incentives for researchers to seek to commercialize their work. Returning once again to Gascoigne and Metcalfe's (2005) study, focus group participants identified the way promotions are allocated within their universities as a "major barrier to commercialization" (p. 27). Because promotions in academia are dependent in large part on publication track records, and commercialization activities can take time away from research activities, the two can be difficult to unite, at least in the short term. Furthermore, focus group participants described a "limited recognition of many of their commercial activities" (p. 27).

Interviews with international experts and practitioners stress the importance of this challenge. SSHA researchers typically have high teaching loads and as mentioned in the previous chapter, often do not have research groups of their own to draw on for added resources and expertise. Commercialization work must be maintained alongside other research and teaching commitments, which is unrealistic in the long run. According to UK respondents, a crucial factor in the success of prior efforts to commercialize SSHA research has therefore been the ability to fund "buy-out", i.e. offer financial compensation to the university for pulling the researcher out of e.g. teaching duties, to allow them, for a time, to focus on driving commercialization efforts forward. According to respondents, such buy-outs are particularly vital when SSHA entrepreneurs need to hire and train new resources to allow them to expand the scale of their operations or offerings.

3.2 Opportunities

The literature identified in the scoping review pays more attention to challenges to the commercialization of SHAPE research than to the opportunities and benefits associated with commercialization work for SSHA researchers. The ones identified and discussed here include financial rewards, the participation in professional networks and gaining influence, and lastly, benefits to the individual researcher's career as well as to the university at which they are employed.

Financial rewards

Gascoigne and Metcalfe (2005) found that the financial reward from successful commercialization endeavors presented researchers with a number of opportunities in their professional life. For instance, focus group participants described their commercialized

projects as earning enough income to "subsidize research in other areas, buy equipment, pay staff salaries and attend conferences" (p. 22). Others identified this income as enabling them to pursue their own academic interests and afford them a degree of flexibility not otherwise possible. Lastly, questionnaire respondents described how they used their income from commercial work to "fund research, assist with student work, and provide them with independence from university structures" (p. 22).

Similar points were made in the interviews with international experts and practitioners, several of whom had experienced that SSHA researchers who engaged in commercialization work found that the entrepreneurial funding and, in some cases, income thus generated offered independence from research grants. The funding covered employment of e.g. early career researchers and research support staff, which supported not only the development of the SHAPE venture but also of the underlying research.

Networks and influence

The study conducted by Gascoigne and Metcalfe (2005) also identified benefits and opportunities associated with commercialization of research derived from the associated engagement with networks of researchers engaging in similar work, as well as networks consisting of professionals from outside the university. Participants in their study identified the opportunity for collaboration as one of the main benefits from commercial activities. Such collaboration could consist of working with people outside the university system, from government agencies, businesses or industry, as well as conducting research projects with colleagues from other disciplines. Furthermore, Gascoigne and Metcalfe (2005) found that, among their participants, commercialization was often driven by a desire to be relevant to government, industry or communities. For these researchers, the driving force for engaging in commercialization was not necessarily to gain support from these audiences, but rather the possibility of influencing ideas and the dissemination of knowledge for change.

Similar arguments were made in interviews with international experts and practitioners, who stressed the focus of many SHAPE researchers on scaling the impact of their research rather than realizing financial gain from the commercialization of their research.

Academic careers and university reputation

The studies identified in the scoping review pointed to the potential positive effects that commercialization can have on individual researchers' careers, as well as on the quality of their teaching, and therefore also on the university as a whole. This may seem contradictory, given that one of the challenges described earlier in this chapter was related to this risk that commercialization work can get in the way of researchers advancing in their academic careers. Nonetheless, while some saw commercialization as a disadvantage to their academic career advancement, other focus group respondents in Gascoigne and Metcalfe's (2005) study found engagement in commercial activities to be beneficial to their careers. Furthermore, questionnaire respondents reported that the improved skills and knowledge gained from commercial activities were "beneficial and could lead to expanded job projects", as well as resulting in a higher profile and improved reputation (p. 24).

