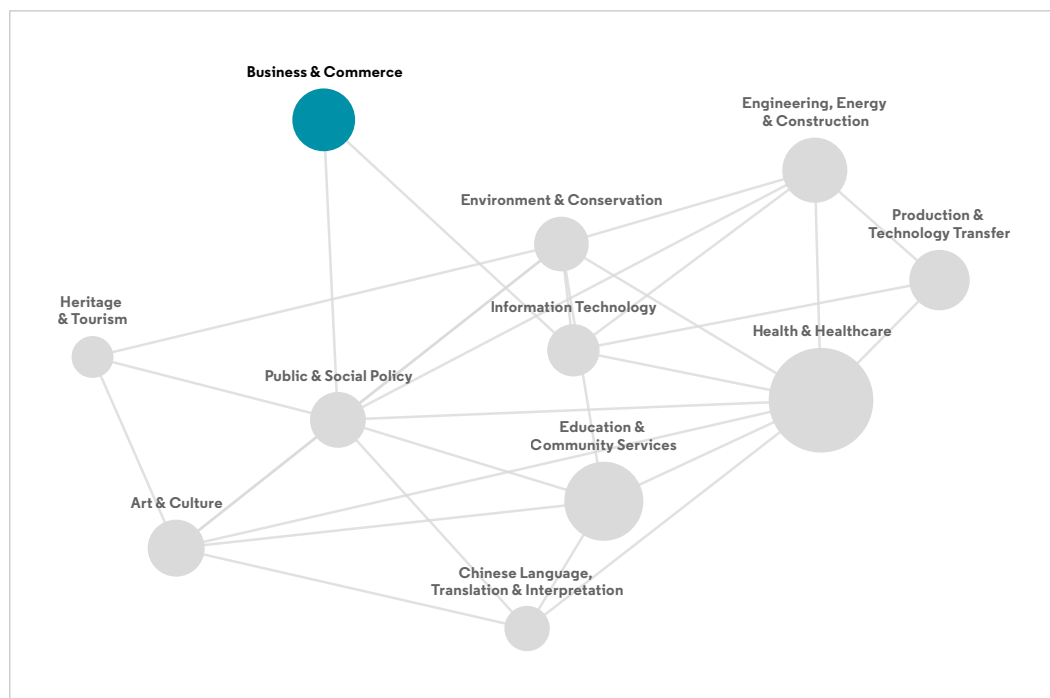




The societal impact of research undertaken by Hong Kong universities:

Business & Commerce

A synthesis of the RAE 2020 impact case studies



Partnered with:



