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Towards characterising negative impact

Introducing Grimpact

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Towards characterising negative impact: Introducing Grimpact[1]

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Abstract

This paper categorises the nature of what we have labelled as the potential for 'GrImpact', in the evaluation of the wider influence of research, beyond academia. As the impact agenda broadly defined grows to include more formally criteria that consider the value of research beyond academia, so too does the pressure to ensure that these assessments of public value are conducted with the public's best interests in mind. In many cases, any negative impact from research cannot be foreseen at the time of the evaluation, making it vital that any kinds of rewards for impact stimulate only positive public benefits (aka "the right type" of impact). Using a series of case studies of identified "negative impact" this paper explores the concept of Grimpact, as well as creates typologies of its characteristics and precursors.

Introduction

Recent political upheavals have the potential for wide-ranging effects on the public perception of the value of public services, including the societal impact of research and higher education. There has been a surprising public swing towards new, populist political movements that profess to represent "the real", otherwise unrepresented and forgotten people, and this swing

also has been felt in several nations that have hitherto resisted populism. There has been the rise of a new kind of citizen, what Reedy *et al.* (2014) called the 'misinformed voter' whose belief sets and voting behaviour may be impervious to rational arguments. This raises the question of how publics which are prone to confirmation bias, distrustful of public experts, and highly path-impregnated in their belief sets (Gastel *et al.*, 2017) are prepared to value research that does not fit with their ideological conceptions.

The rise of the "impact" agenda and its equivalents has in part provided a forum where the public value of research is discussed, weighed and promoted. It has been included as a formal criterion in many funding systems and mechanisms across Europe, UK and North America – all countries where the effect of these political changes are acutely felt. This has included the widening of research funding criteria to include conceptions of research excellence beyond academia, as well as more concrete actions such as including public members in extended peer review panels. Its inclusion reflects the "abstract faith" that public assign trust in science (Luhmann, 1979), and the potential it brings to improving their lives.

Any claim for the wider public value of research depends on making claims on behalf of 'the public' and what might be regarded to create value for them. We here make a distinction between what is created beyond the academy and the value that society gives to that creation. Whilst capacities are neutral in that they exist or not, the value that particular publics attached to those capacities can be positive or negative depending on their ideological inclination or indeed the public mood of the day. In the long-term perspective, publics have been conditioned to regard valuable research as research that creates a positive economic impact, and in part this is because a value can be attached to the impact, that is of the economic value. The widespread acceptance of price serves to mystify the question of whether this is really valued by 'publics' or that value is an artefact of financial engineering (for example the market valuations of some university ICT spin-off companies created during the dot.com bubble).

It is this issue and its partial solution through the use of market prices which creates the short term problem which we envisage, which relates to the challenge of evaluating (here we mean attaching to a value rather than applying an evaluation mechanism) the public value of research. In the absence of mystification, there are no generally believable claims for the public value of science to use as baseline indicators when particular political projects make populist claims about the positive or negative impact of specific branches of research. What we see is that many claims are made for non-economic outcomes that are so extraordinary that they are indisputably good (what Sivertsen, 2018, calls extraordinary impact), and that they are unambiguously beneficial in not involving involving conflicting versions of societal process.

We argue that what is missing is a deeper conceptual exploration of this politically contested version of impact in terms of its definitions, characteristics and precursors, and without that necessary is it not possible to get beyond the domination of economic and non-controversial versions of impact. We contend that a useful starting point is to look at extreme examples of impact and public valuation of that impact, namely where there is a strongly negative impact, what we refer to in this paper as "Grimpact". We present what we claim to be three powerful

cases (Siggelhow, 2007) of Grimpact to better trace out the core tensions, drivers and lines of force within this wider notion of public value. On this basis this paper aim to create typologies for the recognition of the concept more theoretically, as well as its identification during the practice of evaluation and valuation.

Methodology

Selection of case-studies

Three case studies were selected as examples of negative impact, and as we note above, we regard these as powerful cases that represent an extreme where the tensions are so foregrounded that it becomes possible to more clearly perceive them as the basis for addressing them. A description of their precursors and an exploration of their identification as "negative" is provided below.