In addition, Gascoigne and Metcalfe (2005) found that the engagement of researchers and teachers in commercial activities, including the development of relationships with industry, resulted in new possibilities for students, such as training opportunities in project management and business skills; networking opportunities to help students find jobs after graduation; establishing a link between universities and the industry so teachers have a better

understanding of industry needs; and providing guest lectures to give context to the courses (p. 24).

Also here, similar points were made in the interviews with international experts and practitioners who highlighted that SHAPE researchers who engaged in commercialization work often attract other benefits for their research and research career, including increased visibility within and beyond their institution of employment, but also a strengthened ability to attract large research grants due to their increased visibility and the demonstrated societal impact of their research.

3.3 Insights from interviews with Danish university representatives

The Danish interviewees revealed similar perceived barriers and challenges regarding SHAPE commercialization as those identified in the scoping review, although the Danish ecosystem for SHAPE commercialization remains somewhat immature compared to its counterparts in e.g. Sweden and particularly the UK.

As in the scoping review, the challenges identified in the Danish interviews refer to mindset and perceptions among SSHA researchers as major obstacles for commercialization. The role of language and terminology when discussing the commercialization of SHAPE research was particularly prominent in all interviews, with Danish interviewees repeating the findings from the literature, namely the widespread negative association of business-related language among (some) SSHA researchers.

However, a differentiated and tailored approach fitted to the SSHA field is reported to work well and to convince some researchers that commercialization is just a means to financing new research or spread new knowledge and make a difference for the surrounding community or world. Another challenge that can be addressed by universities is the lack of commercialization skills and knowledge among researchers. This can be strengthened through e.g. training and courses.

In addition to the lack of interest or desire to commercialize, another difficulty in the commercialization of SHAPE research described by the Danish respondents lies in the person-embodied nature of the underlying knowledge. This can be difficult to translate into a physical product, and as a consequence, this kind of research is more difficult to value.

Furthermore, SSHA researchers in Denmark are also concerned about the potential impact of spending time on commercialization on their research and academic publications.[1] The Danish universities have started a few joint as well as individual small-scale programs supporting commercialization in the SSHA field, for example Spin-Outs Denmark's translational postdocs for SSHA researchers (https://spinouts.dk/), or the new SHAPE proof-of-concept funding at Copenhagen University (https://lighthouse.ku.dk/nyheder/2024/ivaerksaetterstrategi/poc_pulje/).

[1] In Sweden for example, the Societal Impact Lab at Malmö University offer a year-long program for researchers wishing to commercialize their research. It is small in magnitude, currently designed to include five researcher participants, and the program itself consists of four modules introducing the participants to different business-related processes and skills. https://innovation.uni.mau.se/sil/

The opportunities associated with commercialization are less visible than barriers at this stage, however they appear to be gaining increased focus in university strategies. This corresponds well with interviewees generally advocating for using 'carrots' over 'sticks'.

The opportunities identified in the Danish interviews largely mirror those identified in the scoping review, including establishing potential financial rewards for researchers, securing time for research in parallel with the commercialization activities, and increased recognition of commercialization experience in connection with career advancement.

As the number of good practices and illustrative SHAPE venture cases increases in Danish universities, this sheds additional light on the potential positive effects of commercialization work on SSHA researchers' academic career and on the scale of societal impact from their research.

4. Recommendations for how to promote commercialization of SHAPE research in Denmark

As Chapters 1 and 2 indicate, the commercialization of SHAPE research is a nascent field, and challenging yet filled with unrealized potential and opportunities to increase the economic, environmental and societal impact of SSHA research. This final chapter summarizes key recommendations drawn from the scoping review and the interviews with Danish and international experts and practitioners to provide inspiration for possible next steps towards strengthening SHAPE research commercialization in Denmark.