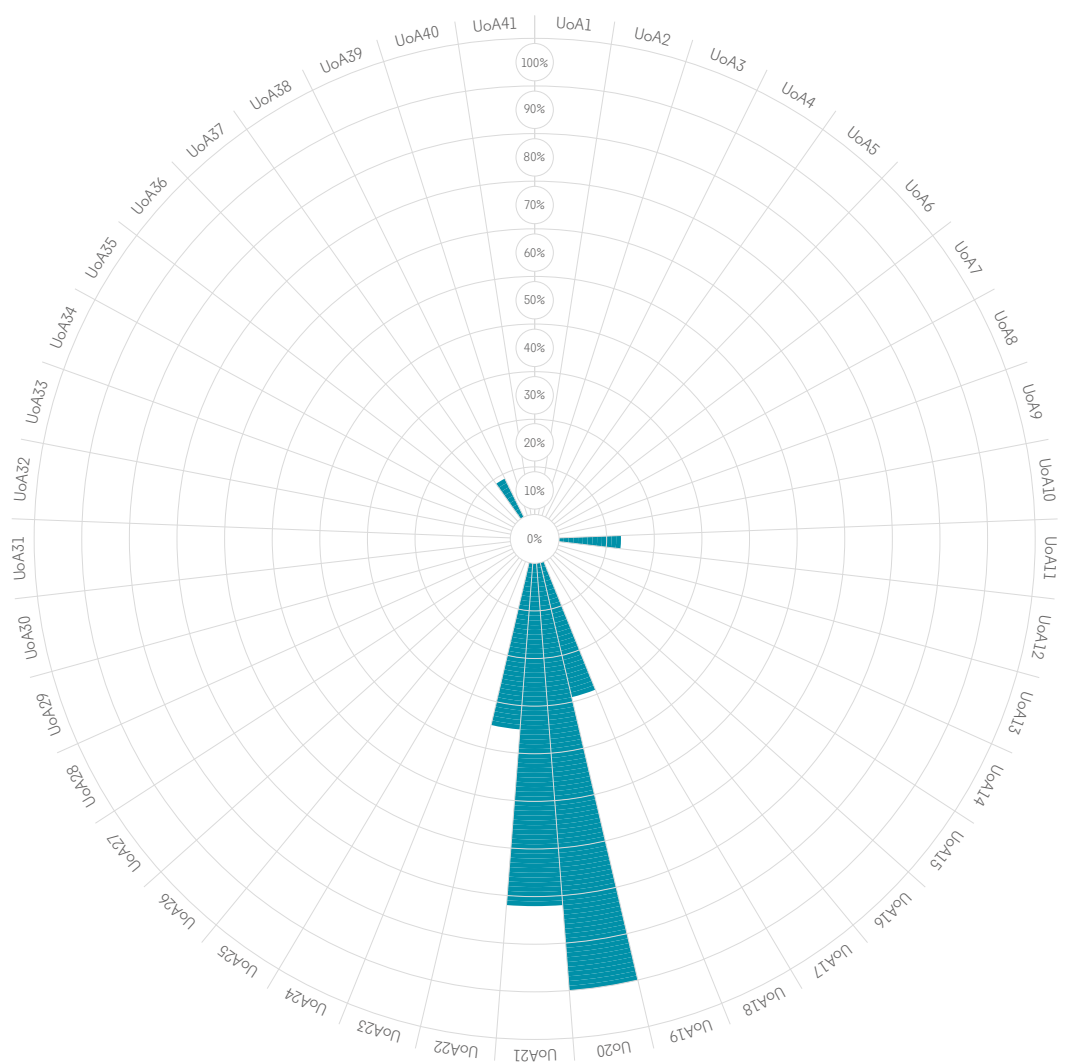
This report is part of a series of outputs that examines the impact of research arising from eight universities based in Hong Kong and funded by the University Grants Committee (UGC). The report focuses on the Impact Case Studies (ICS) produced by the UGC-funded universities as part of their response to a Research Assessment Exercise (RAE) in 2020. The overarching report - *The impact of research undertaken by universities in Hong Kong: A synthesis of the RAE 2020 impact case studies* – is accompanied by 11 thematic reports that examine the nature of research impact in different areas, ranging from Arts & Culture to Health & Healthcare. The 342 impact case studies that are analysed through this body of work are also available on a searchable database that is posted on the UGC’s website.

The Business & Commerce cluster contains 35 impact case studies from three primary topics identified in the topic modelling.¹ The cluster represents 10% (i.e. 35/342) of the case studies submitted to RAE 2020.

The impact wheel in Figure 1 illustrates how the Business & Commerce cluster is distributed across the 41 Units of Assessment (UoAs) used for RAE 2020. Not surprisingly, for UoA 20 (accountancy), nine of the ten the ICS (i.e. 90%) submitted to the UoA were in the Business & Commerce cluster.

Likewise, 13 of the 18 (72%) ICS submitted to UoA 21 (economics and finance) and eight of the 23 (35%) submitted to UoA 22 (business) were also in this cluster, along with two out of seven (29%) for UoA 19 (law), two out of 15 (13%) for UoA 11 (mathematics and statistics) and one out of eleven (9%) for UoA 38 (visual arts, design, creative media, other creative arts and creative writing). The fact that the 35 ICS came from only 6 UoAs meant that the Business & Commerce cluster was one of the most concentrated across the eleven clusters that were reviewed.

Figure 1: Impact wheel for the Business & Commerce cluster (n=35)



¹ See methodological annex for details.

The impact of Hong Kong universities' research: **Business & Commerce**

Table A shows the most salient features of the case studies in terms of beneficiaries, location, type of impact and time lag. It gives the percentage of case studies in this cluster that were tagged with sub-codes under these code headings, as well as the percentage of case studies tagged with those sub-codes in the entire sample of 342.

