Towards a Social Media Research Methodology: Defining Approaches and Ethical Concerns

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Abstract— **Social media research and suitable methodologies and ethical approaches for analysing social media data are still emerging. This paper presents a methodology for projects using social media data alongside consideration of ethics within the social media analysis context. Earlier stages of the methodology will be expanded to develop a strategy for examining ethics alongside consideration of the relevant analysis techniques that may be employed. This will provide a comprehensive methodology that will provide a springboard for the clear and ethically sound scrutiny of social media data. We aim to present the challenges of using social media data, while the inclusion of ethical and legal aspects in this paper aim to draw researchers' attention to the peculiarity issues involved with dealing with social media data.**

Keywords—social media; methodology; strategy; methods; ethics; legal; lifecycle.

I. INTRODUCTION

Since 2011, interest has grown in social media from both the academic and industrial perspectives [1]. For example, Law Enforcement Agencies substantially increased their usage of social media data, with policy changes being implemented to adapt to social media and its possible uses after the 2011 London riots occurred [2][3]. This interest has to some extent been driven by the rapid increase in usage of social media networks and of internet accessibility; the internet was used daily or almost daily by 82% (41.8 million) of UK adults, compared with 78% (39.3 million) in 2015 and 35% (16.2 million) in 2006 [4]. Organisations now have social media teams to monitor events and actively release information, quickly reacting to situations of widespread interest [1]. A great deal of research both has helped to shape the future of social media research, but this remains in its infancy. Examples of this inside the UK include the Government Social Researchers [1], a research team within the UK government "ensuring ministers and policy makers have the data to understand social issues [5] and evaluating the policy responses to them", the Economic and Social Research Council, Ipsos MORI [6] and the Centre for Analysis of Social Media - part of a cross-party charity-run think tank DEMOS [7]. Outside the UK there are such things the Big Boulder Initiative [8] located in the United States, which markets itself as the "first trade association for the social data industry" and European Citizen Science Association in Europe that is looks to "connect citizens and science through fostering active participation" whether that is using social media or other platforms [9].

The Big Data characteristics of social media data as regards their volume, velocity and scope has created a need for methodological innovations that are suited towards investigating social media data and their overall lifecycle and which apply both qualitative and quantitative approaches [10]. Quantitative methods seem to be the most popular in research to date, but analyses are certainly not restricted to this approach [10]. For example, new approaches in qualitative research are being formed in areas ranging from narrative analysis, to so-called *thick* data that document human behaviour and the context of that behaviour, to the analysis of non-verbal data such as sound and images, to combining and linking data - both text and interactions - from different platforms across times and contexts. Given this vast, expanding area of research, scholars will need to acquire new skills to explore, analyse and visualise their findings and situate them into their appropriate contexts [10], and will also need to be able to make appropriate ethical considerations for their research.

There is a need for further development of a clear methodology drawing together the already extant building blocks of good practice displayed both in researchers' papers [11] and by organisations, such as Canadian's government "Social Media Data Stewardship" (SMDS) project, that reduce the bias and flaws in social media data analysis. SMDS focuses on the data management processes applied in the context of using social media data. In the methodology section, we will discuss difficulties that are encountered when trying to find a social media lifecycle that has a clear defined strategy from start to finish, as without a clear approach to follow, such research can be a difficult experience for scholars embarking on work in this field.

The ethical perspective of extracting and collecting social media data in particular demands further consideration [10]. This is very important as it ensures the public's data are protected and are represented in a fair and respectful manner, whereby a tweet or post is not been taken out of context or used inappropriately. Ethics must be taken into consideration when going through each stage of the methodological framework. This paper will focus on the social media research methodology process,

while simultaneously considering the relevant ethical concerns.