4.1 Key takeaways from the scoping review

Competence development and networks

The findings presented in this report underline the importance of building knowledge and skills in SHAPE research commercialization among both researchers and technology transfer and knowledge exchange professionals.

For researchers, this can include training in basic business and commercial skills (Gascoigne and Metcalfe 2005) to help social scientists acquire the necessary entrepreneurial and commercial skills and tools to develop their ideas into commercially viable products and services, and to build their capability to run more commercially focused organizations and initiatives (Ulrichsen and Athanassopoulou 2024). It can also include exposure to real-life examples of SHAPE commercialization, where focus is on communicating what the commercialization process was like, how it can be applied to different projects, as well as what the pros and cons experienced by researchers (Hardy 2024). Moreover, networks can offer opportunities for researchers to locate mentors, co-founders and other individuals who can provide advice and expertise, such as entrepreneurs with successful experience in commercializing social science research (Ulrichsen and Athanassopoulou 2024)

With regards to competence development for professional support staff, both training and networks are also effective tools, with a view to e.g. fostering learning about SSHA research and researchers (Abreu and Grinevich 2013) and sharing experiences to develop skills and best practices, particularly as professional support staff can be quite isolated from peers in their day-to-day-work, limiting their access to knowledge sharing and collaboration (Rahman et al. 2021).

Promote awareness of the benefits of SSHA research commercialization

The literature also points to the importance of raising awareness of the value and potential impact of bolstering the commercialization of SSHA research as well as diffusing good practices. Rahman et al. (2021), for instance, suggest creating promotional material in the form of in-depth case studies of commercialization cases, to highlight good practices and distill learnings from successful as well as failed activities. Target audiences for promotional material include knowledge exchange professionals, but also e.g. academic researchers, the public, policymakers and potential industry partners, emphasizing not only financial but also broader societal benefits from application of SHAPE research (Gascoigne and Metcalfe 2005), the value of which is often overlooked or underestimated (Benneworth and Jongbloed 2010).

Develop appropriate metrics for monitoring activity and performance

Rahman et al. (2021) argue that the metrics currently used to measure impact of knowledge exchange and research commercialization are poorly suited to capture key activities and impact of SHAPE commercialization. Among other things, they suggest metrics should capture not only venture formation and IP-based technology transfer but also activities such as consultancy.

Strengthening incentives to commercialize

The literature also recommends strengthening incentives for SSHA researchers to commercialize their research, given the lack of incentives discussed in Chapter 2. For instance, Ulrichsen and Athanassopoulou (2024) call for strengthening incentives for and legitimacy of research commercialization in social science departments, as well as removing structural barriers to engage in social science commercialization, arguing that contractual issues make it harder for social scientists to engage in commercialization. On a related note, Gascoigne and Metcalfe (2005) proposed that universities and funding agencies should provide clear guidelines on consultancy and other external work and specifying how the financial rewards from commercial work are shared between researchers and the university, and that researchers should be provided with more support and released from normal duties to engage in industry collaboration and commercial work. Similarly, Hardy (2024) proposed funding programs allowing researchers to buy out of their teaching obligations for a specified time period, which she documented had a positive effect on researchers' will and ability to commercialize research. Ulrichsen and Athanassopoulou (2024) also stress the need for funding to support the commercialization process, including for buy-out to allow social scientists to commit to the commercialization process. Lastly, Rahman et al. (2021) suggested developing funding specifically for SHAPE commercialization, which should include "translational and KE activities; to support the seed and/or scale up of social sciences start-ups and to support recruitment of experienced KE professionals with industry background" (p. 15).

