iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 2 **Issue:** II **Month of publication:** February 2014

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

Vol. 2 Issue II, February 2014
ISSN: 2321-9653

INTERNATIONAL JOURNAL FOR RESEARCH IN APPLIED SCIENCE AND ENGINEERING TECHNOLOGY (IJRASET)

The Soundness of Surveys: Offline and Online

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Abstract: the Internet can be an efficient medium for the relocation, exchange, and collection of information in psychology-related research and data. The qualified simplicity and inexpensiveness of creating and maintaining Web-based applications, connected with the ease of use via the graphic-user boundary format of form-based surveys, can found a new research boundary for the social and behavioural sciences. From the seventies on, phone interviews became a popular alternative, thanks to the near universal acceptance of the telephone. And now, as the internet is ever more everywhere, web-surveys are attractive an interesting option as well. Online surveys are usually careful cheaper, faster, and more suitable. To survey the possible use of Internet tools in psychological research, this study compared Web-based assessment techniques with traditional paper based methods of different method of Internet attitudes and behaviours. It was establish that, though treatment remains a threat to online surveys for now, lack of a sampling frame is a more basic problem for e-mail and web-surveys. Another important problem, and one that seems to be growing, is the low response-rate for online and phone surveys, particularly where caused by crowding out effects. Then for delivery, while access control is often cited as a problem for web surveys, there is a technological solution available that works up to the address level (beyond which mail-surveys have similar problems).

Key words: - data, offline, online

1 Introduction

As more types of media have entered people's homes, surveys can be conducted in ever more ways. In the thirties and forties, going door to door, or mailing surveys out, was the only options. From the seventies onwards, phone interviews became a popular substitute, thanks to the near common adoption of the telephone. And now, as the internet is ever more everywhere, web-surveys are becoming an interesting option as well. Online surveys are usually measured cheaper, faster, and more convenient. In addition, they also have a possible for worldwide reach, allow for complex skip-logic, and remove errors in data-entry.

Yet online surveys bring new effort as well, especially in terms of soundness. Therefore the most vital pressure to the soundness of both online and offline surveys will be assessed in this paper. First some limits of the paper are explained. Then the idea of soundness that is used here will be clarified. And after that, a range of distinctions between online and offline surveys are set out crossways two vital moments in conducting them: solicitation (inviting participants) and delivery (administering the actual survey). When this basis has been laid, it will be used for classify and assessing pressure to soundness, such as low response rates, and interviewer property. In this assessment some thoughts will be given to formative which of these issues are likely to stay a difficulty in the long run as well, as importance is in part a purpose of durability. The paper will then be finished with an overview of the pressure, and some final words on their sensible implications for survey research.

1.1 Limits

First of all, there are many types of web surveys, and they can have many different aims. Some just serve as activity, others aim to aid webmasters at soliciting feedback on their exact sites, and yet others are used to quarry for hypotheses, or to pilot (try out) a new questionnaire. All of these are appropriate aims in themselves, but this paper will only be troubled with scientific surveys that plan to allow for inferences across big populations. An object that follows from this is that this paper will focus on quantitative research. Secondly, there are many temptations in inexpensive, fast, online surveys: bad sampling

such as redistribution an open request link on a meeting, or sending out invitations to ones whole goal population (a census); bad questioning, by formulating questions without much consideration, or by adding too many empty questions; and finally, adding in multimedia and colour indiscriminately. While these can, and often do, bully the reliability of online surveys, due industry will be assumed here, not what is inexpensive, seductive, or easy. In addition, what will be evaluated here is objective, as different to apparent reliability (many on-line surveys are done poorly, giving them a bad name). Thirdly, there is many more intimidation to the reliability of surveys, than can be discussed in the space of this paper. Some of these are sober threats to surveys regardless of the medium, while others have only small effects in most cases. A few examples are: bias from answers being self-reported; surveys being administered in mock settings; ways in which options are branded, or can limit answers; and bias or errors in question-formulation, data-entry and analysis. These will not be further discussed. Nor will belongings that might alter them, such as varied research designs, or gathering balancing data from other sources. This paper is about one-off (cross-sectional) surveys only, and mainly discusses threats that differ between online and offline surveys.

