

Practices and Metrics of Citation in Scholarly Publishing

Taha Sochi (Contact: t.sochi@ucl.ac.uk)

London, United Kingdom

Abstract: In the world of academia and research, citation (i.e. being cited and referred to) in scholarly publications is generally regarded as a primary metric for integrity and excellence. In other words, it is the currency of credibility and the gold standard for reliability. In this article we try to shed light on some of the bad and immoral/unethical practices related to citation in modern scholarly publications and activities. In fact, citation (and actually academic and scholarly activities in general including scholarly publishing) became in modern times an industry that is subject to many non-scholarly factors and considerations (whether sinister or benign), and this should be regarded as a form of corruption that threatens the integrity, authenticity and morality of the present and future of academia, research and scholarly activities (and actually human knowledge and progress in general). This threat is aggravated by the epidemic of predatory journalism and the wide availability of artificial intelligence tools which facilitate the abuse of scholarly publishing and citation practices and the manipulation of metrics and parameters related to these activities. We also discuss briefly the value and significance of academic and research metrics related to citation which are commonly used these days to evaluate scholars (as well as other scholarly entities like journals and institutes) and assess their scholarly works and ranks (noting the direct negative impact of the bad citation practices on these metrics and parameters and their supposed significance). We finally present some proposals to address the limitations, shortcomings and abuses of the existing practices and metrics related to citation.

Keywords: Modern science, ethics of science, ethics of scholars, citation practices, citation metrics, citation abuses, predatory journalism, artificial intelligence.

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1 Introduction

In the academic and research world, citation of someone's work is vital for attributing credit, validating claims, and situating research within its broader body of knowledge. However, there is a growing concern among scholars regarding the misuse of citations, which undermines the integrity of scholarly publishing. Scientists (and scholars in general) despite their typical image as people who pursue truth and are role models for honesty and decency, can engage in citation practices that are immoral/unethical or unsound from a scholarly viewpoint. These bad practices can distort the research process and affect the integrity of scholarly work in general and scholarly journalism in particular.

As we will see, scholarly citation in its current situation is subject to many personal and non-scholarly considerations and hence in many cases citation does not reflect the state of the cited work (as well as the non-cited work) accurately and fairly (such as its importance, impact, value and quality). Moreover, it is a vast field for immoral/unethical and scholarly-unsound practices (and even criminality in some cases). We also note that most of the existing citation-related metrics and indices are inherently flawed or inadequate and extrinsically susceptible to abuse and manipulation.

I believe (like many other scholars) that the malfunctioning of the existing citation system and tradition and its abused and biased metrics and indicators have serious bad consequences and hence they require an immediate and earnest treatment. This should include putting a clear code of conduct and regulations within the community of scholars (with some enforcement measures, incentives and deterrents) to rectify the defects of the current situation and practices of scholarly citation (and actually many other problematic aspects). We also propose a review and improvement of the citation-related metrics and indicators so that they become more realistic and reflective of what they are supposed to represent and indicate and less susceptible to manipulation and abuse.

This paper is largely based on my past and present personal experiences over more than twenty years as a student, researcher, author and reviewer. However, I also consulted during the writing of this paper the wide literature available on the world wide web on this subject and related subjects and issues (see for instance [1] and the hyperlinks that will be provided later on) and hence it also represents the views and experiences of many other researchers and academics (and scholars in general). Nevertheless, we think these issues are not given sufficient attention so far and hence more voices and efforts are required to raise awareness about the extent and gravity of these issues and their serious consequences. Also, more practical steps and measures are required to tackle these issues and address

their negative impacts.

Our plan in this paper (following this introduction) is to discuss the main types of ill practices in the current situation of scholarly citation (see § 2). We then discuss briefly the issue of scholarly metrics related to citation to assess their value and significance in representing the actual academic and scholarly substance and content of research and the related entities such as scholars, journals and academic institutes (see § 3). This is followed by a brief discussion of some proposals to address the defects and limitations of the existing practices and metrics of citation (see § 4). We finally conclude the article by outlining the main achievements and conclusions of the present investigation (see § 5).

2 Ill Practices Related to Citation

In the following subsections we discuss the main types of ill practices in scholarly citation. However, before this we should note that there are two main broad types of citation-related ill practices: immoral (or unethical) practices and scholarly-improper practices (i.e. they are bad from a scholarly viewpoint although they are not immoral/unethical in their own right since they represent negligence or ignorance or lack of high academic standards and quality and so on). In the following discussions we will not distinguish between these two types of ill practices due to their clarity from this perspective in most cases although we usually make some remarks about this matter to draw the attention to certain issues and subtleties.^[1] We should also note that the following types of citation-related ill practices are not necessarily disjoint or mutually exclusive since some of these practices may have different aspects and perspectives and hence they can be included under more than one of the following labels and titles simultaneously.

2.1 Excessive and Irrelevant Self-Citation

Self-citation refers to the practice of citing one's own work in his subsequent publications. In fact, self-citation with and without proper context or scholarly justification is a widespread practice among scholars of all ranks and walks of life. Actually, most scholars feel a strong temptation to cite their own previous works for the slightest of reasons (and

^[1] Actually, most (if not all) these ill practices have bad scholarly effects and impacts as well as immoral and unethical consequences (where these two aspects are demonstrated, individually and/or collectively, in various contexts and circumstances and depending on various factors such as awareness and intention or results and consequences and so on).

even without any reason) for obvious purposes such as highlighting their previous research and improving their academic metrics related to citation (such as their h-index).

While self-citation is entirely legitimate when an author builds upon his own prior research to facilitate understanding the background and context of his current research, there is an alarming trend of excessive and irrelevant self-citation where the author cites himself unnecessarily many times or without relevance and proper context. This is especially bad when this excessive and irrelevant citation is at the expense of citation of other scholars whose work is more appropriate and relevant to cite in the given context. Many scholars use self-citation to inflate their citation count and enhance their perceived academic impact. This can lead to biased literature reviews where the cited works are disproportionately based on such inflation rather than on balanced and fair view of the existing research.

Anyway, excessive and irrelevant self-citation inflates the author's citation metrics without contributing meaningful new insights or give proper and fair credit to the author and the other authors in that field of research. It also skews the representation of the field by failing to consider relevant research by other authors and scholars. Moreover, it creates an artificial and misleading network of citations which are driven by a desire for recognition rather than academic merit and research excellence and hence it can be regarded as a form of deception and fraud (at least in some extreme cases). In short, it can be immoral and unethical as well as being a bad practice from a scholarly viewpoint and perspective.

We should finally note that self-citation is not restricted to individual scholars since it can similarly apply (for instance) to institutes, groups and journals. For example, some institutes and research groups exchange citations among their members and affiliates to enhance their citation profile and metrics. Similarly, some publishers practice publisher-level self-citation to inflate their citation impact. These forms of self-citation are more difficult to discover and detect (and hence take into account and quantify by the citation-related metrics) than self-citation at the level of individual scholars.