The sections to be covered in this paper will be in accordance with the social media project lifecycle presented in Section 2. This will look to build upon existing methodological frameworks for social media research and, in particular, the GSR's social media lifecycle. This lifecycle was not originally designed for research purposes, and so must be modified to be fit for such a purpose, but it will be seen that it provides us with a good starting point from which to begin. Other approaches will also be considered and these will be merged in order to create a hybridised lifecycle that forms the essence of the methodology presented here. In Section 3, we will discuss the ethical concerns that can impact the social media research strategy and its lifecycle. In Section 4, conclusions will be drawn from the paper.

II. METHODOLOGY

Section 2 discusses a series of social media research strategies and how they are integrated into our social media lifecycle.

A. Social Media Research Strategy

Upon reviewing a wide range of papers, it was noted [11]-[13] that some provided an excellent, thorough description of the steps they took in their research. However, it was often found that the initial stages of the research that would be needed for a complete addressing of any research question were poorly defined. The available literature tends to be project specific in its approach and is therefore not immediately suitable for generalisation to other research - not unexpected, given that social media research methodology is a topic still in its infancy. From an early researcher's standpoint in particular, it may be difficult to know where to start in the area and to identify what decisions need to be taken to form a social media methodology for the project in question.

The research community and other organisations are trying to come up with better ways to express their social media strategies, such as the SMDS project, which *"focuses on studying practices behind and attitudes towards the collection, storage, use, reuse, analysis, publishing and preservation of social media data"* [14]. SMDS has produced a social media data process that aims to clarify for researchers the layout and order of each phase that may be required in a social media data project. SMDS focuses on the data management process of social media data and aims to help researchers to consider their attitudes towards the data they wish to work with [14]. What we aim to do in this paper is to identify a *complete* set of stages for any social media research project lifecycle to follow, including within this the SMDS insights into data management, as these touch on highly pertinent points within the overall process.

Having found the nascent SMDS data management paradigm, we continued the search for a full social media project lifecycle. While this proved impossible to source as no such lifecycle yet exists, we did encounter a somewhat developed social media research project lifecycle created by the UK Government Social Research (GSR) service. The GSR based its lifecycle on the Cabinet Office framework for data science projects, as it had *"numerous parallels here"* [1, p8]. This lifecycle has been tested on two social media projects within Government, namely, using Twitter to predict cases of Norovirus and assessing the experiences of the 20th Commonwealth games held in Glasgow, producing reports on the analysis of broadcast and online coverage. There is no publically available information on whether or not this social media lifecycle was in fact a success. However, GSR produced outcomes that may be a measure for potential successes. For example, the Commonwealth games on Twitter were in the top 10 highest sporting event hashtags of the year, generating a highly positive contribution to Scotland and Glasgow both internationally and within the rest of the UK [15]. Furthermore, GSR identified that between 14/06/14 to 06/08/14, there were 3.2 million mentions of the Commonwealth Games on social media in the English language. There were other positive outcomes, but what this allows GSR to do is to identify where future improvements can be made with the organisers in raising the profile for relevant cities and events [1] [15]. In the sequel, we shall aim to integrate aspects of the GSR service lifecycle and the SMDS data management process alongside our own insights into the social media project lifecycle.

B. Our integrated social media project lifecycle

The GSR social media project lifecycle [1] consists of seven stages: Stage 1: Rationale – Business/Citizen Need, Stage 2: Data, Stage 3: Tools and Output, Stage 4: Research Phase, Stage 5: Implementation/Publication/Action, Stage 6: Evaluation and finally Stage 7: Business as Usual. While this is a useful basic framework that will help to guide researchers through their social media projects, it still requires further development and refinement as the considerations outlined at each stage are given in little detail. Furthermore, this lifecycle is applied in a commercial and governmental context, which can make it difficult to know what to do at each step from a research perspective. Nevertheless, we have chosen to adopt this framework as a starting point as it proved itself helpful in structuring our own initial social media research project. The research we are conducting aims to enhance the analysis of social media in the context of public (dis-)order events. This investigates how social media data are stored (big data issues), collected, analysed (text mining and sentiment analysis) and then disseminated (to the police, to help predict when disorder may occur). This will form part of the creation of a model to analyse social media data to try to predict the escalation of such events and our research is presently ongoing. We will adapt the GSR lifecycle to suit the needs, aims and goals of research projects (as opposed to governmental projects), and a diagram showing the relevant adaptations is displayed in Figure 1.