1.2 Soundness

Soundness is not a easy notion, and it, and its machinery, are defined differently by different authors. The definition of reliability that is relied on here is: that a survey represents what it intends and claims to represent. Then there are two sub-types of reliability: external-, and internal soundness. External reliability refers to the soundness of the survey further than the study: its generalizability, both to the population, and across contexts. Internal soundness, for surveys, refers to the strictness of dimension: that the concepts one sets out to calculate, are actually measured (and completely). Reliability is often further subdivided, but for reasons of space that will not be done here. Finally, soundness can be contrasted with dependability: a study giving constant results across trials. Though different, soundness presupposes reliability: if (sets of) questions (instruments) are not reliable indicators of what they try to calculate, they cannot assurance that one measures what one thinks one does.

1.3 Online/Offline

While the difference between the online and offline realms might seem directly forward, it is not. First of all, online is broader than the web, and also covers e-mail and Skype calls, for example. Secondly, there is a whole range of midway cases between online and offline. Such as: an interviewer supervision you incoming data on an iPad, which is then stored on a server; a survey on CD ROM sent through the mail; a scripted phone interview with touch-tone data-entry; or a web-survey that includes a video-link with the interviewer? Are these online, offline, or both?.

In an attempt to clarify things, a number of scopes can be distinguished, such as: by what means the participant is invited; whether the member enter the data himself; whether an interviewer is present; the medium used in the survey, such as manuscript or voice; whether answers are recorded in real time, and so on. But even that would be too much granularity for the variety of this paper. Therefore, the two most important moments in the performance of surveys were certain: solicitation (inviting participants), and release (administering the actual survey), and along these, differentiations were made between types of media. (see table 1).

Table 1: Modes of solicitation and delivery: The archetype offline survey is the door-to- door survey, solicited and administered in person (left column), while the characteristic online survey is at the other end of the table: a portal-site survey solicited and delivered via the web (rightmost column).

Moment	Person	Phone	Mail	E-mail	Web
Solicitation Offline	⟶	intermediate	⟶	Online	
Delivery Offline	⟶	intermediate	⟶	Online	

This schema accommodates for survey techniques that are reasonably complex, such as phone solicitations for a web-survey, while still allowing for a fast overview. Another characteristic of dissecting things this way is that the moments roughly communicate to the difference between external- and internal soundness.
This will become clearer in the following sections, as the threats to reliability are discussed and classified in accordance with it (table 1).

2 Solicitation problems

2.1 Limited coverage

For a long time, the most clear threat to external soundness for web-surveys was, that large sections of the population did not have access to the internet.9, 30 In 1998, only 33% of the US population had an internet-connection at home, and in 2000, though growth was phenomenal, it was still a mere 50%.9 This low rate of adoption was accompanied by a bias towards certain demographic groups.
Households earning more than $75,000 were 20 times more likely to be online.9 Differences between web- and mail/phone surveys have been experiential for other demographics (young, male, urban, educated), and for answers to various types of questions (slightly more liberal answers, if any pattern) as well.34, 9 More just, some studies have start smaller differences, or even no differences at all (for certain populations, such as students and lesbians).
One early key to the problem of coverage was that offered by the Dutch Telepanel. People were recruited by phone, and then given a computer with internet-access; if they did not already have one. Another come up to to the problem is post-stratification. This comes down to re-weighting respondents so their weighted answers to questions on demo graphics; match those of the generally population.
obviously, this approach is not bulletproof, as removing skews on general demographic variables only allows you to say you have disqualified these known biases, not the many indefinite ones (in other answers).
The only real solution will come with time. As adoption continues to grow – in early
2010 the US adoption-rate has previously risen to 80% –, web-coverage will be less of a problem in the future. Though differences in connection-quality determination likely remain, and at least for now, treatment is still a problem for e-mail and the web (see table 2).