2.2 Non-Citation of Relevant Work of Other Scholars

Neglecting citation of relevant work of other scholars is another ill practice of citation. Some scholars (especially those of higher ranks) deliberately avoid citing the work of other scholars (especially those of lower ranks), even when it is directly relevant to their research. This may be done to undermine the work of rivals and diminish its value, or avoid giving

credit to others as a form of hostility or punishment or revenge or competition, or create an illusion of originality and precedence about the author and his work, or even because of sheer feeling of envy or disdain of citing the work of “unworthy” or junior rank scholars.^[2] Such behavior is especially prevalent among higher rank academics and researchers and in highly competitive fields where citation counts can directly and strongly influence funding opportunities, academic career advancement, and professional recognition and awards.

Apart from its moral and ethical downside (e.g. by potentially harming other scholars careers, or depriving them of due credit, or misleading the academic and research community by creating an illusion of novelty or exclusive insight) it can hinder the progress and advancement of science by obscuring or undermining important research, or diminishing the value of collaboration and knowledge sharing. So in short, this practice of degrading competitors and rivals (or obscuring and misrepresenting their work in citation, or devaluing and undermining their genuine research) is immoral and unethical as well as being a bad practice from a scholarly viewpoint and perspective.

Anyway, this type of ill practice of citation (or at least some of its shapes and forms such as when it is used to create an illusion of originality and precedence) may be classified as plagiarism and academic dishonesty. We should also note that the capacity of citing relevant work in any single paper is limited (since the relevant papers that can appropriately be cited in a given subject and topic are usually too many to be cited all), and hence what is intended in this subsection is things like neglecting citation of certain relevant works of key importance (e.g. being landmarks or being recognized as precedent in their field), or when the sources are too few and hence they can be easily cited, or when the citation is not representative of the existing situation in that field because papers representing certain views and opinions are not cited, and so on.

We should finally note that “of Other Scholars” in the title of this subsection may be deleted because “Non-Citation of Relevant Work” of the author himself may also be considered (whether in this subsection or in another subsection) such as when the author wants to hide his previous work (which is relevant or necessary to cite) because he changed some of his views and opinions, or because the previous work is of low quality and below the accepted standards, or it contains some errors and mistakes, or it violates certain rules and standards, and so on. In short, the author may avoid citing some of his own previous work for illegitimate or malicious purposes and against the requirements of transparency

^[2]In fact, the feeling of envy and jealousy is strongest among scholars and this is a phenomenon (or rather illness) that exceeds all limits and crosses all borders and boundaries (geographical, historical, epistemological, etc.).

and honesty, and this should also be regarded as a type of ill citation practice which could be unethical and immoral as well as wrong from a scholarly perspective.

2.3 Improper- and Over-Citation of Celebrities

There is a general tendency and trend among scholars to cite the work of celebrities, famous scientists and prominent figures within and around the academic and research circles. In fact, this tendency and trend can be explained by several factors such as:

1. Famous scholars and celebrities are often associated (rightly or wrongly) with high-quality, foundational and authoritative research, and hence citing their work can lend credibility to the citing research. In other words, citing celebrities generally has a positive impact in academic and research circles where the reputation of the source can influence how the citing work is received and perceived by the audience and peers (such as readers, editors, reviewers and funding bodies).
2. Another factor is visibility because citing celebrities and famous scholars could help in increasing the visibility of the researcher and his work and connecting him to influential academic and research circles and institutes. This is because the high visibility of the celebrities can bring visibility to the citing author and his work.
3. Citing famous scholars and prominent figures in academia and research can be an effective and easy way for alignment with the prevailing academic trends or schools of thought and association with influential people in the particular field of research with many positive effects and beneficial impacts (such as lifting up career, getting funding and publishing opportunities, obtaining promotions and awards, and so on).
4. The hierarchical structure of academia often motivates and dictates on the young researchers (in particular) to cite the famous and powerful in their field of research.
5. Citing famous scholars and prominent figures can be a form of flattery citation (which will be discussed later on; see § 2.9).
6. There is also a psychological motive for citing (and over-citing) of celebrities which is the enjoyment of citing celebrities due to the “spiritual” bond that many people (including scholars) feel toward celebrities and idols (and “heroes” in general). This is also inline with the illusion of becoming great and famous by associating oneself with the great and famous people. Accordingly, it can be a form of motivated citation (see § 2.12).

Anyway, the tendency of citing celebrities and famous figures (which leads naturally to improper- and over-citation of them) is a harmful disease in academia and research and has many negative effects and impacts. For example:

- It amplifies the credit of some scholars at the expense of other scholars.
- It can undermine the development of fresh and creative ideas by failing to consider more recent and innovative research (which often emerges from the young scholars and new-comers to research).^[3]
- It limits the scope and extent of literature reviews and creates a sort of scholarly “echo chambers” which distorts the representation of scholarly works and contributions (as well as the individuals, groups and institutions).
- It produces a biased and potentially exclusionary view of the field, and could lead to neglecting valuable contributions from marginalized views and opinions.
- It fuels the harmful culture of celebrities in academia and research by creating idols (as well as amplifying the idolization of already famous scholars).^[4]

So in short, there is a strong tendency and trend to cite the famous and celebrated scholars in their fields (such as those who get prestigious awards and honors) regardless of the quality or importance or relevance of their work, and this bad practice has many harmful effects and consequences.

We should finally note that although the practice of improper and excessive citation of celebrities may not be morally and ethically wrong in itself, it is scholarly wrong and unsound in general. Moreover, it can be unfair and lead to unfair consequences as indicated above (and hence it can become indirectly immoral and unethical).^[5] We should also note that celebrity status and culture is not limited to individual scholars but it extends even to institutions (in the form of prestigious universities, research centers, and so on) which get more recognition (in terms of credit and attention, citation of their work, and so on)

^[3] In fact, the effect of over-citation and bias in the citation of celebrities (and actually the adoration caused by and drive this trend) does not only lead to unduly amplification of credit (which is unethical) but it can also hinder or delay scientific progress and advancement in knowledge where scholars stick to the theories of celebrities and hence science and knowledge become cult-like. In this regard we have many historical examples (e.g. from the middle ages where scholars kept following certain scholars like Aristotle) as well as from the recent past (e.g. from the era of the beginning of the twentieth century where the theories of certain celebrity scholars dominated the landscape of physics ever since and hence they overshadowed other theories and trends and oppressed the progress and advancement of science).

^[4] In fact, the role and culture of celebrities in science in general not only in citation (as well as in all other venues of life) are very problematic as they have many negative impacts on the progress and healthy advancement of science and knowledge in general (and life in more general). However, this is not the place to discuss these issues in detail.

^[5] For example, the naive reader of the modern physics texts will get a strong impression that the entire modern physics was created and developed by a handful of scientists whereas in reality it is the product of a collective effort by generations of thousands and thousands of scientists. This is largely due to the celebrity culture where the celebrities get the lion share of the credit while the others get almost nothing. So from this aspect this practice is unethical and immoral (or it leads to unethical and immoral consequences) since it is a form of discrimination (in favor of some scholars and against other scholars).

than other institutions, and this is reflected in terms of funding and citation for instance (where they get more funding and citation as well as other advantages and resources).^[6]

2.4 Improper- and Over-Citation of Seminal Studies

Another general tendency and trend (which is similar to improper- and over-citation of celebrities; see § 2.3) is improper- and over-citation of famous landmark (or supposedly landmark) studies to the exclusion of a broader range of research. In fact, what we said in the previous subsection about celebrities and famous scholars and entities applies largely (with some modifications) to celebrated and seminal studies in general.