Figure 1. Social media research project lifecycle

The steps in the lifecycle are explained below. We will outline the purpose of each step and show where modifications have been made to the GSR lifecycle. The lifecycle explained below will be informed by the pilot study we conducted, which has involved analysing Twitter data around the time of the Baltimore riots, with the aim of developing models to identify potential riots before they occur.

1) In [1], stage 1 (Rationale – Business/ Citizen Need) is described as a need to think about social media's attributes (e.g. speed, cost, real-time production). On the basis of these attributes, there are suggestions for the business or citizen's need to be based on: *"using insight to deliver a more timely service to the citizen with fewer resources through the support of social media analysis than would have been possible with traditional means."* [1, p9]. To measure if the project is delivering a timely and resource efficient service to the citizen can be difficult to determine in some cases without actually conducting the project. A rationale for the research must be established, as without this the project will likely lack focus and be too broad, weakening any results or insights obtained. This means that valuable resource that could potentially be better utilised elsewhere is being wasted. While nothing new has been added to this section compared to the GSR lifecycle, we have placed into the appropriate research context. This stage in our process is important, as one must have a question to drive the collection and analysis of data in research and, as outlined by [10], one should not let the data drive the researcher. Without a suitable research question, the project would lack purpose. The rationale for the project we carried is outlined above.

2) Stage 2 is a new step which has been introduced called "Selection of Potential Method(s)s". This step is required to help adapt this commercial lifecycle into a research context where consideration must be given as to which methods (for example, case study or archival research) will be applied in the research process. This must be

decided early on in the process, so that the following stages can take this into account when making relevant decisions in the latter phases of the lifecycle. If this step is not undertaken explicitly in a research context then results may be obtained that are of a particular nature, without account having been taken of the fact that the nature of the methods employed is inextricably linked with one's research outputs. This may cause a loss of momentum in the stages ahead, where special account would have to be made for the method or methods employed. For our particular research, we selected a case study-based approach to allow us to work with particular disorder events immediately and then attempt to generalise these to the wider public order context.

3) "Data" is now stage 3 of the lifecycle. In [1, p9] it is emphasised that *"The primary purpose of this data is not for research so consideration should be given to representativeness, robustness and ethics."* This statement is confusing, as the same level of rigour would apply in a research context. In this section, the researcher must justify the datasets to be used in the project and examine any necessary ethical considerations regarding the use of the social media data in question in their research. The original purpose of this section remains the same as in the original GSR lifecycle. This phase considers which dataset(s) may be explored to answer the research questions of the project. There is extra emphasis on selecting the correct data as cost may well be an issue here, more so than for a government entity, depending on the size of dataset required for the research, given the finite nature of research grants in particular. This step is also useful in providing time to think carefully about the selection of datasets. If the data are chosen without due care then this will impact the cleaning, analysis and output of the project, though given the emerging nature of social media technology, it can of course be difficult to fully understand the range of data and metadata that are available before one already has a sample to hand. To that end, collection of a small pre-sample of data can also be a useful initial substage here. The dataset used for the pilot study is based on collecting live data from the 2015 Baltimore riots, USA. This pilot study will help to inform the collection of further datasets, on which the pre-processing and data manipulation scripts developed for the Baltimore data can be re-run.