The 35 case studies in this cluster benefited three key sectors under the classification of the Hong Kong Standard Industrial Classification: 51% benefited Financial and insurance activities, 43% Professional, scientific and technical activities and 17% Public administration. The key socioeconomic group were citizens/communities (17%), university students (3%), and marginalised and minority communities (3%). The key decision taker groups that were involved were the private sector (74%), government departments/agencies (25%) and NGOs/third sector (26%). Beyond Hong Kong (83%)

and Mainland China (6%), these case studies primarily had an impact in the United States (31%) and Singapore (17%). The most salient type of impact was changing practitioners' attitudes, behaviours, or knowledge (74%), followed by informing procedure, practice or protocol (57%), informing government guidelines or strategy (51%) and service or product in regular use (40%). On average, the research in this cluster was started in 2010, compared to 2006 for the whole sample. The median publication date for this cluster was 2016, slightly later than the median for the whole sample (2015).

On reading the ICS in the Business & Commerce cluster it was evident that most of the ICS could be grouped into three main subthemes: organisations and businesses; economic and financial policy; and financial and economic practice.

Table A: Some salient features of research impact identified in the Business & Commerce cluster (n = 35)

Beneficiaries of impact (top mentions)	% of <u>cluster</u> impact case studies	% of <u>all</u> impact case studies
Hong Kong Standard Industrial Classification		
Financial and insurance activities	51%	8%
Professional, scientific and technical activities	43%	13%
Public administration	17%	14%
Sociodemographic group		
Citizens/communities	17%	17%
University students	3%	6%
Marginalised and minority communities	3%	6%
Decision taker group		
Private sector	74%	30%
Government departments/agencies	34%	31%
NGOs/third sector	26%	17%
Location of impact		
	% of <u>cluster</u> impact case studies	% of <u>all</u> impact case studies
Hong Kong	83%	75%
Greater Bay Area (excluding Hong Kong)	0%	3%
Mainland China (excluding Hong Kong and GBA)	6%	12%
United States	31%	32%
Singapore	17%	13%
Type of impact (top mentions)		
	% of <u>cluster</u> impact case studies	% of <u>all</u> impact case studies
Change practitioners' attitudes, behaviours or knowledge	74%	31%
Inform procedure, practice or protocol	57%	52%
Inform guidelines or strategy	51%	27%
Service or product in regular use	40%	28%
Elapsed time		
	<u>Cluster</u>	<u>All</u>
Median year of research commencement	2010	2006
Median year of publication date	2016	2015

Organisations and businesses

One key area of impact relates to organisations and businesses. One ICS details the substantial influence the research team at Hong Kong Baptist University has had on the corporate governance practices and policies of regulators, policy makers, and the business sector in Hong Kong and Mainland China. This work has raised the standards of best practice promoted by professional associations, contributed to improving the practices of publicly listed companies' corporate governance, and been incorporated into the educational materials for corporate governance seminars held by professional associations. Another ICS described corporate social responsibility (CSR) research at Hong Kong Baptist University which has aided financial institutions in incorporating CSR practices into credit quality assessment and decision-making; inspired exporting businesses in the Greater Bay Area to invest in CSR practices and boost competitiveness; and promoted CSR practices amongst practitioners. Two cases detailed influence on knowledge management and transfer in organisations. The first detailed how research conducted by City University of Hong Kong improved knowledge management practices and important indicators of overall company success in several organisations. The second detailed research by The Polytechnic University of Hong Kong, which addresses information asymmetry issues, led to improvements in information transfer for practitioners and shifts in disclosure policy. Another ICS in this category provides details of the Hong Kong Pay Level Survey (1995 and 2018), which was carried out at the Hong Kong Baptist University. This research had a direct impact on the decisions made by Hong Kong organizations regarding their annual pay adjustments and reward strategies. It also had an influence on the practice of reward management and helped to increase the effectiveness of organizational procedures.