In many cases, scholars feel tempted (and sometimes obliged) to cite seminal studies that are frequently referenced and cited in the particular field of research, assuming these seminal studies lend credibility to their work and bring academic and personal benefits (such as funding, citation, alignments to certain trends and groups, visibility, and so on). However, this can result in a narrow, and sometimes outdated, view of the field. While citing seminal studies can be important and necessary (such as in historical contexts and reviews), an over-reliance on these sources can obscure new and potentially more relevant investigations and findings.

Improper- and over-citation of seminal studies can also limit the scope of literature reviews, amplify the credit of some scholars at the expense of other scholars, and undermine the development of novel ideas by failing to consider more recent and innovative developments.^[7] Although this practice (as such) is not wrong from a moral and ethical viewpoint it is scholarly improper and unsound in general and can have indirect moral and ethical downsides and bad consequences (as indicated already).

^[6] Actually, the celebrity culture (whether about individual scholars or academic institutions or even in general) is unethical and immoral because it is a form of discrimination and favoritism. Moreover, it has many bad effects and consequences such as exclusion of gifted individuals and high-quality contributions from outside the privileged circles and environments, and reducing diversity which is necessary to any healthy, sustainable, productive and balanced environment.

^[7] Improper citation of seminal works (especially those historical studies which lost their academic significance and value due to major advancements) and the consequent over-citation of them can lead to stagnation of progress of knowledge due to the undue glorification of certain ideas and theories. In fact, we have many historical examples of such over-reliance and undue glorification (e.g. from the middle ages where scholars kept following certain theories and seminal texts, such as the Aristotelian school of thought and texts, with very little interest in searching for novel investigations and ideas) as well as from the recent past (e.g. from the era of the beginning of the twentieth century where certain theories, such as general relativity, dominated the landscape of physics and hence it oppressed other theories and ideas which could be more sound and beneficial to science and knowledge in general).

2.5 Citation of Dubious or Unverified Sources

In this type of ill citation practice the author cites sources which are questionable and lack academic credibility because they do not meet the basic standards of scholarly publications.^[8] An example of this is citing an article of an unknown author published in a predatory journal or posted on a preprint repository which lacks proper moderation and scrutiny process.^[9] In fact, there are several reasons for this practice such as:

1. Naivety and innocence where young and inexperienced researchers (such as PhD students who lack proper supervision) do this practice because of their ignorance of the basic requirements of scholarly citation and the conditions to be met by the cited source.
2. Desperation where certain views or data (for instance) are exclusively available in certain sources which are published in rogue venues or predatory journals.
3. Temptation due to certain motivations and advantages. For instance, the increased pressure and demand for publishing may force or encourage some researchers to build on (and hence cite) works from predatory journals or unreliable sources because they are convenient to build on and easier to access (noting that predatory journals are open access which is not the case with many genuine scholarly journals and their publications) or because they provide convenient data and contents.

Anyway, this citation practice should be avoided by respected and honest scholars because dubious publishers usually adopt questionable editorial practices and the cited sources usually lack peer review (and even proper moderation and check) and hence when such sources are treated as proper scholarly documents and cited as such they can introduce unverified and potentially harmful contents into the academic stream. In fact, this practice is harmful even at the personal level because it can damage the credibility and reputation of the author within the academic and research community because this type of bad citation can be easily detected and exposed.

We should note that this type of ill citation practice can be more common^[10] and more

^[8] This type of ill citation practice may be labeled (or at least exemplified or instantiated) by the so-called “citation contamination” which may be defined as a practice when a researcher cites papers published in questionable journals, which can then spread potentially flawed, fraudulent, or plagiarized research. It is “contamination” because it contaminates the scholarly record and pollute the integrity and undermines the credibility of the legitimate research. We should also note that the above should apply (by priority) to citation of fake and fraudulent research (i.e. not only dubious or unverified).

^[9] Actually, this may be tolerated or accepted if the content of the cited article is verified to be sound and meets the approved scholarly standards (noting that there are other justifying reasons for accepting this type of citation and hence this example provides typical, rather than strict, circumstances and situations for this type of ill citation practice).

^[10] Studies in this regard have found that questionable and predatory papers and journals continue to be

harmful than we may think especially with the recent explosion of academic publishing and the infestation of predatory journals which sometimes adopt malicious tactics that are difficult to notice or discover to most young researchers (noting that the predatory journalism brand or species evolves like the legitimate brand and species and hence it becomes increasingly more elaborate and sophisticated). In fact, there are alarming signs that the phenomenon of “fake news” in politics and public life repeats itself in academia and research where some people deliberately and maliciously create and publish fake research papers^[11] to create chaos and havoc or to get credits and privileges by easy means.^[12] The wide availability of artificial intelligence tools these days makes faking research a very easy and convenient task (and even an enjoyable experience).

Therefore, academics and researchers in general (and the young and new-comers in particular) should be extra cautious these days in their citation practices to avoid the traps and minefields in scholarly publishing and citation that emerged in the recent years due to the new developments and advancements (such as the emergence of open access models and predatory journalism, the recent explosion in artificial intelligence, the wide availability and accessibility of preprint repositories and services, the wide availability and accessibility of commercial authoring and editing services, and so on).

We should also note that citing blogs (or articles published on the internet by unknown persons/cites) should also be classified into this type of ill citation practices^[13] although this is generally rare and it is easily detectable and hence it is rarely harmful. Anyway, such a practice should be avoided in general except in very specific circumstances and for legitimate purposes. We should also note that respected researchers should also avoid (or at least follow very strict rules when) citing articles which are on the fringe or perimeter of serious science and scholarly knowledge such as some types of science popularization articles since they may contain some harmful contents or suggestions (due for instance to being simplistic or containing exaggerations or lacking thoroughness and rigor or being

cited even though in small numbers. Some studies have also shown that dubious articles from questionable journals are being cited by articles published in respected journals and indexed by respected scholarly indexing venues and websites.

[11] See for instance:

<https://theconversation.com/fake-papers-are-contaminating-the-worlds-scientific-literature-fueling-a-corrupt-industry-and-slowing-legitimate-lifesaving-medical-research-246224>

[12] In fact, there are many reasons for this sort of malicious activities. An obvious example of such reasons is revenge especially by those who failed to get into academia and research by proper ways and means. Another obvious example is getting into academia and research by easy ways since faking research is much easier than making genuine research.

[13] We mean by this, citing such sources as authoritative sources (e.g. of opinions or data or information) and not for other legitimate purposes.

used for propaganda and marketing).