4) Stage 4, "Tools and Outputs" is named the same as in the original GSR lifecycle. In this phase, the use of specialised social media tools can help to make cleaning and analysis of the collected data easier for researchers. Furthermore, social media data may require manipulation to *"render it useful in a social research setting"* [1, p9]. The outputs from analysis of these data can range from traditional reports showing present findings to predictive models designed to solve real time problems. GSR's process for this step is kept, but

in addition to this, the researcher must outline their data collection strategy to show how relevant data in relation to any research questions will be obtained, as well as considering how those data will be stored and whether single or multiple platforms are to be used as this will have an effect on the tools chosen. There are a plethora of tools available for data acquisition, processing and analysis and the tools to be used must be selected with care to ensure that they are both suitably secure and efficacious for the data in question, otherwise, time will be invested in tools that are not appropriate for large scale data retrieval (not all return the same metadata, for example), cleaning and/or analysis. The tools selected will depend upon the platform from which data are to be extracted. In our case, since we are dealing with Twitter data we chose NVivo NCapture to extract a live sample of data from the Baltimore riots and used R for data manipulation. For the retrospective datasets that we collect in the future, we will instead be using DiscoverText for acquisition. This tool is widely used in the research community because it provides access to one of the cheapest ways to retrieve a complete historical record from Twitter's official provider GNIP. Even though the extraction and analytical tools are being selected at this stage, the actual techniques for analysis will be investigated in stage 5.

5) Stage 5 was originally named "Research Phase" in the GSR lifecycle [1], rather than "Analysis". Clearly, given that we are aiming to develop a full research lifecycle, the former name is no longer appropriate. This step emphasises that care must be taken regarding the representativeness of data to mitigate any bias in the analysis. Lastly, *"Care should be taken to ensure research generates a dataset of a size which can be handled by the subsequent analytics programs."* [1, p10]. This is an important aspect to consider, as the volume of data produced can be on a very large scale. This could break the confines of some analytical programs' constraints. Other Big Data characteristics (namely: variety, veracity, velocity and virtue) and the type of techniques applied by the researcher can have an influence on the choice of analytical tool adopted to achieve their aim(s) [10]. The naming of this section has been selected to align with its focus on preparing the data for the analysis, helping to identify whether the chosen analytical tools need to be changed to handle the dataset(s) in question and to establish which techniques (in our case, change point identification, sentiment analysis and machine learning) should be applied to analyse the data to assist in responding to a research aim and answering relevant research questions. The selection of techniques to analyse the data is a complex process that is dependent on the investigators' level of experience of the techniques in question while also ensuring that they will suit the dataset(s) chosen. For example, in our pilot study, the selection of sentiment analysis techniques for a newcomer to a developing field can be fraught with difficulties as different papers suggest different techniques to use and most do not provide a concrete path to understanding the basics before choosing what path to follow. Social media analysis is a developing area and at present one does wonder if the techniques available are effective enough for any given specific domain, whereas in other fields techniques may well have been tried and tested over many years. In our experience within the pilot study, this led to it taking a considerable length of time to make a decision, which is why it's appropriate for this consideration to have a stage of its own. Another consideration to make at this stage is whether the researcher has the appropriate equipment to process Big Data and explore the intricacies of the dataset chosen using the desired tools. For example, initially within our research, using the R language presented some issues when processing a large amount of data, as R Studio is single threaded. This meant the PC being used was inadequate and required an upgrade due to poor single threading performance. An assessment must be made early on as to whether the PC or Cloud selection has the processing power to analyse the data in a reasonable amount of time (or indeed at all if there are memory considerations).

6) Stage 6 was originally entitled "Implementation/ Publication/Action" and has been renamed to "Implementation" here. In [1], it is originally emphasised that social media research is in its infant stages and that the likelihood is that the work being carried out will be exploratory. Any successful *"outcome or otherwise should be communicated"* [1, p10] to the interested communities to build on this in future work, which is the same in business as in research. To assist in these steps the researcher can include the good practice from the SMDS approach on "publishing" to "reuse/sharing" and "preservation" [14]. Publication is one of the steps in this section as dissemination of research is clearly vital. The GSR lifecycle emphasises successful outcomes, but as this is now named "Implementation", there is a new focus, more appropriate for research, on making sure the project requirements and specifications as previously outlined above are implemented in practice so as to achieve the aims of the project. For example, in this step we extracted the data with NVivo NCapture, cleaned them and analysed them to detect the sentiment within each Tweet and identify significant changes of sentiment within the timeframe over which the data were collected by using R. It was appropriate that this all took place within this phase, as one step flowed to the next with purpose and direction to contribute to the aim of the project. In addition, to this, ethical consideration must be given further thought at this phase to how any data are shared and preserved, but this data management process will not be discussed in this paper, as we shall