Table 2: Coverage as a threat to external soundness: A threat to e-mail and web solicitation and delivery

Moment	Person	Phone	Mail	E-mail	Web
Solicitation				C	C
Delivery				C	C

2.2 Lack of a sampling frame

A more primary problem with the internet has to do with sampling. Random sampling is vital, as without it, introducing biases is almost inevitable. Moreover, random samples are necessary for self-assurance intervals and other statistics to be valid. In order to take a random sample, one first needs a list of one's population of interest, called a border. But no such list exists for internet users. And where it is probable to randomly generate phone-numbers, this does not work for e-mail addresses. Only in very particular cases is it possible to get, or accumulate, a list. Such as when, ones population of interest consists of web-hosting companies, members of a club and students at a certain university. Panels again have been future as a solution to this problem. Either self-selected panels consisting of millions of members, such as those of Harris Interactive, or large panels (randomly) recruited by phone. For both types of panel, biases can be introduced by self selection and panel-effects (peoples answers changing as a result of taking many surveys).Yet a possible difficulty with panels recruited by phone, and with phone-surveys in general, is to

land-line phone numbers (land-lines are traditionally used in phone-surveys) don't provide a just right frame either. Some households have multiple lines, and some people, particularly students and the young, have no land-line at all. More and more, they have one or more mobile phones as a substitute. So, while the dawn internet offers no frame, the frame offered by phone-lines is becoming less solid than it used to be. It is indistinct how this will have fun out. Yet for now, and the near prospect, the lack of frames is a basic problem for web- and particularly e-mail-surveys, and a rising problem for phone-surveys (table 3).

Table 3: Lack of a frame as a risk to external soundness: A primary threat to e-mail and web solicitation, but increasingly difficult for phone-surveys as well (lowercase letter 'f' indicates a modest threat).

Moment	Person	Phone	Mail	E-mail	Web
Solicitation		f		F	F
Delivery					

2.3 Low response rates

Another primary problem for online surveys, and phone surveys to a smaller degree, is a low reply rate. Low response rates are difficult because the people that don't participate are usually diverse from those that do. For mail-surveys, response-rates between 40 and 70% are quite normal, while for e-mail and web-surveys, response-rates often fall (far) below 30%. Moreover, the kind of non-response that web-surveys be given can be diverse from that in face to face settings. In the offline world people can refuse to contribute, or walk away, while on the internet, people can read (part of) the review, and only then make a decision whether they want to continue or not.And where a actually there interviewer could gently inspire somebody to go on filling out a survey, this is much harder to do online. The belongings of a low down response-rate might be mitigated by receiving higher quality data from online surveys, as some studies have reported belongings such as longer answers and less item non-response for on-line surveys. Yet other studies present incompatible evidence. And much of the reported development, could have been due to differences in coverage as well (education level, age, etc.). A directly circumventing response-rate problem (and frame-problems) has also been tried by inviting people to web-surveys by phone. However, these studies had reply rates that were even not as good as: around 10% (of internet users).The only fixation that seems to have worked, so far, is contribution multiple delivery modes. But even in that case, the online version was chosen by only 2 to 10% of respondents. So people still seem to have a muscular favourite for paper and phone surveys. Though, it is likely that this difficulty will reduce over time (with better, and more user friendly devices). A more great issue behind low response-rates is that (e-mail) invitations are being packed out by SPAM. This is a difficulty similar to that of telemarketing, which two decades earlier caused a drop in response-rates for phone-interviews. A part from making it more difficult to harvest e-mail addresses (as people hide them), many request e-mails will now also end up in SPAM-filters. In addition, norms accusing SPAM can, for some people, come to cover e-mail invitations as well. One study even reports scholars having their servers hacked, after posting invitations to several news-groups. Certain professional associations, such as ESOMAR, MRA and MRS, even depress sending invitations through e-mail. Yet the problem of overload stretches even additional: people not only are given a lot of scrap, they also have ever better possibilities to engage in (more) entertaining performance (including entertaining

surveys).Over time such crowding out property could become great threats to methodical surveys across all modes, though low reply rates are mainly limited to the web and phone for now (table 4).