In short, citation of dubious or unverified sources is a bad practice that should be avoided because it undermines the quality of the research contents by potentially promoting questionable ideas and unreliable information. Moreover, it undermines the quality and value of the citation count metrics by giving unduly credit to suspicious sources as well. It can also compromise the scientific rigor of a field and may lead to the spread of wrong or misleading views and data. Furthermore, it devalues the peer review process (and academic quality checks in general) and makes it more difficult to identify reputable research and distinguish between good and bad scholarly work. Accordingly, this practice of citation is wrong from an academic and scholarly point of view and can be immoral and unethical as well and hence it should be avoided by respected scholars.

2.6 Citation for Metrics and Prospects not for Relevance

In this type of ill citation practice the author cites sources not because they are relevant (even if they are actually relevant) but to boost his citation metrics or career prospect (or those of colleagues, or associates, or institutes, or ... etc.). In fact, academics and researchers in recent days (unlike old days) are increasingly motivated and encouraged to cite works that contribute to their own career trajectory, such as citing papers of their own or their associates and affiliates or citing papers of high-citation authors or from high-impact journals, even if those works are not directly relevant (or not because they are relevant, useful or necessary to the citing research). This practice may be incentivized by the desire to boost their own citation profile and metrics (or those of associates and affiliates; see for instance § 2.6.1) or appear aligned with top-tier research by associating themselves and their research with widely recognized authors and journals (and so on).

In fact, this trend is encouraged and fueled by the wrong mentality of “publish or perish” where the focus of scholars shifts from quality research that serves scholarly knowledge and objectives to quantity citation practices and tactics that serve personal objectives and self-centered goals and agendas. Unfortunately, this mentality is not only very common among academics and researchers these days but it is generally seen as acceptable (and even commendable as being a sign and drive for activity, productivity and accomplishment).

Anyway, this type of citation practice is wrong and harmful to scholarly knowledge (as well as being unethical and immoral) for many reasons. For example, it distracts from the true objectives of citation such as advancing knowledge, promoting understanding, attributing fair credit to the right people and entities, identifying chains of ideas and

developments, connecting works and activities of genuine and honest scholars, and so on. It also distorts the academic and research landscape because (for instance) papers that align with certain trends and serve certain metrics (regardless of their quality or relevance) gain undue attention and prominence at the expense of other papers which may be more worthy of this attention and prominence.

Accordingly, this practice and trend can contribute to the devaluation of authentic research where the focus on the citation metrics (and related parameters such as publishing in high-impact journals) can lead to the devaluation of genuine research and narrowing the scope of the so-called “prestigious” or “cutting-edge” research where genuine research contributions can be buried under loads of artificially inflated publications and swept by floods of staged scholarly shows.

We should also note that using dodgy tactics to artificially inflate the citation metrics and scholarly profiles and create the illusion of being highly accomplished can distort academic rankings and mislead funding agencies, universities, research institutes, governmental agencies, decision makers, and so on. This can lead to posts, promotions, grants, awards and honors being unfairly assigned and awarded based on illusory or inflated achievements and fabricated impacts, and this should obviously be at the expense of other scholars who are more qualified to get these resources and awards.

In short, this ill practice of citation is not only wrong from a scholarly perspective and by the commonly accepted scholarly standards and values, but it is immoral and unethical as well. In fact, it could even have some legal consequences and liabilities as a result of misleading and misinformation caused by this practice.

2.6.1 Citation Cartels and Scholarly Networks

In this regard we should talk a little bit about citation cartels (and related scholarly networks)^[14] which emerged in recent times (among academic and research circles and groups) and seem to grow quantitatively (in size and number) and qualitatively (in influence and power). Citation cartels are formal or informal groups of scholars or journals who conspire to actively and systematically cite each other’s work (often regardless of the relevance of the cited work) in order to artificially boost their citation metrics, ranking

^[14] We use “scholarly networks” here to refer to groups whose collaboration (or rather collusion) extends beyond citation. In fact, citation cartels represent an instance of scholarly networks since these networks can collaborate (or collude) in scholarly activities other than citation (as will be clarified later on in this subsection). We should also note that “cartels” in this context can also be attributed to academic journals and institutions (and actually to other types of scholarly entities).

and impact (noting that scholarly networks similarly conspire in activities similar to citation, such as authoring or reviewing, to get certain illegitimate benefits and advantages). While collaboration and reciprocal referencing are common in research communities and are generally acceptable and legitimate (even though they usually include some form of collusion or mutual understanding to get certain benefits and advantages), the practice of citation cartels (and scholarly networks in general) extends beyond this common form of academic collaboration and cooperation.

Some of the practices and activities of these cartels and networks are:^[15]

1. Exchange of citation (usually excessively and with no regard to academic relevance and standards) between authors or journals.
2. Exchange of authorship where some authors include the name of individuals (who have no connection to the published work) as co-authors in return for including their own names as co-authors on the publications of those individuals (or in exchange of other favors and services such as giving positive reviews, or accepting their papers for publication in certain journals, or citing their work, or getting certain awards, or ... etc.).
3. Exchange of positive reviews and favorable recommendations (such as with regard to publication in journals, or getting grants from funding bodies and governmental agencies, or getting academic posts and promotions, or ... etc.).

Anyway, the activities of these cartels and networks are generally illegitimate from a scholarly perspective.^[16] Moreover, they are usually unethical and immoral and can be illegal as well (at least in some of their extreme shapes and forms).

2.7 Misleading Citation

In this type of ill citation practice the author cites some work (which is usually an authoritative work such as a classic and highly trusted textbook) in a certain context and position to create an illusion or impression of supporting or opposing certain idea or argument or claim while the cited source in the given context and position does not have the capacity of supporting or opposing the given idea or argument or claim. This type of citation is misleading because the cited source is not related to what is being cited for and it does

^[15] In this list we go beyond “citation” which is the subject of the present paper. We do this for the sake of completeness and common benefit (noting that we may investigate these issues in more details in upcoming investigations and publications).

^[16] See for instance:
<https://www.science.org/content/article/citation-cartels-help-some-mathematicians-and-their-universities-climb-rankings>

not align with the citation context.

This practice obviously violates academic integrity and distorts the attribution of ideas and the use of academic sources. It may also encourage the development of a cycle of misinformation and misrepresentation in the scholarly records. Moreover, it could damage the trust between scholars themselves and between them and the broader public with regard to academic credibility and decency. In fact, this type of ill citation practice should be classified as dishonesty (i.e. unconditionally not only from an academic perspective) when it is done with premeditated intent.

In short, this bad practice of citation is not only wrong from a scholarly perspective and by the generally accepted scholarly standards, but it is immoral and unethical as well. In fact, it could even have some legal consequences if it caused harm and damage because of this misleading and implicit misinformation.

2.8 Decorative Citation

In this type of ill citation practice the author cites some sources with very little or no relevance or need but because he wants to inflate the size of his paper, or to give the impression of conducting thorough and comprehensive research,^[17] or to meet the requirement of certain journals or preprint repository sites which require having a references (or bibliographic) section in their publication, and so on. In short, in this type of ill citation practice the citation is used to improve the shape and appearance of the published work and for aesthetic purposes rather than to add scholarly value to the citing work or to meet a demand or necessity from a scholarly perspective.