focus on the legal and ethical considerations of social media data usage, which will look in particular at publication dilemmas. Publication is included in the last phase of the lifecycle instead as we must implement and (in particular) evaluate *before* we can publish within the research context. In our own context, had we attempted to include publication here alongside analysis, this stage would have become confused by the lack of evaluation. Furthermore, given the paucity of the quality of social media data, we required additional focus on relevant cleaning of the data and attempting to consider publishing at the same time would have resulted in a loss of momentum.

7) Stage 7 (Evaluation) is included in the lifecycle due to the immaturity of social media research compared with other more established research fields. In [1], there is a focus on the evaluation of exploring what value there is in social media research compared to traditional methods. It suggests that this stage will confirm whether not social media was specifically required "to respond to a business or citizen need" [1, p10]. This stage will remain the same as outlined in GSR's lifecycle but with a rather different focus. Where the GSR strategy considers whether or not there was value in the use of social media data, the researcher's focus will be on how effective the use of such data was in addressing the research aims and questions. A stage devoted to evaluation is important, as through evaluation we can identify whether our techniques have been effective in answering any research questions. For example, in our case, we aim to consider whether using a lexicon dictionary approach over machine learning for detecting sentiment provides a greater level of accuracy within the framework we have set. We have not yet completed this section of the lifecycle for our own work on social (dis-)order, but this stage of the pilot study has shown us which techniques are less effective (e.g. Latent Dirichlet Allocation) for this specific study and allowed us to apply a greater focus on others (e.g. Changepoint identification).

8) Stage 8 has been renamed from "Business as Usual" as it is in the GSR lifecycle [1] to "Knowledge Management" in order to fit the research context. The original purpose of this phase remains, but with the addition of publication to emphasise its importance in this context. This phase re-evaluates research techniques in order keep research up-to-date with any modern research techniques and to think how about how any knowledge gained about social media research methods themselves can be transferred to others to instil good practice. This stage can be commenced once a significant part of the cycle is completed. Publications are crucial way of sharing good practice within the research community and can then lead to subsequent further research after interactions with the community, leading us back to stage 1 to begin a new project and frame

suitable new research questions. The pilot study's outcome has informed us that this original lifecycle with a series of changes can be placed into a research context that is effective in guiding social media projects. These findings will be shared in the form of publications and with other researchers through other means of communication such as conferences.

It is important to note the lifecycle is not only to be used as a single iteration. A researcher can go repeat stages to develop the project through one or many iterations. Furthermore, this lifecycle itself will be further evaluated when cycling through it again within the rest of our research project. Having outlined a possible lifecycle for social media research, in the next section, we discuss the ethical and legal considerations that must be made throughout the social media research lifecycle.

III. ETHICAL AND LEGAL CONSIDERATIONS

Technological advancements are outpacing developments in research governance and what is agreed as good practice. The ethical code of conduct that we rely on for guidance for collection, analysis and representation of data in this digital era is not up-to-date [16][17]. Social media is ethically challenging because of its openness in relation to the availability of data. The Terms and Conditions of these platforms (including Twitter, Facebook, YouTube, Weibo, Qzone, Reddit, LinkedIn and other global social media platforms) state that users' data is available for third parties, so in accepting these, users are giving legal consent for their data to be made available [18]. As [19] outlines *"Just because it is accessible doesn't mean using is ethical"*, which means that researchers must evaluate their positions carefully, as to whether using the data is or is not ethically sound.