Two case studies provide insights into impactful research on leadership. The first describes how leadership research by The Hong Kong Polytechnic University improved productivity and innovation and lowered employee turnover. This work led to one large company reducing staff turnover by 36% and another increasing employee proactivity and patent applications by 50%. The second describes how people-oriented leadership practices developed by Lingnan University increased the effectiveness of a range of companies. From this work, a dairy manufacturer and retailer saw increased sales and better organizational development, technology start-up companies benefited from improved internal hierarchies, knowledge sharing and integration, and an auto parts manufacturer saw increases in productivity and cost control. A related ICS describes how research from City University of Hong Kong provided family governance, ownership design, and succession planning advice to businesses and their owners in Asia. These interventions, plus working with the International Financial Corporation of the World Bank Group to design and implement specialized ownership mechanisms and governance structures for nationally significant Southeast Asian businesses, which has improved their productivity and viability. Another ICS details business models developed by The Polytechnic University of Hong Kong, which helped transform two Guangdong companies into top brands in Mainland China's furniture industry. The first company, Shangpin, saw revenue increase by over 400% and now stands at over HK\$7b (cUS\$0.9b), and the second company, Victory, saw revenue increase by 70% in the relevant part of its business. A final ICS in this category relates to research on cutting-edge management techniques in Asia. Researchers from The University of Hong Kong created teaching cases to fill the gap in the market for research-based instructional materials related to Asian business. These cases are used by colleges, businesses, government agencies, and other organizations, with yearly sales of over 110,000 copies to over 170 countries.

Economic and financial policy

One area of impact relates to economic and financial policy. In the first of these, researchers at the Hong Kong Baptist University developed novel economic policy uncertainty indices for Mainland China, Hong Kong and Macao. These have been used by the Hong Kong Monetary Authority, the Hong Kong Government Economist, and the Monetary Authority of Macao to enhance economic assessment, forecasting and surveillance. In the second, researchers were involved in the development of the City University of Hong Kong, Hong Kong Consumer Confidence Index, which measures consumers' confidence towards various economic and investment environments in Mainland China, Hong Kong, Taiwan and Macao. In another ICS, research from the City University of Hong Kong influenced thinking on exchange rate dynamics and Mainland China's foreign exchange policy. A fourth ICS, by City University of Hong Kong provides details of macroeconomic research on the housing market and related policy implications. Another ICS showcases The Hong Kong University of Science and Technology's research on telecommunications policy, which influenced cross-border trade agreement between Hong Kong and Mainland China. This work informed senior government policymakers locally and nationally and contributed to economic impact following the opening up of this sector to Hong Kong investors. A sixth, by The University of Hong Kong, was influential in the development of government policies on a Local Markets Programme to stimulate economic activities in newly developed districts and in the creation of a social enterprise for marketing and entrepreneurial capacity building for over 200 low-income women. One interesting ICS in this category details the work of researchers at Lingnan University, which has generated a wide range of research results that have impacted the evolution of competition policy. By creating several significant regulations for Mainland China's 2018 Anti-Monopoly Law, the research has also produced direct effects on competition law enforcement in Mainland China. The merger control regulations that were developed have been

used to evaluate more than 3000 merger notice cases since 2018 and this research has led international best practice in the field.

Several other case studies also described impacts economic and financial policy. The first of these showcases research from The Hong Kong University of Science and Technology arising from an appointment at the Bank for International Settlements (BIS), which serves central banks in 60 member countries (representing 95% of the world's GDP). This work influenced policy discussion among central banking sector leaders at the 2016 BIS and Bank Negara Malaysia conference and through BIS publications and briefings to policymakers. A second ICS informed an important element of the Dodd-Frank Act in the USA, which regulates executive management rewards of listed companies. The research conducted by The University of Hong Kong informed debate on the regulation of management, accounting and regulatory professionals and investors. A third ICS detailed research by City University of Hong Kong that developed practical law reform recommendations that were adopted by the China Securities Regulatory Commission, the Shanghai Financial Court and the HK Securities and Futures Commission. A key impact from this work is that investors can now more easily bring security-related civil suits and obtain compensation remedies for the harm caused by securities misconducts. Another gives details of research from The Hong Kong University of Science and Technology on executive compensation, independent directors, and dual class shares, which has directly informed policy discussion by the world's largest asset manager, Blackrock, and other stakeholders. It has also influenced professional practice through direct engagement with business communities across Asia and via extensive media dissemination. One other ICS in this category relates to tax avoidance policy. Research conducted at Lingnan University has informed stakeholders about corporate tax practices through accessible publications in the business press and practitioner journals, and by engaging with industry via tax consultancy. This work has benefited corporations, CPA practitioners, governments, and tax authorities.