Measles Mumps and Rubella combined vaccine (MMR)

Published in The Lancet in 1998, the paper *"Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children"* by Wakefield and colleagues, implied a link between the measles, mumps and rubella (MMR) vaccine and a "new syndrome" of autism and bowel disease. As a result, a vaccine scare ensured that vaccine rates globally dropped, as worried parents withdrew from voluntary vaccine programmes (to a vaccination level of 80% in the UK, well below the WHO 95% level for herd immunity). Although the causality of this link (between publication and falling vaccination rates) has been difficult to quantify (Godlee, 2011) especially on its direct impact (vaccine coverage), it is even more difficult to quantify its indirect impacts (resources away from studying autism, contribution to the decrease in trust of experts).

What makes this a case of Grimpact from our perspective was that as the ensuing vaccine scare took off, critics of the paper quickly noted that it was a small case series with no controls that linked three common conditions and relied too heavily on parental recall and beliefs. A number of major scientific and professional organisations argued that there was clear evidence of data falsification, whilst subsequent epidemiological studies continued to find no evidence of a link between the MMR vaccine and autism. Wakefield was given many opportunities either to replicate the paper's findings, or to acknowledge his failings but declined to do either. In 2010 after a hearing by the general Medical Council regarding Wakefield's fitness to practice as a medical professional, The Lancet retracted the article citing fatal flaws both scientifically and ethically. Despite having been stripped of his clinical and academic credentials, he continues to push his views to a growing number of anti-vaccination groups.

Cambridge Analytica (CA)

A second more recent case study we use is he Cambridge Analytica scandal that emerged into public consciousness in early 2018, with an investigation into the research of a Dr Aleksandr Kogan and Dr Michal Kosinski from Cambridge University and their connections to a data company, Cambridge Analytica. Cambridge Analytica has since been linked with Breitbart's Steven Bannon, and the use of what some have called information warfare to

unduly influence the outcomes of a number of elections, most high profile the UK Brexit Referendum, European elections, 2016 US Presidential Election with the total number of rigged votes estimated by some to be as high as 200.

As part of his research into neuro-psychology, Dr Aleksandr Kogan built the app "thisiyourdigitallife" in 2014, marketed through his company Global Science Research in collaboration with Cambridge Analytica. Using Kogan's app, participants consented for the data to be used for academic purposes only. However Facebook allowed for data to be collected not just on the participants, but also all people within the participant's social network. As a result, an conservatively estimated 50m profiles were collected and, through Kogan's affiliations with CA, allowed to be used for commercial purposes.

In combination with the work of Michal Kosinski (also affiliated with CA and Cambridge University), which developed behavioural models based on users' social media interests ("likes") (Kosinki, 2013), and using a tool known as "behavioural microtargetting" (Kosinki, 2015) was also to influence behaviour. The use of this data has been since linked to unduly influencing the US elections since 2014, including the 2016 Presidential election; the 2016 UK/Europe referendum; and the 2013 & 2014 Kenyan elections. The capture of these grimpacts is still ongoing, and will be monitored as this study continues.

Economic theory and the financial crisis (ETFC)

The 2008 global financial crisis was mostly due to misbehaviours from financial private firms, such as banks or rating agencies, who have been accused of committing financial crimes by offering predatory loans, gambling with toxic assets, and selling Ponzi schemes. Nonetheless, many of those actions, especially those concerned with innovative financial engineering (typified here by Collateralised Debt Obligations based on extremely risky loans) were not neither banned not illegal. Deregulation and a lack of adequate supervision by Regulators of the world's leading capital markets allowed financial actors to extract super-profits by selling on these supposedly safe products, that were then sold on further into secondary markets hiding the underlying volatility of the loans behind a supposed top credit rating. The deregulation had been pushed by an intimate network of policy-makers and lobbyists, validated by economists pursuing these same free-market, laissez-faire lines.