Datasets with this scale of social interaction, speed of generation and level of access are unprecedented in the social sciences. This has led to many published papers that include complete tweets and/or usernames without informed consent [18]. This seems to have happened because of the openness of some social media platforms, thus leading to assumptions that these are 'public data' and that projects using such data therefore do not require the same level of scrutiny by an ethics panel as do studies using data collected by more standard methods, such as interview or questionnaires [18]. Some universities may have not caught up with the pace of technology and this is often reflected in their ethical policies and within their forms dealing with ethical considerations. Even where ethics panels have already scrutinised such data, they may still deem it to be 'public data' due to the lack of a suitable framework to evaluate the potential harm faced by those whose ostensibly public data is used in the research in question [17]. In some cases, ethical approval is not required per se, but it is suggested by a given university's policy that researchers consult resources, such as the Association of Internet Researchers, that can help to ensure that any social media data are used in an ethical fashion [17] [20].

Despite noting above that some ethical panels are not making much consideration about the ethical use of social media data, there is some evidence to suggest that a

number of universities are making strides towards updating their ethical guidelines with regards to social media data. As one such example, the University of Sheffield has a research ethics policy note that raises many important points that can be considered in other institutions [21]. This note indicates that research must have ethical approval *before* a dataset can be extracted. However, this may pose both a financial and a contemporaneity problem. If the researcher wants to use historical data that will in any case come at a cost then this will be the case with or without prior ethical authorisation. However, if the data cannot be extracted on-the-fly because ethical approval is taking time to obtain, then the institution's budget would have to be prepared to pay for those data in the long term. Furthermore, if the researcher is considering topics of current interest and wishes to amend their search criteria as data come in, it may not in fact even be *possible* to seek suitable a priori approval. Of course, planning in advance is well advised here, but there are times when one cannot predict the topics of research interest that will arise today, tomorrow or in many weeks' time, which makes it difficult to plan such requests in advance. This policy is thought provoking, as it makes the researcher think about the importance of ethics in the very early stages of their research and the requirement for ethical approval for social media research is clearly a step in the right direction towards ensuring high ethical standards. However, as noted above, it may be financial unviable, or prevent the collection of data required for some projects. To that end, we would recommend that perhaps there be a fast track ethical approval system for time-critical social media data projects so that on the one hand they receive suitable ethical scrutiny, while on the other they can also proceed in a timely manner, enabling researchers to react to current events of public interest.

According to a series of survey findings from [22] and [23], it appears that there is a disconnect between the practices of researchers in publishing content on social media posts and *"users' views of the fair use (includes accuracy) of their online communications in publications and their rights as research subjects."* [17]. The decision-making process in one's ethical approach to social media data must consider the expectations of social media users as regards their personal privacy. In addition to this, the researcher must review the nature of the information from a user on social media alongside its originally intended purpose.

Users on social media *"may not intend for their data to be used for their [researchers'] purposes"* [24] and have, therefore, not consented to it being used for research. Considerations must be given to possible risks to the users whose data are being employed in any research. We must recognise that social media research transcends the usual boundaries of geography and standard methodologies. This means that a scholar's research design must ensure that it satisfies the legal regulations and terms of service of each platform as well as those platforms' hosting countries' laws and the laws where the researchers are based. This also includes institutional guidelines, the privacy and expectations of users and their vulnerability from publications covering their activities,

the reuse and publication of data and how users' contributions are anonymised [24]. The application of ethics must consider the concerns raised above. If researchers and organisations are not careful in their approach, the disconnect between researchers and users may grow further. A lack of action regarding such ethics could lead to a series of undesirable consequences, such as users calling on social media platforms for changes in their terms of service to restrict the use of their data. The impact of this may make it extremely difficult to use social media data for research designed for the public good.