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Table 4: Low response-rates as a danger to external soundness: A threat to e-mail and web solicitation, but difficult for phone surveys as well (lowercase letter 'r' indicates a modest threat).

Moment	Person	Phone	Mail	E-mail	Web
Solicitation		r		R	R
Delivery					

3 Release Problems

3.1 Controlling access

A usually mentioned threat to the (mostly internal) soundness of online surveys is, that it would be solid to control access to them. People could pack them out double, position a link to them on a meeting, or worse, even bots (computer-programs) could be filling the ballot with bogus-answers. Traditional means of warning control are indeed unsuccessful, such as limiting answers to one per IP address, and setting cookies in participant's browsers. This, because peoples IP-addresses alter, and cookies can be separate, or circumvented by just using another machine. Yet there is a answer that does work: as long as each person in the example with an sole password that can only be second-hand to pack out the survey once (coupled with a properly configured server). The password can optionally be embedded in the URL that is provide with the invitation, so it does not even have to be entered by hand (Though requiring manual entry allegedly improves the quality of responses).4,19

Among the trouble that, remain, are that participant could feel insecure about whether their answers are being treated secretly.

Particularly as participants can never know for certain what the survey-software records, and the password could always be used to link them reverse to their particular answers. Professed anonymity is significant, as it improves response-rates, and reduces social desirability biases. E-mail surveys have this difficulty to an even greater extent, because they are sent to, and received from, particular addresses (so identities are stored). Another difficulty that remains, but that postal mail-surveys have as well, is that safety can only be achieved up to the address-level. zero can stop people from asking their children, or a friend, to fill out the survey. Only in-person, and phone surveys protector against this (table 5).

Table 5: Access control as a threat to internal soundness: Access can only be limited up to the address-level for web-, e-mail, and mail surveys (lowercase indicates a modest threat).

Moment	Person	Phone	Mail	E-mail	Web
Solicitation					
Delivery			a	a	a

3.2 Interviewer Possessions

The attendance of an interviewer inducing socially wanted answers (or other biases), is a great danger to phone- and in-person surveys is called interviewer-effects. White people are, for example, more likely to give politically correct answers, when they are being interviewed by a black person, on racial issues. Other things that are known to be play down, besides racism, are smoking, drinking, and gambling behaviour, and reported sexual activities. One study has even found age-interaction-effects, with older people being more susceptible to interviewer effects. another danger, is that an interviewer might (unknowingly) give out delicate cues about how he requirements people to answer. This can happen, for example, through articulation, or by giving people more time for sure questions (more time is perceived as more important). One prejudiced solution to interviewer effects, is working with

manifold interviewers, where each takes care of an incomplete number of participants. This should at smallest amount stop out some of the belongings that differ between interviewers, and thereby increase soundness. Another way to improve things, is training interviewers as skills do vary. Also, it could be argued that, while using interviewers introduces interviewer-effects, them being able to guide things, has many reimbursement as well. Both face to face, and on the phone, they can, for example, stimulate people to carry on, reassure participants trust in the obscurity of their responses, or detect and question bogus answers. Moreover, they can – particularly face -to face – pick up the respondents mood, or other background factors that might power responses. In addition, interviewer-effects have been shown to be somewhat smaller in phone-interviews. Some experiment even suggests that certain interviewer-effects might be mitigated with the bright use of virtual actuality (such as differences in body-height, tone of voice, and strength of moving expressions).Yet, traditional, in-person, and phone interviews, will always be affected interviewer effects (table 6).

Table 6: Interviewer belongings as a danger to internal soundness: basic for in-person and phone surveys.