These economists, holding teaching and researching places in several universities, seldom disclosed their financial relationships with financial firms, or financial groups of interest which had interests in such deregulation initiatives. These scholars also were invited, and accepted, public offices and decision-making or expertise roles. Although the direct causes of the global financial crisis cannot be attributed to economists alone, it seems that their impact on economic and financial policies, in the US and other places, was crucial for allowing a general climate of deregulation of dangerous activities. Critically, almost no economists that were predicting the toxicity of the assets and the consequences of the systemic failure were provided a platform for their findings.

Measuring & characterising Grimpact's impact

For this study, we have characterised the non-academic impacts of research around the ways in which research is taken up within society, through its encounter with users, its adoption by

user communities and its incorporation into outcomes (Spaagen & van Drooge, 2011, Benneworth *et al.*, 2016). Our focus is specifically on those impacts that were; attributable to the original research article, or researcher's body of work; emphasis on a change, benefit/drawback and influence beyond academia; measurable and comparable, with a preference for indicator-level evidence; and/or verified through independent evidence/ and or research.

Grimpact characteristics stemmed from the analysis of each case study, and were grounded in the analysis of the influence of the research, beyond academia that had had an extraordinary effect. The categories were developed independently during the analysis of each case, and then drawn out and compared between cases. Identification of "grimpact" rather than "impact" was influenced by Sivertson's (2018) description of normal versus extraordinary impact, where extraordinary impact is a spectacular deviation from normal impact, while normal impact follows the 'societal contract' for the expected outcomes of research in a particular sector of society.

Grimpact can therefore be characterised by an "effect", rather than through the mapping of micro impacts that underpins models such as SEP, SIAMPI and the ReACT models (Spaapen & van Drooge, 2011), which may more appropriately describe normal impact. To focus on the outcome/change/effect-driven model of impact was also necessary in this study in order to examine the ex post characteristics of the impact pathway. However, future studies will broaden this conceptualisation and not be restricted by this view and instead should encompass a broader, interaction/micro impact view and is grim characteristics, as we reach a clearer conceptualisation of grimpact.

Results

We have been through each of the three cases to identify the various kinds of grimpact that could be produced, that is to say effects were produced in society that reduced overall welfare levels or reduced the capacities and capabilities of particular groups to live fulfilled lives. In the case studies we have restricted our analysis to first order, direct effects rather than the second- and higher-order effects that may have been enabled by the first order effects produced. Our analysis allows us to distinguish grimpact into four overarching headings, namely the violation of normal impact, the diffusion of attribution, academic transgressions and its contagion effects. More information is provided below as well as summarised in the table 1 (below).

Violation of normal impact

In line with Sivertsen's (2018) distinction between normal and extraordinary impact, "normal" impact is found in the responsible relations between academic and other, non-academic organisations. These relationships exist for the pursuit of the research but nevertheless through interactions with and spillovers to societal stakeholders, there is an impact produced as a direct consequence of the conditions necessary for the research. By undertaking issues on societal subjects with societal subjects, research outcomes are readily and seamlessly available for implementation by these collaborating, non-academic

organisations. Grimpact is characterised by the absence of this normal impact emerging, and the distantiation between the researchers and the subjects of the research.

This is arguably most clear in the ETFC case, where ongoing interactions between research and their respective stakeholders suggested that it would be expected that normal impact would be created. However, because of the absence of blame placed at the door of those economists who had been involved in enabling the crisis, there was no feedback from the crisis situation to the academic discipline, hindering economics own attempts to come to terms with its own conceptual, theoretical and methodological shortcomings in which a focus on the mechanisms of market processes had obscured the wider systemic risks that might emerge from this.

Part of the absence of this normal impact arises from the presence of research misconduct, which through a manipulation of details or excessive framing and omission of putatively relevant variables a desirable set of results are arrived at. This was seen in both the CA and MMR cases, and under conditions of research misconduct this coupling and feedback mechanisms were also violated, leading to a breakdown of normal impact and ultimately enabling the Grimpact. We here see resonances with Sivertsen (2018)'s argument that research misconduct could also potentially have an impact.