Social media research ethics as specified above requires further development and awareness to ensure that the public's data are represented in their context in an accurate, respectful and fair way [10] [25]. Ethics of social media data analysis is of significant importance and is hotly debated in the research community (by organisations such as, the Social Research Association [26], the Academy of Social Sciences [27], and the New Social Media, New Social Science [28]) and outside of it, where improvements are continually being made to relevant ethical frameworks [10]. Ethics could be applied in the sense of one's own morality and standard of ethics, but the problem with this is that not everyone may have the same high ethical standards. Indeed, one may think that they have a high set of standards when in actuality their standards are lower than they believe and overall this is a slippery slope as it is open to suggestions of improper usage as there is no conformity to an agreed set of rules.

Current ethical guidelines are an ongoing area of development amongst research institutes and other organisations. There are a series of organisations that have produced a set of guidelines to follow, all of which support a high standard of ethical practice in social media research. Some examples of these organisations and efforts are provided below.

- A Canada Research Chair has emerged from a five-year partnership with SMDS. This project aims to address the concerns of incoherent and inadequate practice in social media research and suggests a set of guidelines for conducting large scale and aggregated analysis through social listening [14] on sensitive topics, such as medical and religious data [29].

- Ipsos MORI (funded by institutes such as the EPSRC, ESRC, CASM and DEMOS) is a market research organisation in the UK that is "curious about people, markets, brands and society", where they "deliver information and analyses by making it faster and easier to navigate our complex world and aid clients in making better decisions." IPSOS MORI produced a guide that examines and reviews the ethical, legal and regulatory framework for embedding ethics in social media research [30]. When considered alongside the SMDS framework, these provide a comprehensive set of user-driven principles to help manage all aspects of social media data in research, such as how to decide and handle the use of reproduced tweets - especially those that concern sensitive topics.

- The Economic and Social Research Council (ESRC) has an "ESRC Framework for research ethics", which contains a few social media guidelines [20] that can be put into practice. As social media ethics develops, we would suggest that the ESRC might wish to consider the addition of further guidance aimed towards helping social media researchers, particularly newcomers to the field, to navigate the uncertainty and confusion of this nascent field to help to ensure that they meet a high standard of ethics.

- The Government Social Research (GSR) team used a data science framework and incorporated a social media element into this directly. This report shows some pertinent core principles for the researcher that must be considered when conducting any social media research [1]. There are many important ethical considerations given, such as "Core principle 4: Avoidance of personal and social harm" [1, p20] and "Core principle 5: Non-disclosure of identity" [1, p20] which are straightforward and clear to understand.

The above ethical guidelines cover different areas, for example, the SDMS guidelines are focused on the actual conduct of social media analysis, the IPSOS MORI framework covers legal and regulatory issues, the ESRC guidelines are rather generic and do not yet constitute a concrete approach while the GSR team have simply appended to their current ethical framework a social media element, so that the framework is more specialised towards social media [25]. There are calls from [25] for institutions' ethics committees to integrate requirements into the approvals documentation (by specifying which ethical guidelines would be applied in one's research); as [25] suggests there is a low level of ethical awareness amongst researchers applying social media data mining in their studies.

Now, all these guidelines provide very important points, but their multiplicity creates difficulties for the researcher as there are still uncertainties around the ethics of social media research in part because these guidelines do not always agree. Of course, this area is still in its early stages of development. In addition, what makes this area even more difficult is the terms and conditions set by the individual social media platforms. These can be hard to interpret because of the legal terminology or may be otherwise ambiguous and different platforms have different terms of service, such that it can be difficult for multi-platform research to adhere to them all simultaneously. Moreover, the terms and conditions can create ethical concerns for publication - for example, Twitter will not allow tweets to be presented without usernames [10], which can make it difficult to protect participants from potential harm. If the data are highly sensitive and the username is published, then the effect of linking the user to these data and the research may cause an effect within the public sphere. For example, the subject may receive positive responses, thereby boosting their reputation, or, perhaps more seriously, highlighting negative tweets may damage the mental or physical wellbeing of those mentioned within them.