4.2 Good practices for promoting SHAPE commercialization

While the interviews echo the takeaways from the scoping review, they also underline the importance of the combined ecosystem in successful commercialization of SHAPE research. While the importance of structural support and framework conditions does not seem SHAPE specific, they need to be tailored to the SHAPE challenges in order to promote SHAPE commercialization. Hence, tailored initiatives shall, among others, include

- A well-functioning, dedicated SHAPE-targeted innovation, and especially entrepreneurship, program to promote the commercialization of SHAPE research
- Targeted SHAPE funding or financing, ranging from internal funding sources and startup support, to buyouts, loans and investor finding, e.g. proof-of-concept or structural facilities
- A tailored SSHA commercialization terminology in the form of cultural and value factors, i.e. incentivized through a tailored articulation of what SHAPE commercialization means

A well-functioning SHAPE ecosystem needs both the two first systemic initiative types as well as the last person-born initiative type to succeed.

Because social capital is such an important facilitating factor for SHAPE commercialization, nudging seems to be a more important initiator than top-down announced demands. Culture and values are therefore necessary to have in place and articulate, even if it is not sufficient in itself to initiate commercialization. A clear top-down support in the ecosystem as well as

passionate and experienced entrepreneurial zealots are apparently still necessary facilitators to initiate or augment commercialization of SHAPE research.

Although good practices are limited in a field as immature as the field of SHAPE research commercialization, there is inspiration to gain from environments with more experience. While UK insights and experiences have been mentioned throughout the report, box 4.1 provides a more coherent description of some of the main initiatives related to SHAPE commercialization in the UK.

Box 4.1. Inspiration from UK efforts

As mentioned throughout the report, the UK has had almost a decade of concerted efforts to strengthen awareness of and support for commercialization of SSHA research.

The introduction of the SHAPE acronym was a step in this process, aimed at creating a strong and recognizable counterpart to the well-known STEM acronym. A key catalyst in the overall UK process to strengthen the commercialization of SHAPE research was the establishment of the Aspect network. The network was launched in 2018 with funding from Research England's Connecting Capability Fund as a platform for uniting individuals and organizations with a shared interest in entrepreneurship, commercialization and societal transformation based on SSH-based research. In 2023, the network transitioned into a member-funded organization.

Since 2018, Aspect has provided a forum for sharing experiences with SHAPE commercialization across UK institutions; funding for collaborative projects producing outputs and resources to be shared by the member community, and training to academics and professional service staff. Aspect has been an active platform for advocacy to raise awareness and funding in support of commercialization of SHAPE research in the UK and internationally.

Aspect provides funding for projects aimed at testing ideas and piloting new tools for SHAPE commercialization, on the condition that the projects be collaborative between members and the results had to be freely shared with the network via a dedicated online platform. In the first years of operation the funding available for collaborative projects was substantial, and its current member-funded form, this is reduced to provide seed funding for members to engage in exploratory projects and develop applications for larger grants.

Aspect also played a key role in the development of the SHAPE-focused Aspect Research Commercialisation (ARC) Accelerator and the annual reSHAPE conference on the impact of SHAPE aimed at entrepreneurs, investors, high-level policymakers and other key stakeholders in the British research and innovation ecosystem.

According to interview respondents, Aspect played a key role in establishing a community connecting people dedicated to scaling the impact of SHAPE research. It also helped connect fragmented 'pockets of activity' across institutions, as one respondent phrased it.

Such collective action has been central in enabling for more effective and efficient efforts to support SHAPE commercialization at UK institutions. As several UK interview respondents pointed out, SHAPE commercialization case pipelines are small, and in almost all cases too small in any given university to warrant substantial investment or efficient research commercialization support. This calls for the development of a joint pipeline and a common,

centralized infrastructure that can support SHAPE commercialization across institutions, like Aspect and the ARC accelerator.

ARC, which is run via funding from the UK research councils (through the joint ESRC/AHRC SHAPE Catalyst program, which runs from 2023-2026), is an acronym for Aspect Research Commercialization'. The ARC accelerator has developed four offerings for SHAPE entrepreneurs, ranging from short online 'Discover' sessions allowing potential entrepreneurs to build knowledge of SSHA commercialization and inform their decision about whether or not to move forward with efforts to scale the impact of their research to a 'Accelerate' – a focused, 6-month accelerator program for selected cases, which includes funding for, among other things, buy-out of entrepreneurial scientists. This latter option has, according to interviews, been crucial for ARC to be able to engage researchers in commercialization projects.