Attribution (aka allocating blame)

Whereas attribution is a widely discussed limitation in impact evaluation studies, the same als applies to grimpact. In two of the cases (CA and MMR), the grimpact and therefore the accountability could be attributed directly to one individual publication, limiting the ability to analyse the individual research behaviour that is characteristic of grimpact. However, in the CA case at least, a number of papers published by the researchers at the fore of the CA grimpact were identified, it was not clear what characteristics of the papers, independent of the behaviour of the researchers, led to the negative social consequences. A device was created which was in the first instance intended to be positive, to enable individuals to contribute to scientific endeavours by making their own personal data available to researchers. At some point this was then commercialised to create a device which was invisible to the services and which harvested their data and also tailored content to them in ways that made them most receptive to the messages of the broadcasters.

Likewise in the ETFC case it is actually much easier to attribute the critique of ETFC than to the creators of it – by critique we are here thinking of Nassim Nicholas Taleb's Black Swan. ETFC operated as an enabling herd instinct in which academic research justified irrational exuberance in the finance markets and framing that irrational exuberance as reasonable. What was anomalous behaviour was then regarded as normal, encouraging a shift in the academic science towards regarding these irrational anomalies as being rationally produced, and ultimately leading towards a set of false understandings and conceptualisations in the field as a dominant ideology between researchers and stakeholders. The effect was so diffuse that it is extremely hard to say at which point the assumption-making of efficient markets became an irrational dogma that led to the financial crash.

Transgressing boundaries between academic and entrepreneurial conduct

A third common characteristic seen in each case was that the degree of research misconduct occurred, and it was through the transgression between acceptable academic and non-academic behaviours that grimpact was created. Therefore capacities that existed under strict ethical controls and with particular framings and limitations were freed from those limitations and were used to produce that grimpact. This suggests that a key characteristic of grimpact is that emerges as the result of transgressive behaviours by individuals (At odds with the supposedly prevalent ethical norms of the scientific communities), rather than an innate characteristic of the research, and that its spread is not necessarily serendipitous.

In the MMR case, the misconduct (both ethical and procedural) lead to all authors of the original article (except Wakefield) ultimately to accept their culpability and to retract the paper. Following the failure to replicate the results, and the backlash from the academic community surrounding the supposed misconduct coupled with the devastating effects of what could potentially be regarded as unsubstantiated claims, the *Lancet journal* issued a formal retraction in 2010. Nonetheless, Wakefield continues to claim the veracity of the study especially to anti-vaccination advocacy groups, and the grimpact in terms of the reduced vaccination levels.

In the CA case, however, the academic backlash has, at least for now, contained the grimpact. Here the academic misconduct of ethical mismanagement of personal information, as well as the use of social media profiles to influence behaviour has stimulated the creation of a reactionary regulations designed to ensure that such misuse in similar studies is acknowledged in assessments of ethical risk to participants. In addition, Facebook has since withdrawn their support for CA and a higher burden of risk has been applied to researchers wanting to access Facebook data for research purposes.

The degree of academic misconduct in the ETFC case is more nuanced. Here, as with all the cases, the grimpact was behavioural, but related to way that the ongoing relationships between researchers and stakeholders exerted a wider steering effect on the academic field as a whole that in turn reinforced and justified that core community. The temporary successes of these financial instruments gave strong signals to non-involved researchers that market-working and risk-dilution were functioning mechanisms rather than temporary bubble characteristics sustained by this irrational exuberance. Carrick-Hagenbarth & Epstein (2012) found that 15 of the 19 economists in the study, or almost 80%, worked in some capacity with private financial institutions. Over the period of 2005 through 2009 of these 15 economists with private financial affiliations, 13 did not disclose these ties in any of the academic publications we reviewed. Of these 15 economists, 11 had general media articles, interviews or testimonies; and of these 11, 8 failed to disclose any private financial affiliations.

The contagion of Grimpact

In all three case studies, the contagion of grimpact was both fast and broad, invading other fields (interdisciplinary) and extending beyond the primary geographical scope of the initiating researcher and stakeholder interactions. In part that was due to the 'eyecatching' nature of the construct and the ease within which it could be used by others who were not necessarily cognisant of the background. The MMR case played to the more general parents

fear of doing harm to their children, with inoculation raising the risk of sinning by commission, rather than the apparently less risky omitting to have one's child vaccinated. The CA case progressed quickly when the proposal was developed to weaponise the created capacity, transforming the apparently positive co-creative contributory tool into a weapon in the information war. In ETFC, the researchers had apparently found the 'golden egg' of finance by apparently allowing financial engineering to reduce the risk profile of junk investments (such as the predatory no income, no job, no asset mortgages) bringing with it the possibility for returns without risks.