Online research poses a greater risk to upholding confidentiality than does protecting offline research [18]. One reason for this is that at present there is a permanent record of what has been posted online. For instance, any quotation used can lead directly back that user in question with the use of a search engine [18]. This raises concerns over the anonymity of data. For example, as noted above, Twitter's data sharing licensing policy allows the sharing of Tweet IDs only, to ensure the data collection process is reproducible [18]. Using the identification ID provides a way to obtain the same dataset from Twitter's API. These IDs are unique and are easily searchable on the web to locate each tweet. This can be a cause for concern as it makes it easier to de-anonymise the data, so if the data are highly sensitive then a choice has to made as to whether that ID should be excluded from being shared if it causes an ethical concern [18]. Furthermore, the anonymisation techniques we can apply now may become easier to deanonymise in the future due to technological advancement.

In the UK, we must also take other laws into consideration, such as the Data Protection Act 1998, as researchers need to comply fully with the data protection principles laid out therein. Section 33 of the Data Protection Act 1998 allows exemptions to be made in accordance with principles 2 and 5 of the act for personal data used in research [31]. Recent developments within the UK Government suggest they are looking to form a council of data ethics "to address the growing legal and ethical challenges associated with balancing privacy, anonymisation of data, security and public benefit." [32] and also to implement the General Data Protection Regulation on the 25th of May 2018 [33]. Researchers will have to take these developments into account in their future practice as it may impact their social media research. Even after Brexit, the General Data Protection Regulation (which includes similarities with the existing UK Data Protection Act 1998) will be adopted into UK law [33]. It is essential that researchers keep abreast of any legal developments and keep up-to-date with good practise in their relevant area so as to make the best possible ethical use of social media data.

The concerns outlined above regarding the ethical challenges of using social media data can make for a difficult challenge for the social media researcher. The best course of action the researcher community can take is to address concerns and difficulties on case-by-case basis, thereafter trying to update guidelines and frameworks to deal with such cases. Genuine mistakes might have been made in the research community, which both individual researchers and the community as a whole can learn from. If a researcher has made a genuine ethics-related mistake in their work and has demonstrated remorse, then we as a community need to forgive and look to further strengthen the ethical standards and frameworks available to us. Indeed, ethical concepts are not just hoops to jump through in the early phases of research, but concepts requiring ethical inquiry [18], which may in itself take time. Mistakes may not be recognised until well after they have occurred and numerous judgements are possible, which can provide uncertainty and ambiguity, but this is likely to apply to any research [18]. Ethical

considerations will be in a constant state of assessment throughout any project and each case that arises during the research process can be worked through using a set of context-specific decisions. In addition to this, researchers must be guided by core ethical principles set by their employing organisations and external bodies, while also employing an appropriate mixture of the frameworks as laid out above, to ensure that the highest ethical standards are followed in any research.

There is a need to improve ethical assessment and one way to do this is to create a value-based ethical culture and practices in the research community and within other organisations for the development and deployment of intelligent systems both within the UK and elsewhere. This is known as Value Based Design (VBD) [34]. To do this, one must identify, enhance and ultimately embrace management strategies and social processes that facilitate value-based ethics within their design process. This could be included as an additional step in the framework in a future development, as it may provide a way to ensure a higher standard of ethical practice in the future.

IV. CONCLUSION

This paper has taken an existing methodology, the GSR lifecycle, and created from it a new social media lifecycle suitable for the research context. This was illustrated via a new diagram (Figure 1) that contains steps adapted to incorporate changes that are required for use in a research context. Alongside this, a number of ethical concerns have been explored and we have highlighted a series of pertinent points to consider in any future social media research project. Overall, this paper has sought to provide an easier way for researchers to enter the domain of social media research and then conduct relevant research, while providing an insight into the importance of the relevant ethical considerations in this area. Future research directions could include widening the framework beyond the UK, to other domains such as the wider European Union, the United States and Canada in a more detailed fashion and further thought could be given to how to expand the framework to include VBD.

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