This type of ill citation practice should be avoided especially when the cited sources have no relevance to the citing work. It may also become unethical and immoral in certain cases and circumstances (in fact it can be unethical and immoral from other perspectives and considerations such as being misleading; see § 2.7).

2.9 Flattery Citation

This is another type of ill citation practice where the author cites someone's work (or some group's work) for the sake of flattering the cited individual (or group) with disregard to academic and scholarly considerations to get certain favors and benefits. The following are some examples of flattery citation:

^[17] In fact, this may more appropriately be classified as misleading citation (see § 2.7).

1. Citing the publications of an editor or a (potential) reviewer^[18] to increase the chance of acceptance for publication.
2. Citing the publications of the journal to which the research is submitted to increase the chance of acceptance by the journal (since the journal will benefit from citing its publications, e.g. by improving its impact factor).
3. Citing the publications of a supervisor or adviser or a colleague or a member of a funding body or a faculty member or an acquaintance to strengthen the bonds or get some benefits and rewards or as a form of acknowledgment and recognition of gratitude to certain favor (such as being previously cited or commended by the cited author) or as a gesture of goodwill toward a certain individual (such as a friend or a member of his faculty) and so on (also see § 2.12).

This type of ill citation practice (which is very common and is generally tolerated and may even be seen as acceptable by the majority of scholars) should be avoided (at least because it does not meet the higher standards of academia and research). It may also become unethical and immoral in certain cases and circumstances.

2.10 Coercive Citation

In this type of citation practice the author is pressured or coerced to cite certain papers or mention some scholarly works or sources, and hence the blame in this ill practice should be put primarily on those who apply the pressure on the author rather than on the author (although the author may also be blamed for bending to pressure). In fact, we have several types of coercive citation; some of these types are:

1. Coercive citation by journals where the pressure on the author is exerted by the journal to which the citing work is submitted. Some journals (to increase their impact factor and enhance their citation metrics) ask the author to cite papers published previously by the journal. In fact, some journals (in the past at least) put citing a certain number of their papers as a prior condition for submission (i.e. the submitted paper will not be processed and considered for publication unless it meets this condition).^[19]

^[18] Since journals usually ask the authors to suggest potential reviewers of their work, the authors may cite some of the publications of the potential reviewers who they suggest to get a better chance of positive recommendation from these reviewers in case that the paper is reviewed by these suggested reviewers. This should also apply when the reviewer is known or revealed to the authors for some reasons and in some circumstances, e.g. when the reviewers do not hide their identity before or during the review process or their identity becomes exposed explicitly or implicitly (e.g. by guess and indications) during this process.

^[19] Eighteen years ago I was forced to cite three or four papers of a certain journal (to which I submitted

2. Coercive citation by editors where the pressure on the author is exerted by the editors of the journal. Some editors abuse their position by asking the author of a submitted paper to cite their own work (or some other work related to them or their associates) although this is not an implicit or explicit policy of their journals. The author will risk the rejection of his paper if this demand is refused.^[20]
3. Coercive citation by reviewers where the pressure on the author is exerted by the reviewers during the review process. Some reviewers abuse their position by asking the author of a paper under their review to cite their own work (or some other work related to them or their associates). The author will risk the rejection of his paper if this demand is refused.^[21]
4. Coercive citation by seniors and supervisors (such as the deans of academic faculties or the supervisors of PhD students). In fact, this also applies to some academic and research institutions and their departments and faculties which may coerce their students, research staff and faculty members to cite works belonging to these institutions (or these institutions have certain reasons and motives to support and promote these works).

Certain indications (as well as my personal experience) suggest that coercive citation is relatively commonplace and may have other forms (which may be disguised or implicit unlike the aforementioned forms which are blatant and explicit).

Anyway, coercive citation is morally and ethically wrong and is scholarly bad since it has many bad effects and consequences. For example, it distorts the academic records and inflate the metrics and profiles artificially and unfairly. It can also harm the quality of the citing work such as when the cited work is irrelevant to the citing work or of low quality. From an ethical and moral perspective, coercive citation is an indecent and opportunistic practice and an abuse of positions and privileges. In fact, this practice should be classified

one of many papers) because this was an official policy of the journal and this was stated explicitly on the journal website as one of the submission conditions.

^[20] I suspect that sometimes there is a collusion between the editor and the reviewer (see the next point) in this type of coercive citation (or the editor inserts in the review report some of his demands).

^[21] I have a number of amusing incidences and instances in this regard related to my past work as an author (as well as to my observations as a reader and researcher). In one occasion, the reviewer of one of my papers sent me (as part of his review report) a list of about thirty papers mostly of his own (most of them are irrelevant to my paper) and tried to blackmail me to cite these papers (under the threat of rejection if I refuse his demand). This was repeated in other occasions (although with much less than thirty papers). I also noticed such bizarre and illegitimate practice during my research work (and readings in general) where certain citation patterns strongly suggest such a practice of coercive (or flattery; see § 2.9) citation. For instance, some papers cite a large number of papers belonging to a single author with no obvious reason or suitable context (which strongly suggests coercive or flattery citation or other types of ill citation practices; see for instance § 2.6.1).

as a form of bullying and harassment and should be rejected and condemned by the academic and research communities (and actually by any decent human being).

2.11 Incentivized Citation

This type of ill citation practices can be regarded as a lighter form of coercive citation (see § 2.10) where citation is incentivized (i.e. encouraged voluntarily) rather than forced and coerced. For example, academic institutes and research groups may encourage their students, research staff and academics to cite their own works to raise their profile and enhance their reputation. In fact, what have been said about coercive citation (see § 2.10) applies almost entirely to incentivized citation (with replacement of force and coercion by encouragement and motivation).

2.12 Motivated Citation

This is similar to incentivized citation (see § 2.11) but while incentivized citation is about motivation by the beneficiary entity (e.g. the cited author or journal), motivated citation is about motivation by the citing author himself without involvement or urge by the beneficiary entity. In fact, there are many non-scholarly self-motivated reasons for citing someone’s work such as love, admiration, strengthening personal bonds, supporting relatives and friends, feeling of belonging and affiliation, aligning with certain trends and entities, feeling embarrassed if not citing that work,^[22] acknowledging good gestures and wills, exchanging favors and commendations, and so on.

2.13 Commercial Citation

Some scholars (whether genuine or fake)^[23] offer citation for financial benefits and returns^[24] and this should be regarded as one of the most ugly forms of citation and bad

^[22] For example, you may cite the work of some authors who cited your work because you feel embarrassed if you do not return this “favor” by citing their work.

^[23] Even fake scholars should be considered in this investigation because we are assessing the situation of citation in general. Moreover, being good or bad in this context is mainly about the practice in itself not about who do this practice and hence the ill practice (as such) is the same in its negative effects and impacts and moral downsides whether it is the act of a genuine scholar or a fake scholar.