The general takeaway from UK interviews is that it takes time to build SSHA/SHAPE researchers' knowledge of and experience with research commercialization processes, as well as experimentation and the dissemination of shared learnings. Also, support staff need to work with researchers over an extended period of time to develop and identify high-potential cases. The ARC accelerator's staged offerings were developed to enable longer-term engagement and gradual ramping-up of mutual commitment levels and resource investment in a given case, whilst Aspect's ongoing training and collaborative projects produces tools and resources that can benefit the community and those they partner with.

4.3 Recommendations: possible next steps for Danish universities

International interview respondents were asked what advice they might have to offer to Danish universities. Their main recommendations can be synthesized as follows:

- **Find champions.** Several UK respondents highlighted the role of strong individual advocates in driving the SHAPE research commercialization agenda forward, gathering a community, engaging university leaders and other key stakeholders, and attracting resources in the UK.
- **Maintain a common network** to connect institutions, individuals and initiatives focused on SHAPE commercialization, establish a common language around it, share knowledge and tools, identify best practices, raise awareness of and resources (e.g. from public/philanthropic sources or from potential investors in SHAPE ventures) for SSHA commercialization within the broader ecosystem, and potentially coordinate training and offer seed funding for joint activities. Such a network is crucial to ensure that 'pockets of activity' are connected, can grow and be sustained, and eventually become embedded as permanent fixtures in universities' innovation and entrepreneurial ecosystem, the way support for STEM spinouts has become institutionalized over the past 20-30 years in Europe. As one respondent pointed out, without this type of permanency of activities and investments, activities are the first to be cut when university budgets have to be adjusted, so dedicated funding is crucial to maintain university commitments over time. The network. could be established as an add-on to the existing Open Entrepreneurship platform and potentially linked up to international networks like Aspect.

- **Establish a joint pipeline and a centralized infrastructure** to support its development, either developing customized commercialization support for Danish cases and/or tapping into existing international offerings such the ones from ARC. Interview respondents stress that building an effective centralized infrastructure requires years of sustained investment and recommend starting small (i.e. gradually building experience, e.g. through pilot activities, and allowing for adjustments to the infrastructure before scaling it) and developing a clear and convincing five-year plan to pitch to potential public and philanthropic funders. The plan should lay out feasible and appropriate goals and targets and a realistic path for attaining these. The plan should also connect efforts to support SHAPE commercialization to current priorities in policy and politics, e.g. addressing relevant societal challenges in e.g. public health or green transitions through effective scaling of SSHA-based solutions and insights.
- **Do not overemphasize for-profit spinouts** as the only or preferred path to scaling. As stated in Chapter 1, there are many possible mechanisms for scaling SHAPE ventures, from traditional for-profit ventures to non-profit organizations, and various mechanisms for scaling activities while retaining the research and research group at the university. Overemphasizing spinouts at the preferred commercialization route may ultimately lead to less optimal solutions.
- **Develop appropriate metrics to track activity and results.** As mentioned earlier, metrics for assessing performance on and of STEM startups cannot be transferred to SHAPE startups, given the many differences between the two, as detailed earlier in this report. Appropriate metrics, which are suitable for SHAPE startups and consider the broader spectrum of commercialization mechanisms that can be used to scale the impact of SSHA research, should be developed.

The interviews with representatives of the Danish universities confirmed that their institutions are generally all at the start of a journey towards a building a functioning ecosystem for supporting commercialization of SHAPE research. Key focal areas included experimenting with SHAPE-oriented activities and tools but also creating positive interest in commercialization work among SSH scientists, ideally through 'bottom-up nudging' rather than top-down imposed requirements. This includes increasing awareness of the opportunities offered by SHAPE commercialization work but also addressing concerns about the challenges and potential risks for academic researchers.