The time of impact is more difficult to pinpoint as in many cases the grimpact is ongoing or indeed as with the case of CA has only just been exposed. But what is perhaps interesting is the 'zombie' nature of grimpact; one might expect with the MMR crisis having been launched by a publication in the Lancet that its retraction would stop the negative consequences, but this was not the case, and indeed led to the creation or at least empowering of vaccine denialist communities increasing its overall impact by the decreasing the number of vaccinations taking place and the corresponding increase in cases of childhood MMR (Harmon, 2010).

Discussion

This paper provides an initial analysis of the characteristics of negative impact (Grimpact) in three well-known cases. A number of commonalities were found that can be used to drive future studies in this area. A greater recognition that research impact can be grim (sic) is increasingly important in light of the academy's drive to evaluate the ex-ante, as well as ex-post impact alongside the academic merits of research.

If in normal evaluative circumstances, accountability is the aim of mapping impact to both hold researchers accountable (reward) for the use of public funds as well as incentivise societally focused research, then the same ideals should apply to Grimpact. By acknowledging Grimpact (its existence as well as characteristics) prior to its realisation, there is an opportunity to hold researchers accountable. The extent that this is possible, however, is limited to recognising those activities and behaviours that can be monitored and measured. This is a common problem in impact evaluation as well, but for Grimpact as the three case studies have shown, there is an opportunity to hold researchers accountable by acknowledging that several common academic misbehaviours contribute to non-academic grimpacts as well. This includes consequences from research misconduct, and the alignment efforts such as engaging research end-users and stakeholders. Indeed, the loss of control over the trail of involved stakeholders and ownership of data and results was also characteristic in out three described cases of grimpact (MMR and CA).

Limitations of this brief introductory exploration include a degree of satisficing that determines the extent that the case study approach is able to determine the extent of each case's grimpact. As an initial analysis, however, this study provides a first step towards recognising that research has a broader influence beyond academia and that not all of these are worthy of celebration as part of the academy's dominant rhetoric of the value of the greater societal value of publically funded research.

Table.1: Summary of the characteristics of Grimpact in three case studies

	Measles, mumps and rubella combined vaccine (MMR)	**Cambridge Analytica (CA)**	**Economic theory and the financial crisis (ETFC)**
Public/private fraud	All authors of the original article have since renounced the study, except for Wakefield who continues to profit from his association with the paper (Godlee, 2011).	Used social media data beyond the contracted guidelines of use.	Undeclared conflicts of interest. Economists with connections with private financial firms such as banks and hedge funds, and public financial institutions like central banks and the International Monetary Fund. Many of those financial firms are considered to have committed serious misbehaviour via predatory loans, financial toxic assets (derivatives), Ponzi schemes, etc. (Carrick-Hagenbarth & Epstein, 2012)
Lost control of use		Colleagues registered company name, using the results, without the knowledge of the original researcher.	Complete partnership between researchers and stakeholders. Researchers were close to supervisors, policy-makers, helped pass laws and regulations (Carrick-Hagenbarth & Epstein, 2012)
Had a negative intended effect	Influenced vaccination rates, that led to a rise in MMR cases, and deaths (Napier et al, 2016; Suk & Semenza, 2011)	Research if misused, posed *"a threat to an individual's well-being, freedom or even life"* (Kosinski et al, 2013)	There is are views according to which capitalism and market economy needs consumption, the race for profit, financial gamble and non-regulation (Barak, 2017 and others). As such, negative effects on the markets were somehow expected. However, personal justifications and rationalisations of individual economists seem to show that effects were unintended and