^[24] See for instance [1] and the following site:

<https://www.science.org/content/article/vendor-offering-citations-purchase-latest-bad-actor-scholarly-publishing>

I should also mention that I found (during this investigation) adverts about selling and buying citations on some freelance platforms.

practices in academia and research in general. In fact, this form of ill citation can amount to criminality. The unethical and immoral sides of this practice as well as its negative impacts on academia and research (and scholarly activities and human knowledge in general) are very obvious, and they can actually represent and implicate almost all the bad consequences and effects that we investigated in the other subsections of the present section (and hence we do not need to go through these details).

Anyway, the guilt and blame in this ill practice is shared equally by those who buy citations as those who sell them, and hence no excuse should be sought to justify this practice by buyers who may try to justify it (for instance) by promoting good and authentic research, or getting duly acknowledgment and recognition, or counteracting the effect of other ill practices of rivals, and so on. The least that should be done against any one involved in this sort of activities (whether seller or buyer or broker or mediator or anything else) is to name and shame those who use or promote this shameful practice.

We should also note that an ill citation practice that is similar to commercial citation is to create fake profiles and publications (for the purpose of citation) to boost metrics and rankings. In fact, these sorts of ugly and fraudulent practices (which are real and practiced by some scholars) may become more common in the future especially with the wide availability of artificial intelligence tools (which facilitate these practices) and the infestation of predatory journalism (and other types of predatory and fraudulent academic and research activities such as selling and buying authorship as exemplified by “paper mills”). Therefore, the academic and research communities should take swift actions and decisive measures to stop this sort of corruption and disease which represents serious threats to all types of scholarly practices and activities (and to human knowledge in general as well as to human morality and decency). In fact, the harm of these fraudulent practices is not less grave than the harm of fake news in politics and public life (which exploded in recent times thanks to artificial intelligence, social networks, and so on).

2.14 Outdated Citation

This type of ill citation practice mainly originates from negligence and is caused by failure to follow or/and update academic sources and bibliographic references (where the author fails to keep up to date with the new developments and advancements in his field because he is not following the novel developments and advancements in his field or because he is lazy to add new items and entries to his bibliographic database) and hence he keeps citing outdated (and thus potentially irrelevant) works without considering recent advancements

and developments.^[25]

So, this practice is primarily bad from a scholarly technical perspective and not from a moral or ethical perspective (although it may also have causes and consequences of ethical and moral nature). This sort of bad practice (and the failures associated with it) is especially real and bad in modern times (which witness an explosion in research at rapid rates in almost all fields of human knowledge) and particularly in fast-moving fields of research (which are characterized by being developed and advanced more rapidly than other corresponding fields of research) since updating and keeping up with the new developments become difficult under these conditions and in these circumstances (and hence it is easy to lose the race and stay behind with obvious bad consequences).

Anyway, this practice has various bad effects and negative impacts. For example, it can hinder the scientific progress by ignoring the current knowledge and developments (i.e. if it is widely practiced and became a trend). It may also mislead (some) readers into thinking that older and outdated theories (or ideas or data or ... etc.) are still relevant and this could have serious theoretical and practical consequences. In short, this practice can lead to the continuation of old results which are no longer valid or they have been superseded by better and more accurate results.

3 Scholarly Metrics Related to Citation

There are considerable number of citation-related scholarly metrics such as citation count, i10-index, h-index, citation impact, field weighted citation impact, impact factor, and CiteScore. The definition and significance of these metrics should be sought elsewhere (such as the world wide web and specialized journals in this field). The purpose of all these metrics is to assess the performance (related for instance to productivity), impact and quality of published research (and published scholarly literature in general), scholars and scholarly journals (and potentially entities and institutes related to them such as research groups, universities, academic institutes, research centers, publishers, and so on). What is common to all these metrics is citation (where it is considered from various quantitative and qualitative aspects and perspectives) and hence all these metrics will be affected directly or indirectly by any ill practice of citation or abuse of the existing citation

^[25] It should be obvious that we are talking here about citation of sources which are supposed to stay up to date with the developments and advancements, and hence we should exclude citation of sources for their historical values and for historical purposes (such as documenting the historical development of a theory or a product). In fact, such sources are not outdated from this perspective.

system (and the related traditions and values).

Anyway, all these metrics have downsides and shortcomings. One of the main downsides of these metrics is that no single metric of these can provide a complete and reliable picture (or assessment) to what the metric is supposed to assess and reflect. For example, the h-index is supposed to reflect productivity plus impact but this may be true approximately and conditionally (i.e. by considering certain conditions and attachments which are not incorporated or embedded in this index itself)^[26] rather than accurately and categorically. However, the stereotype (among the general public of academic and research communities and actually even among many peers and seniors in these communities) of this metric generally ignores the limitations in the value and significance of this metric and hence the h-index is generally given a value and significance more than it deserves. In fact, the inflation (or exaggeration) in the value and significance of this metric applies similarly to all other metrics which are generally overestimated in their value and commonly perceived as complete and categorical in their significance and indication.

Another main downside of these metrics (which is already indicated) is that they all can be abused and manipulated (i.e. no one of these metrics is sufficiently rigorous and foolproof). Actually, some of these metrics are relatively easy to abuse and manipulate especially with the recent advancements in artificial intelligence^[27] and the wide spread infestation of predatory and fraudulent activities related to academia and research (such as predatory journalism, commercial authoring services, and so on).

All these negative factors are enhanced in influence and impact by the radical change in the last decades in the general notion and attitude about the field of academia and research which increasingly became commercialized and deprived of its moral values and ethical dimensions. In fact, academia and research in recent times became an industry like any other industry whose objective is to bring benefits and profits (whether of material nature or of intellectual nature) to whoever get involved in this business.^[28] The injection of huge

^[26] For example, the h-index is affected (and hence limited in value and significance) by factors like the citation practices, visibility and field of research. However, these factors (which are generally subject to non-scholarly influences) are not considered in this index.

^[27] There are a number of reported cases of researchers being caught using artificial intelligence tools to generate academic contents and fake references to inflate their citation-related metrics and indices (some of these cases involve faking academic profiles as well). There are also similar attempts of researchers being manipulating citation-related metrics in “sting operations” (as part of legitimate investigative journalism).

^[28] In this regard we should mention the negative impact of privatization of academic and research institutes and its effect on commercialization and monetization of knowledge which reduced knowledge to be a commodity like any other commodity (rather than a “sacred gift from heaven to mankind”) and weakened regulations and moral/ethical commitments. However, this is a big issue which is out of the

amounts of funding (by giant companies and corporations, governmental agencies, funding bodies, wealthy benefactors, astronomical tuition fees, and so on) contributed badly to this corruption and mess since these huge amounts of fund (as well as the power and capabilities they bring) became a magnet for many devious individuals and people with no morality or ethics (and even criminals) to come and participate in this revolution of lucrative academic jobs/activities and well-funded research projects which bring not only fame, reputation and honors (as it is mostly the case in the past) but money, wealth and power as well. This also encouraged fake and fraudulent scholarly activities (such as commercial authoring and citation) to appear and thrive on the fringes and perimeters of this wealthy environment. The recent explosion in artificial intelligence and predatory journalism (as well as other means and facilities associated mostly with the modern communication revolution and the world wide web) facilitated and encouraged many of these illegitimate activities and bad practices (as indicated already).