Moment	Person	Phone	Mail	E-mail	Web
Solicitation					
Delivery	I	I			

3.3 Demonstrate Effects

Finally, show effects can be seen as the online equal of interviewer effects. Differences in how the survey is displayed across plans, screen-sizes and operating-systems, can, in more or less slight ways, influence how participants interpret questions. But technology can have other belongings as well. A slow internet-connection can discourage people from captivating a survey, or missing plugging (such as a Flash-plugin) may even make a review out-of-the-way to large portions of the sample.One workaround, is sticking to basic technology (HTML forms). Though with the use of Javascript, it has become likely to make forms come into view precisely the same across functioning systems, by replacing OS-specific form buttons and check-boxes with images (as Survey Monkey does), so there is a trade-off here.39,21 As with interviewers, digital forms also bring many payback, such as taking care of skip-logic, validating answers, and as long as drop-down selection-menus, and background help. In addition, they permit one to randomize the order of questions, cancelling out effects that question-order might have in paper-surveys. Moreover, multimedia might be used to inspire, or guide people (increasing response-rates).Multimedia can bias responses as well, of course, but it can be argued (though this has not been studied) that in a world where people are more and more used to multimedia, a sober, simple design, can bias responses as well (towards sober answers). Nevertheless on overall, the difference between browsers on personal computers seems to be decreasing (apart from screen size). Though mobiles show a bit more diversity, and differences in the way e-mails are displayed,

Still exist (table 7, and an overview of all threats in table 8).

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Table 7: Display belongings as a danger to internal soundness: A modest danger to e-mail surveys and web-surveys (lowercase indicates a modest danger).

Moment	Person	Phone	Mail	E-mail	Web
Solicitation Delivery				d	d

Table 8: Overview, of intimidation to the soundness of surveys External: coverage (C), lack of a frame (F) and low response rates (R). Internal: Access (A), interviewer effects (I), and display effect (D) (lowercase letters indicate modest intimidation).

Moment	Person	Phone	Mail	E-mail	Web
Solicitation		fr	a	CFRa	CFRa
Delivery	I	I		Cd	Cd

4 Conclusions

To conclude, the notions of on- and offline have been hole across solicitation and delivery, and were divided into various types of media, along these. This schema was then used to classify, and clarify pressure to soundness.

It was establish that, though coverage remainder a threat to online surveys for now, lack of a sampling border is a more basic problem for e-mail and web-surveys. Another significant problem, and one that seems to be rising, is the low response-rate for online and phone surveys, particularly where caused by crowding out effects. Then for release, while access manage is often cited as a problem for web surveys, there is a technical answer available that works up to the address level (beyond which mail-surveys have similar problems). For in-person and phone surveys, interviewer effects are the most basic fear. While for online surveys, display effects can cause reasonable to minor problems, particularly across devices that are very different, such as personal computers and mobile phones.

The overall picture that has emerged is that all options have compensation and disadvantages (also see table 8). Even though some options, such as soliciting participants through websites (by leaving an open link), are usually not a good idea, unless there are exact reasons for taking this direct, such as contacting populations that are hard to reach if not. Besides this, experiments with solicitation through one medium for a survey delivered through another (such as phone to web), did not seem to work well. Thus it follows, that web surveys are mainly a good choice when a border can be obtained for ones population of interest (and coverage is expected to be good for them). In most other cases, in-person, phone- and mail-surveys, still seems superior: both in terms of response-rates, coverage, and the availability of frames.

The sundown over land-lines might, at some point, make the web seem more positive in comparison. Yet only if lady fortune is with survey researchers, and the adoption rate of smart phones increase sufficiently, it might become likely to send invitations to web-surveys by text-message. A clickable link (already supported by the iPhone) could then take people straight to the survey, in the phones browser. Over the span of a decade or more, this could make smart phones into a very influential frame for both phone- and web surveys. pending

such times, the just right modes for solicitation and delivery do not exist, and being aware of, and acknowledging the limits of each mode, is the best we can aim to when designing and field a survey.