The Open Entrepreneurship taskforce and the project that commissioned this report offer a promising starting point for raising awareness of the potential of supporting SHAPE commercialization in Denmark, attracting resources, and coordinating next steps. While Danish universities show a preference for developing their own in-house approaches to supporting knowledge exchange and research commercialization, the small scale of SSHA commercialization case pipelines make it necessary to develop a joint foundation consisting of a common language and an evolving centralized infrastructure to support SHAPE commercialization. For instance, for starters, courses and training offerings aimed at both support staff and researchers could be jointly developed and coordinated. It's also unlikely that an accelerator program could be sustained by any one institution; but a national program could be realistic when a sufficient pipeline has been established across the eight universities.

5. Methods appendix

5.1 Scoping review

The present desk study builds on a scoping review of selected scientific and gray literature, and a dozen interviews with experts in the SHAPE field.

Using systematic as well as handhold literature search, a relative scarce number of contributions were found. The literature covered primarily from the UK with a few exemptions covering countries with UK inspired educational systems, i.e. former UK colonial countries. As the search has character of a scoping review, the search was limited and ended with 12 articles on SHAPE commercialization, which could contribute to answering the questions in sections 1 - 3. Additional to this, a number of mainly UK-based initiatives, and centers, were identified. However, these sources were mainly informative, illustrative, and inspirative, and not peered academically founded research literature, i.e. often not even the character of grey literature.

The identified literature was relatively common in its conclusions on perceived and experienced challenges, opportunities, recommendations and characteristics concerning SHAPE-based commercialization and form the backbone in this report.

5.2 Baseline study of Danish SSHA-startups

The baseline study should be seen as a brief, preliminary examination of startups based on existing data and approaches for defining startups and not necessarily as an analysis of data or approaches tailored to suit a study focused specifically on SHAPE ventures. Hence, new and more detailed analysis especially targeted at the SSHA field, would provide additional insight to the results here.

This preliminary baseline study draws on data collected for an analysis conducted by IRIS Group (2022) to identify and describe all startups from five Danish universities (AU, SDU, KU, DTU and CBS) over the period 2008-2019.

The data used here only includes startups established by university employees, and thus excludes startups created by students or recent graduates. We apply the same conventions as used in IRIS Group (2022), where university employees must have been employed at the university within two years of the registration of the startup and must have had at least activity corresponding to ½ FTE at some point in time since its establishment. The data used here exclude startups based on university ownership (spinouts). Based on the available data, it was not possible to identify which faculty the spinouts originate from.

5.3 Interviews

Eight semi-structured interviews with Danish experts from Danish universities' support offices for (SHAPE) research commercialization were performed.[2] The outcome relates the literature-based findings from the scoping review with practice-based experience in the Danish context. The interviews concerned definitions and framings of SHAPE-based commercialization as well as its relevance in a Danish knowledge-producing ecosystem. Furthermore, the interviews

[2] This also includes an expert from the seven arts educations under the Ministry of Culture.

contributed with examples of former, ongoing and coming initiatives as well as illustrative cases of successful SHAPE-based commercialization.

Finally, seven semi-structured interviews were conducted with eight foreign experts representing agenda-setting institutions from Sweden (three interviews with a total of three respondents) and UK (four interviews with a total of five respondents). While the outcome represents state-of-the-art knowledge on commercialization of SHAPE research, the interviews also contribute with inspiration for initiatives and framings in the Danish context. The UK appears to be a frontrunner on SHAPE-based commercialization that can contribute with examples of cases as well as good practices and effective policy framings (at least in a UK context).

The Swedish interviewees represent another structural context, where commercialization of SHAPE research at universities is prioritized and set in system.

All interviews were conducted during the period May-July 2024.