To sum up, all the existing citation-related metrics are intrinsically poor in value (due to their inherent shortcomings and limitations) and extrinsically poor in significance (due to abuse and manipulation or at least due to their susceptibility to abuse and manipulation especially with the aforementioned recent developments which facilitate dodgy activities and ill practices). This is aggravated by the negative impact of ill citation practices (see § 2) which are wide spread among almost all sections and ranks of scholars and scholarly institutions and bodies.

4 Addressing Ill Citation Practices and Metrics Limitations

In this section we discuss briefly some of the possible steps and measures that can (and should) be taken to address the problem of citation-related ill practices and the limitations and vulnerabilities of the existing citation-related metrics.^[29] However, we should confess that some of our recommendations and proposals are not practical in the current situation of scholarly environments and academic and research communities. In fact, real change in the current situation requires fundamental change in the values and standards which

scope and space of the present paper.

^[29] It should be noted that although the talk in this section is about citation (due to the scope of the present paper), most of the suggested recommendations and proposals apply equally to other aspects and practices of scholarly activities and entities (such as authoring and reviewing within the academic and research space, and using artificial intelligence tools in academic and research activities and projects).

actually (rather than seemingly and allegedly) govern these environments and communities and regulate their attitude and behavior (and steer their development and evolution in general).

4.1 Necessity of Regulations

The first step in rectifying a faulty situation is regulations so that it becomes clear what is good and acceptable and what is bad and unacceptable. Accordingly, a clear and detailed code of conduct about citation should be created and adopted universally by all (or most) academic and research institutes and entities. The acceptance of this code of conduct should be taken as a condition for the acceptance of any entity (whether individual or institute or journal or ... etc.) in the existing academic and research establishment (such as acceptance for publication in scholarly journals and venues, acceptance for participating in conferences and similar events, acceptance for citation by other scholars and journals, acceptance for application for grants and funding by funding bodies, and so on).

This means that any individual (or institute or journal or ... etc.) who do not accept this code of conduct officially and formally (and actually abide by this code of conduct) will be sanctioned and boycotted by the academic and research communities (and actually “excommunicated”). Regarding the practical aspects of this suggestion we may propose the following:^[30]

1. The aforementioned code of conduct can be created by an elected or selected body of experts in this field. Such body should be representative of the existing academic and research landscape (geographically, ethnically, and so on).
2. A professional body (or board) of neutral and honest scholars can be assigned (by selection or election) to watch and enforce the implementation of this code of conduct.
3. A professional body (or board) of neutral and honest scholars can be assigned (by selection or election) to serve as judges and referees to settle claims and disputes.
4. Limited disciplinary and punitive actions can be taken against individuals and entities for relatively minor violations to the code of conduct, while serious violations can be punished by total and perpetual ban and exclusion. This may also require black-listing of rogue individuals (within the scholarly environments and communities) and predatory entities and activities (such as predatory journals and those who provide commercial

^[30] In fact, some of these proposals may belong more appropriately to the scrutiny and enforcement procedures which will be discussed in § 4.3. However, we discuss them here (and there as well) for the sake of clarity and completeness.

citation and authoring services) in an explicit and formal way (such as on websites dedicated to these purposes).

4.2 Necessity of Education and Upbringing

Education about what is morally good and bad and ethically right and wrong (in life in general and in academia and research in particular) and righteous upbringing are as important as regulations (see § 4.1). In fact, proper education and upbringing in these aspects can be more important than regulations because they treat the problem of bad practices at personal level and in its roots and causes. In other words, the difference between education/upbringing and regulations is similar to the difference between prevention and treatment.

In this regard we propose the following:

1. General education and upbringing of academics and researchers (especially the newcomers to these fields)^[31] should include curricula and practices about the general guidelines and rules that should be followed by academics and researchers (and scholars in general) with emphasis on following morality and ethics in all academic and research works and projects.
2. The recent trend in academic and research institutes and circles which emphasizes on the commercialization and monetization of science (and scholarly entities, activities, and products in general) should be opposed or at least moderated. Human knowledge and scholarly activities (as well as entities related to them) should be given values and goals beyond and above commerce, money and personal profits and gains (especially in their material forms). In fact, the current type of education and upbringing leads to a monstrous form of capitalism and materialism which defies all the transcendental human values which emerged and evolved over countless generations and through painful and costly struggle. These values actually represent the actual content and substance of humanity in its purest form and they constitute the extract of the best human experiences.

In short, we need a fundamental change in the current situation of education and upbringing by emphasizing on ethics and morality in academia and research (as well as in public life) instead of seeing academia and research as a way for getting benefits and making

^[31] Actually, proper education and upbringing (on moral and ethical codes and practices) should be included in the students curricula at all tiers and levels of general and specialized education (starting from the primary school level education).

profits regardless of any ethical code or moral values.

4.3 Necessity of Scrutiny and Enforcement Procedures

Scrutiny and enforcement procedures (to ensure compliance and conformity with the approved moral codes and ethical rules of conduct) are necessary complements and supplements to regulations (otherwise regulations can become useless and ineffective since they can be violated and ignored without fear of unwanted consequences). Some of the suggested scrutiny and enforcement procedures and measures are (noting that some of these procedures and measures have been mentioned or indicated previously as part of our discussion of regulations; see § 4.1):

1. Creating professional bodies (or boards of dedicated specialists) to oversee the implementation of the approved codes of conduct and settle the claims and disputes about them (see § 4.1).
2. Punishing and sanctioning those who violate the approved codes of conduct (such as by exclusion from professional bodies and communities, or denial of certain services and privileges like accessibility to academic publishing, or denial of citation, or ... etc.).
3. Naming and shaming those who violate the approved codes of conduct (e.g. in scholarly publications or official websites dedicated to such purposes).
4. Linking metrics and indices (of individuals, institutions, journals, research papers, research groups and projects, ... etc.) to the past and current behavior of these entities (i.e. the metrics and indices of these entities should be affected positively by good behavior and negatively by bad behavior). For example, an incident of bad citation practice by an individual (or journal) could reduce his citation count (or its impact factor).
5. Total exclusion and ban of all predatory entities and activities. For instance, an official blacklist of predatory journals should be issued and updated regularly. Similarly, predatory journals should be denied any scholarly recognition (e.g. by indexing). Moreover, scholars who use predatory journals or deal with them (in any shape and form such as by serving as editors on their editorial boards or publishing in them) can be blacklisted or excluded from professional bodies or denied certain privileges and services.

In fact, there are many other potential procedures and measures that can be put in place to ensure effective compliance with the approved codes of conduct (and hence the above suggestions should be seen as a small sample of these procedures and measures).