Financial and economic practice

Several ICS related to financial and economic practice. One interesting example within this category is an ICS that details efforts from The Polytechnic University of Hong Kong to lessen the environmental impacts that people or businesses create through their regular operations while maintaining profit and utility. By educating accounting and finance professionals, informing policy briefs, generating public discussion, and informing environmental, social and governance investment practices, this has had a positive impact on public policy, industry, and wider society. Another striking example is collaborative research from The University of Hong Kong, which developed an approach to use financial technology (FinTech) to help developing countries to increase financial inclusion and support sustainable development. This strategy has been adopted by the Alliance for Financial Inclusion (AFI) the Intergovernmental Group of 24 (G-24) and their full membership, which is made up of central banks and financial regulatory authorities from more than 90 countries. A third ICS details research from The University of Hong Kong which has influenced the competitiveness of some of the biggest corporations in the world, as well as FinTech companies, financial institutions, and regulators. Some impacts of this work include developing a new generation of credit limit models and high-performance credit risk models using machine learning and deep learning for the China Construction Bank (CCB), influencing the design of CCB's internal executive training program's curriculum, and informing the FinTech-related policies on the Hong Kong Monetary Authority's (HKMA) Currency Board Sub-Committee to uphold and regulate both financial stability and financial innovation. Other case studies in this group give information on impactful research on i) risk models for compliance, ii) policy and practice gaps for accounting professionals, iii) relevance and reliability in fair value accounting and (iv) pricing information on firms' cash flow.

A number of ICS focus specifically on investment practice. One highly impactful example is research from The Hong Kong University of Science and Technology, in which studies on stock valuation and investing were applied to China Investment Corporation (CIC), the second-largest sovereign wealth fund of its sort, which manages more than US\$940 billion in assets. This resulted in the development of a new quantitative system to manage the fund's multibillion-dollar equities portfolios. The ongoing system has produced financial gains for the company and China as a whole. Related research on financial information complexity and investor reactions also informed a financial regulation amendment by the US Securities and Exchange Commission. Another ICS details research by City University of Hong Kong on statistical learning and big data methods, which has delivered considerable economic impacts through financial technology. This technology has been used to construct portfolio selection strategies and calculate risk in a mutual fund, resulting in enhanced investment performance. The third describes research also by City University of Hong Kong on the information intermediary industries in China, including auditors and financial analysts who certify, process, and disseminate information to the capital markets. This research was used by the Public Company Accounting Oversight Board to set auditing standards and was picked up by international asset management firms in advising investment strategies in China. It was also covered by major media around the world (e.g., the BBC, Bloomberg, Yahoo!), generating substantial discussion. The fourth ICS outlines research from The Polytechnic University of Hong Kong on cross-sectional stock returns. This work has informed investment strategies, helping investors overcome behavioural bias by investing in a well-diversified portfolio.

The characteristics and translation of the underpinning research

Table B provides the salient features of the underpinning research. It provides bibliometrics as well as information on the impetus for the research and mechanisms/channels of dissemination.

133 outputs from this cluster are indexed on the Web of Science, which have a mean citation score of 3.41. The median citation score is 1.96, which is higher than the median of 1.59 for all case studies. Key international collaborators included the United States (33%), Singapore (9%), and the UK (8%). 29% of the research was in response to demand for better protocols, practices, and policies and 20% was commissioned. The research was often