Box 5.1. Interview respondents

Denmark	• Jens Frede Rasmussen, Business developer and special consultant, Aalborg University • Bettina Veneman, Project leader, Copenhagen School of Entrepreneurship • Jonas Brandt, Head of Business Development, Aarhus University • Nicoline Løvenskjold Guldsing, Business developer, University of Southern Denmark • Rune Egedal Westergaard, Special consultant, Roskilde University • Peter Ibsen, Special adviser, IT University of Copenhagen • Pernille Skov, Co-founder and development consultant, Centre for Applied Artistic Innovation • Anne Dvinge, Innovation partner, University of Copenhagen
UK	• Julia Black, Strategic Director of Innovation and Professor of Law, LSE, and Sean Farran, Head of Advocacy and Communications, ASPECT • Tomas Coates Ulrichsen, Director, University Commercialisation and Innovation (UCI) Policy Evidence Unit at the University of Cambridge • Julian Jantke, Director, ARC Accelerator • Melanie Knetsch, Deputy Director of Innovation and Impact, ESRC
Sweden	• Donnie Sc Lygonis, Business development coach, KTH Royal Institute of Technology • Jenny Nordquist, Head of division, Uppsala University • Charlotta Nordenberg, Head of unit, Malmö University

Furthermore, the authors met and discussed SHAPE commercialization with Chris Fellingham and Frida Koslowski from ARC Accelerator, UK, both presenting insights on how to accelerate a SHAPE ecosystem, at a full-day Open Entrepreneurship project workshop June 11th, 2024, in Odense. Insights from the workshop have informed the present report.

6. References

References included in the scoping review

Abreu, M., and Grinevich, V. (2013). The nature of academic entrepreneurship in the UK: Widening the focus on entrepreneurial activities. Research Policy, 42(2), 408-422. https://doi.org/10.1016/j.respol.2012.10.005

Benneworth, P., and Jongbloed, B.W. (2010). Who matters to universities? A stakeholder perspective on humanities, arts and social sciences valorisation. Higher Education, 59, 567–588. https://doi.org/10.1007/s10734-009-9265-2

Braesemann, F., and Marpe, M. (2023). How to foster innovation in the social sciences? Qualitative evidence from focus group workshops at Oxford University. Papers 2309.06875, arXiv.org.

Gascoigne, T., and Metcalfe, J. (2005). Commercialization of research activities in the humanities, arts and social sciences in Australia. CHASS Occasional Papers No. 1. https://www.tossgascoigne.com.au/pdf/32.Commercialization_in_humanities_arts_and_social_sciences.pdf

Hardy, A. (2023). Commercializing tourism research: the potential, perils and paradoxes for researchers. Current Issues in Tourism, 27(4), 670-678. https://doi.org/10.1080/13683500.2023.2198690

Hearn, G., Cunningham, S., and Ordoñez, D. (2004). Commercialization of Knowledge in Universities: The Case of the Creative Industries. Prometheus, 22(2), 189-200. https://doi.org/10.1080/0810902042000218364

Komp, K. (2018). The commercialization of sociological research: on the how and why (not). European Societies, 20(4), 644–664. https://doi.org/10.1080/14616696.2017.1405059

Rahman, S. A., Wallace, P., and Vorley, T. (2021). Commercialization of Research out of Social Science. Innovation Caucus. https://innovationcaucus.co.uk/app/uploads/2022/12/CROSS-Report_7Dec22_LD.docx-1.pdf

Ulrichsen, T.C., and Athanassopoulou, N. (2024). Commercialising Social Science Research: Insights from the University of Cambridge on key barriers, enablers and pathways to success. Report by the Policy Evidence Unit for University Commercialization and Innovation and IfM Engage. University of Cambridge: Cambridge, UK. https://doi.org/10.17863/CAM.107657

Additional references

IRIS Group. 2022. Når forskning og uddannelse bliver til nye virksomheder. https://irisgroup.dk/wp-content/uploads/2022/06/Na%CC%8Ar-forskning-og-uddannelse-bliver-til-nye-virksomheder.pdf