We should finally note that the aforementioned procedures and measures are general

in nature (i.e. they are not specific to citation) and therefore we used a rather general language. However, there are some procedures and measures which are specific to citation. As an example of measures specific to citation, we can suggest that it should be emphasized (as part of the regulations for reviewing and editing of submitted papers) that citation practices and patterns should be scrutinized carefully during the review process and editorial procedure. In other words, citation should be considered as an essential component of any scholarly work (and hence it should be given sufficient attention during the review and editing process) and not as marginal or decorative addition and attachment (as it is seemingly seen and treated these days by most reviewers and editors). This can ensure that ill and suspicious citation practices can be caught and eliminated (or at least reduced and moderated) in the early stages of scholarly publishing. In fact, this can be part of the aforementioned code of conduct which all reviewers, editors and journals (as well as all other scholarly bodies and entities) should be obliged to abide by.

4.4 Necessity of Creating and Adopting a Set of Realistic and Reflective Metrics

With regard to the use of metrics and indices to measure scholarly performance and excellence (as well as other scholarly aspects which we discussed earlier) by citation, it is necessary to create and adopt a wide range of metrics which really represent and reflect in their totality the supposed significance of citation-related metrics and indicators. In other words, it is necessary (in assessing a certain aspect related to and reflected by citation) to adopt a basket (or a package) of metrics that assess the given citation significance from various aspects instead of adopting a single simple metric (or a few simple metrics of limited significance) in this regard. This means that we should have METRICS of metrics where each one of these METRICS is composed of a number of those metrics which represent and reflect various aspects of the particular value and signification which the METRIC is supposed to represent and reflect.

For example, we could have a METRIC for assessing the impact of scholarly journals by incorporating a number of metrics in this METRIC so that this METRIC reflects realistically and accurately the real impact of journals. We could similarly have a METRIC for assessing the performance and productivity of individual scholars or the quality of their research papers, and so on.

Some of the criteria and aspects that should be taken into consideration in selecting the members of the set of simple metrics that synthesize a given METRIC are (noting

that these criteria and aspects are not required collectively in each METRIC but each METRIC takes what it needs to reflect and indicate its particular significance):

1. Quantitative aspects such as the number of citations and their counts.
2. Citing authors and their rank,^[32] track record, integrity and credibility.
3. Number of authors of cited work and the significance of this on the citation count and significance.^[33]
4. Length of cited paper and its quality from various aspects and perspectives (such as its technical language).
5. Being first author or not (assuming that first authorship is regulated by the aforementioned code of conduct).
6. Being corresponding author or not (assuming that being a corresponding author is regulated by the aforementioned code of conduct).
7. Quality of the venue of citation such as the integrity and credibility of the journal in which the citing article is published.
8. The rank, track record, integrity and credibility of the reviewers and editors.
9. Effect of celebrity status (or fame and reputation) of the cited author and the seminality (or potential seminality or fake seminality due to propaganda for instance) of the cited work.
10. The trends, shapes and gradients of the citation metrics and their curves.^[34]
11. Consideration of ethical and moral aspects of authors (as well as journals and other academic and research entities) in general and their practices and behavior in the past.^[35]

We should finally note that automation of detection of plagiarism (or using aiding tools like artificial intelligence chatpots) could be considered in the tools and techniques used in recording and monitoring of metrics and indicators (or even incorporated and implemented within some of these metrics and indicators). In fact, this should apply to other types and forms of bad practices (i.e. not only plagiarism).^[36]

^[32] When we talk about “rank” it should mean rank that is reached by an individual deservedly and according to fair standards and values (to be considered as part of the aforementioned code of conduct) rather than rank within the existing ranking system (which is faulty and biased in general).

^[33] For example, a co-author of a paper with five authors may be given the credit (in citation metrics that consider citation counts) of one fifth of a paper rather than a full paper.

^[34] For instance, a sudden large rising gradient or a spike in a citation curve should be noticed and monitored (e.g. by certain citation metrics and parameters) since it can be a sign of cheating and fraudulence.

^[35] For instance, an author who is known to have some problematic citation instances in the past or he uses questionable citation practices and tactics could be given tentative and conditional (rather certain and unconditional) credit by the metrics and indices.

^[36] This should also apply to the consideration of the above-listed criteria and aspects (noting that au-

5 Conclusions

We outline in the following points the main achievements and conclusions of the present paper:

1. There are many types of citation-related ill practices. Many of these ill practices are commonplace these days and some of them are even seen as acceptable. Most of these practices affect negatively (directly or indirectly) the existing citation metrics which supposedly measure and monitor the performance and excellence of individual scholars, their research, scholarly journals, academic institutes, research groups, and so on.
2. In this paper we identified and discussed the main types of ill practices related to scholarly citation. We also discussed (rather briefly and contextually) issues related to the citation-related metrics and indicators and their supposed significance and value.
3. Citation in modern times became an industry driven and motivated by many non-scholarly considerations and goals. The corruption in the current citation system (as well as related values and traditions) is aggravated by the injection of huge amounts of funding which became a magnet and drive for many unethical and immoral (and sometimes criminal) practices and activities. Moreover, it is facilitated and encouraged by the wide availability of artificial intelligence tools, predatory journals, rogue scholars (whether genuine or fake), and other types of dodgy tools and means.
4. Citation in its current state is subject to many personal and non-scholarly factors and considerations, and hence the existing citation-related metrics do not reflect in objective, realistic and fair way the state of the cited works and entities (as well as the non-cited works and entities) accurately and fairly (such as their impact, originality, value and quality). This should degrade the value and significance of almost all the existing citation-related metrics, and hence the supposed significance (among most scholars) of almost all the existing citation-related metrics is questionable. The poor situation of the existing citation-related metrics is further compromised by the (relatively common) bad citation practices which make them vulnerable and manipulatable.
5. Improper and ill citation practices do not only lead to undue attribution and amplification of credit^[37] (which is unethical) but it can also hinder or delay scientific progress and advancement of knowledge (e.g. by adhering to certain theories and ideas), and contribute to the glorification and idolization of certain ideas and individuals and the

tomation is facilitated by artificial intelligence which improves rapidly).

[37] From another side, these practices also lead to undue denial and abatement of credit to other scholars and entities.

creation and amplification of celebrity culture which is harmful to the scholarly progress and alien to the spirit and values of science and knowledge. In fact, improper and ill citation practices inflict other serious damages and harms to the evolution of human knowledge and progress (as outlined earlier).

6. Improper and ill citation practices can have many moral and ethical downsides and bad consequences even when they are not morally and ethically wrong as they are and in their own right. In fact, some of the improper and ill citation practices can even be classified as criminal activities.
7. Most (if not all) citation-related metrics can be manipulated and abused to reap undeserved and unfair scholarly (or honorary) and material (or physical) benefits and rewards. Although some of these types of manipulation and abuse are generally seen as wrong and illegitimate, some of them seem to be acceptable and legitimate within the existing system of scholarly values and standards (and hence they are widely practiced by scholars of all ranks and walks of life), and these “legitimate” types of manipulation and abuse (in particular) require serious treatment and rectification.
8. To rectify the current situation of citation-related practices and metrics, we emphasize on the necessity of regulations, education and upbringing, scrutiny and enforcement, and creation and adoption of a set of realistic and reflective metrics (or rather METRICS) of composite and diverse nature. This can help in eliminating (or at least minimizing) the abuse and manipulation of the existing citation system and related academic traditions and scholarly standards and values.

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