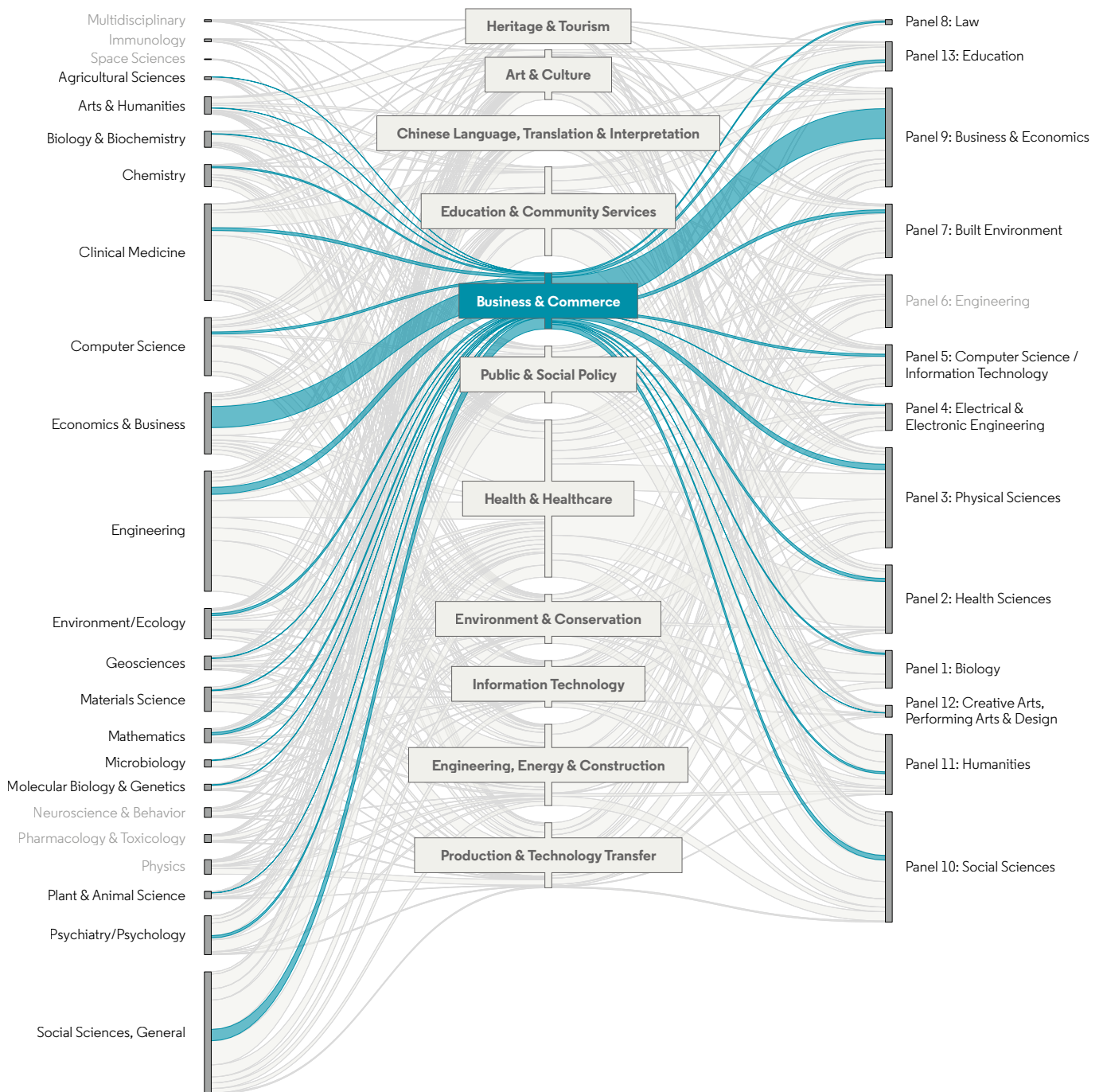
following on from previous work (29%) and was driven by investigator curiosity (11%). The main forms of co-production and collaboration were academic and industry partnership (34%) and academic and public sector partnership (20%). The researchers were involved in the impact by being referenced as an expert or advisor (63%) and through publications being cited by sector (34%). The research findings were disseminated primarily media coverage (57%) and through publishing for non-academic audiences (46%). The ideas and products arising from the research were formally recommended by a recognised body in 20% of cases and the work was given prizes and awards in 17%.

Table B: Some salient features of the underpinning research identified in the Business & Commerce cluster (n = 35)

Analysis of underpinning research	<u>Cluster</u> impact case studies	<u>All</u> impact case studies
Bibliometrics indicators		
Number of outputs indexed on Web of Science	133	1445
Mean citation score	3.41	4.45
Median citation score	1.96	1.59
Collaborators location (top mentions, excluding China)		
USA	33%	18%
Singapore	9%	3%
UK	8%	8%
Impetus for research (top mentions)	% of <u>cluster</u> impact case studies	% of <u>all</u> impact case studies
Pull factors		
Demand for better protocols/practices/policies	29%	8%
Commissioned	20%	16%
Push factors		
Follow on from research team's previous work	29%	12%
Investigator initiated research (curiosity)	11%	12%
Mechanisms/channels of impact (top mentions)	% of <u>cluster</u> impact case studies	% of <u>all</u> impact case studies
Coproduction & collaboration		
Academic - industry partnership	34%	23%
Academic - public sector partnership	20%	17%
Researcher involvement		
Referenced as expert, practitioner or adviser	63%	33%
Published output cited by sector	34%	11%
Dissemination of research findings		
Media coverage	57%	48%
Publishing for non-academic audience	46%	20%
Codification of impact eg prizes, patents etc.		
Idea/product/invention formally recommended by recognised body	20%	12%
Prizes and awards	17%	33%