			unexpected.
Scientific misconduct	Original 2005 article, retracted from The Lancet due to scientific misconduct (Deer, 2011)	Compromise of research ethics due to the misuse of private, personal details.	Ferguson (2012) referred to "questionable research practices". Carrick-Hagenbarth & Epstein (2012) showed that it is rare for academic financial economists to identify their private affiliations were analysing financial regulatory issues that might affect the private firms in which they work.
Unnaturally influence public (campaigns/public opinion)		Links to Steve Bannon, and Russian influences on election campaigns in Europe, US and UK.	Strong influence over public opinion and policy makers Carrick-Hagenbarth & Epstein (2012).
Silenced "experts" (actively or not)	Decrease in public trust in evidence (Salmon et al, 2015; Stroud, 2003)		Carrick-Hagenbarth & Epstein (2012) showed that it is rare for academic financial economists to identify their private affiliations were analysing financial regulatory issues that might affect the private firms in which they work. Economists that used contrary theories and studies were not valued as highly, as those theories used by economists who has close connections with financial stakeholders (Cohen, The New York Times, 2009).
Tension between political versus scientific value			No tension. Shared political and scientific ideological ideas
Value linked with political ideology	More conservative political ideologies less likely to vaccinate citing vaccine safety fears and distrust in experts. (Baumgaertner et al (2018); Rabinowitz et al, 2016	The use of the data is currently under investigation for its use to unduly influence public opinion in the Brexit referendum and the 2016 US presidential election.	
Disproportionate research focus based on disease burden			
Establishment of anti-evidence advocacy groups	Post- publication establishment of anti-vaccination groups, which promoted studies that, supported their agenda, and not others. (Blume,		Advocacy groups established to develop proposals for the regulation of financial markets. In addition, many of these economists also wrote for the media on

	2006)		financial regulation (Carrick-Hagenbarth & Epstein, 2012)
Establishment of false economies and/or public campaigns	Advocacy group focused with on how to "green our vaccines" due to public fears of vaccine safety (Wessel, 2017)		
Changed ways of thinking	Parents give greater weight to risks of vaccines than benefit (Baumgaertner, 2018)	Has contributed to the understanding and conceptualisation of "information warfare"	The Global Financial Crisis was a much broader and more dangerous closer; it popularised the phrase "systematic risk" to acknowledge the potential impact of the collapse of some firms and on the entire economic system Wilson & Grant, 2012, p. 1)
Influenced high level government debate through decrease in trust	During the 2016 US election, republican candidates publicly expressed a level of scepticism over vaccines, citing Wakefield (1998). These include the Presidential candidate Donald Trump (Knopf, 2017)		Influenced high-level government debate, which was largely due to mutual trust and shared ideology Carrick-Hagenbarth & Epstein, 2012)
Contributed to increasing inequality in society			The Global Financial Crisis (GFC) has been the most severe international economic crisis since the Great Depression, and resulted in a recession that has led to high levels of unemployment in the United States and most European countries (Wilson & Grant, 2012) The GFC had impact on employment rates, housing, GDP, exchange rates, and other socio-economic indicators (see Zestos, 2016, for overview of USA and some European countries)
Conflict of interest between the researcher and direct stakeholders	Wakefield used the ensuring public scare for private financial gain that were not in the public's interests (Deer, 2011)	Passed the data collected onto a third party (Christopher Wylie of Eunoia Technologies, Inc) for personal financial gain through his company	No conflict of interest with direct stakeholders (policy makers, private and public financial corporations), on the contrary, it looks more like research-driven on behalf of those stakeholders (Carrick-Hagenbarth & Epstein ,2012). The conflict of interest is with indirect stakeholders, such as taxpayers, consumers, voters, and the public in general

Rectified the situation	No. Wakefield lost his medical licence but is still active in promoting vaccine scepticism globally (Deer, 2011).	Yes. Kogan has been banned from Facebook, and all data handled by Kogan and Wylie has since been "destroyed"	Many academic economists in the study have recently posted statements of disclosure of their private affiliations on their academic web sites (Carrick-Hagenbarth & Epstein ,2012). several economists refer readers of their journal articles to their public disclosure statements, groups provided lists with its many members and their many affiliations. Other rectification (such as changes in the dominant university textbooks of Economics) have not happened (Cohen, The New York Times, 2009)

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