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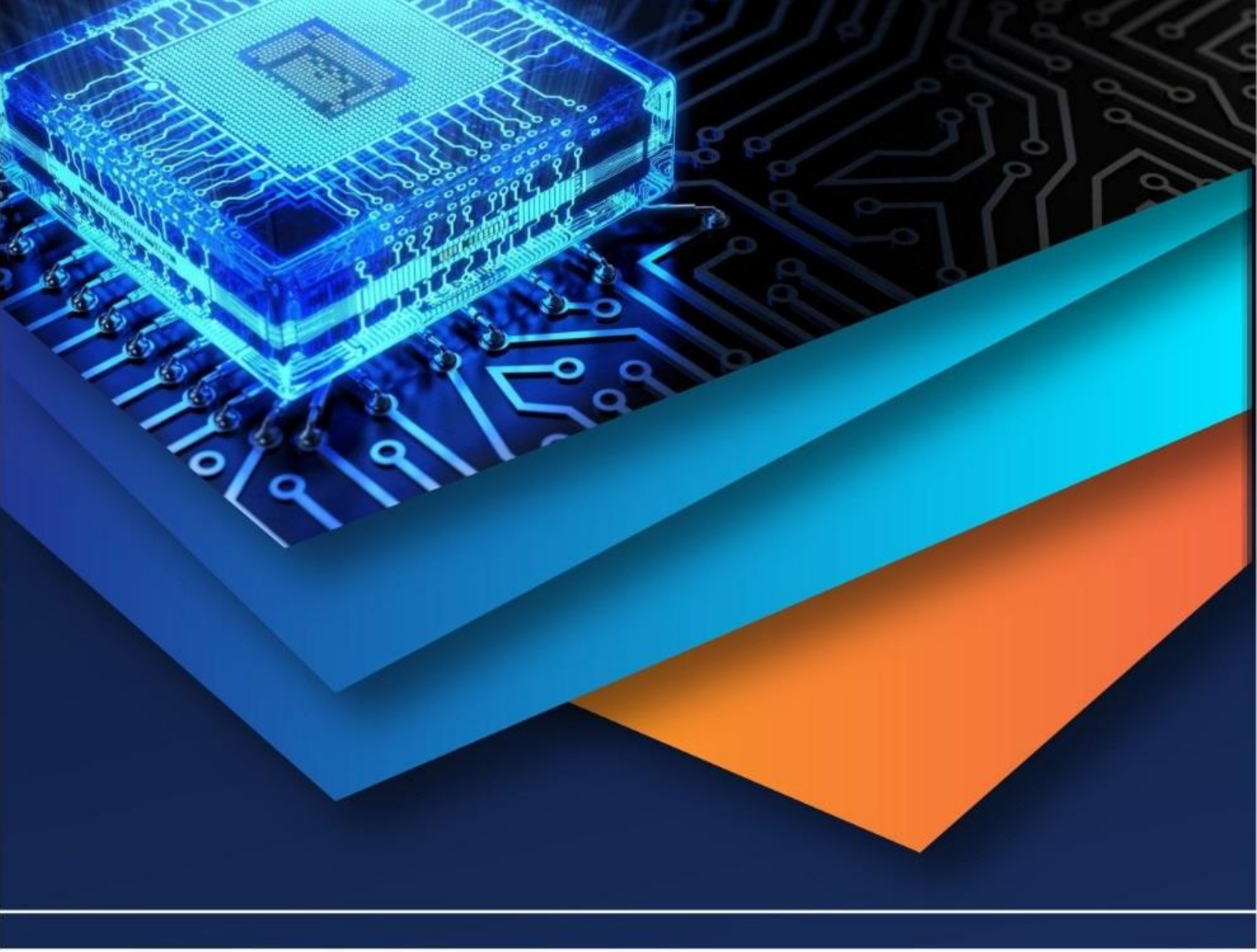

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