The alluvial diagram in Figure 2 links the underpinning research (as classified by discipline using the 23 Web of Science, Essential Science Indicators (ESI), journal categories) to the 11 clusters identified through the topic modelling and the 13 Panels used in RAE 2020. The Business & Commerce cluster has been highlighted, with the impact pathways for the other clusters greyed out. Figure 2 illustrates the multidisciplinary nature of research impact; multiple journal categories feed into the cluster and the cluster contributes to ICS submitted to a range of RAE panels.

Figure 2: Alluvial diagram linking underpinning research with clusters and panels.



Methodological annex

This synthesised impact report presents a cross-cases analysis of the salient features in 342 impact case studies (ICS) provided by Hong Kong universities as part of the RAE 2020 evaluation. A sequential multi-method approach was employed. The first component involved quantitative topic modelling, followed by directed content analysis. This approach allowed the essence of the impact generated by Hong Kong universities to be captured and synthesised. It is important to note that the analysis and conclusions of these reports are based on the impact as described in the ICS. That is, the authors of this report took the case studies at face value and did not verify or question the narratives provided. A summary of the methodology is given below. For more detailed information on the methodological elements of this study, please see the overarching impact report.

Quantitative topic modelling

Quantitative topic modelling was used to identify overarching topics in the ICS. Topic modelling is a language processing technique applied to document sets to understand the different combinations of words or phrases (topics) that are present. It is a data driven approach, meaning results are not dependent on pre-conceived notions of structure, but are instead derived from the data itself.

Python, Scikit Learn, and Gensim packages were used to implement the topic modelling. Text from section 4 (Details of Impact) from the ICS was normalized (i.e. removal of punctuation and special characters), and domain specific stop-words were removed (i.e. words that are used frequently across the case studies). Various implementations of

the topic modelling algorithm were tested, and the Non-negative matrix factorization [NMF] was found to produce the most usable results. After testing multiple models using this algorithm, and manual review by the authors, the number of topics was set to 35 to provide a balance between the breadth of groupings and granularity of topics.

In discussion with UGC, the research team developed an initial taxonomy by grouping similar topics into broader 'clusters'. For example, the topics 'finance', 'accountancy and governance', and 'economics' were grouped into a cluster titled 'business & commerce'. Topic clusters were set at the outset of the analysis to ensure cognitively similar cases were read together, thereby improving the quality of coding, analysis, and impact reports. This classification system then informed the coding and testing of case studies.

Directed content analysis

Qualitative directed content analysis was then used to elucidate the salient characteristics of the impact narratives. This involved an iterative process of examining case studies and developing a code book to categorise their inherent features. The code book was derived from the existing literature and the domain expertise of the authors. It included four overarching categories: a) research, which captured funding source and impetus for research; b) time lags, which captured the elapsed time between the research and its impact; c) mechanisms/channels of impact, which included forms of collaboration and dissemination; and d) impact, which included beneficiary groups (e.g. young people, women, ethnic minorities), location and reach (e.g. Hong Kong, Mainland China, elsewhere), and the nature of impact (e.g. commercial, policy, practice).

Using the cloud based qualitative analysis software, Dedoose, each case study was read, and relevant excerpts were 'tagged' with the relevant codes. Multiple codes

and subcodes were attributed to individual case studies. This allowed all case studies that had been tagged with a particular code (e.g. a particular beneficiary group) to be considered as a group. Two of the study's authors undertook the reading and coding (JG and KW). Inter coder reliability was ensured by double coding 10% of the cases (i.e. each author codes the same case study) and through regular coding meetings that were used to compare code applications and adjust the code book as required. The code book was thus a 'living document' that was reviewed and revised iteratively. This process allowed for cross case analysis that was the basis of synthesised impact reports. A code co-occurrence matrix was used to identify where the overarching codes intersect (for example, instances where particular topics are associated with particular beneficiary groups). The properties of the ICS were systematically examined, and evidence was gathered by assigning segments of text to unique codes within the broader coding categories. This process allowed for cross case analysis that formed the basis of this synthesised impact report.

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