To tape or not to tape, that is the question: reflections on methods of data collection

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Introduction

A pivotal part of the qualitative research process is dependent on the collection of large quantities of interview data. Some insights into this part of the qualitative research task are presented here, based on the personal experiences of the two authors, Ruth Mattimoe and Treasa Hayes. Our observations relate to data collected for two major pieces of research. One of us (Ruth) chose the audio-tape route to gather her data, while the other (Treasa) opted for manual recording of interview material. We now share some of the lessons gleaned in the course of these respective research journeys.

In order to provide some context for the discussion, we provide an overview of the two major studies (Mattimoe, 2002 and Hayes, 1996) for which the data were gathered. While both studies were interprevist, Study A, undertaken by Ruth, took the ‘tape’ route during interviews conducted for this research, whereas manual recording was the route chosen for data collection in Study B, which was undertaken by Treasa. Next, various aspects of the debate surrounding the question: ‘To tape or
not to tape?’ are addressed. The discussion finishes with some final reflections which may be of use to other researchers.

**Study A: overview**

This study centred on an in-depth investigation into the complex processes of room rate pricing in the Irish hotel industry. In the research, I (Ruth) sought to identify the rich panoply of influences at both macro and micro level which shape the setting of the room rate. In addition, I needed to explore developments in training and education in the hotel sector. Also, accounting and marketing perspectives on room rate pricing had to be factored into the enquiry. There was little previous research into pricing in the Irish hotel industry, so there was medium to high uncertainty attaching to my topic.

Turning to the fieldwork for Study A, I decided that a qualitative approach would be most conducive, as I needed to probe the hotel manager's understanding of room rate pricing in his/her particular hotel, as well as the constraints provided by the macro environment of hotel operations. To capture all of this, my empirical research centred on two main areas: an investigation into the structure of the industry and of government and EU incentives and micro-level case studies in two hotels. A series of in-depth interviews with seven key informants provided valuable insights into relevant areas such as the history and development of tourism in Ireland, the education and training of hotel managers, together with specific developments at industry level in relation to room rate pricing.
Having captured the broad range of influences impacting on room rate pricing, I augmented these data by undertaking two major case studies set in two different types of accommodation. One was a 3* hotel in the west of Ireland while the other was a facility which offered large-scale budget type accommodation in Dublin.

My main research consisted of conducting a series of long intensive unstructured interviews with the manager at each case site. I augmented these data by holding interviews with other key actors such as the accountant and the marketing manager, at both locations. The overall data gathering process involved undertaking a total of 18 interviews at the two sites, with an input of about 50 hours interviewing time. The seven interviews with key informants, mentioned above, took an additional 20 hours. I taped all the interviews for this study.

**Study B: overview**

The research for Study B (undertaken by Treasa) focused on an exploratory study of management, control and accountability in Irish voluntary organisations. The main fieldwork for the research was qualitative in nature and I recorded individual interviews manually, without using a tape recorder. Much literature was available on management, control and accountability in general, so my work was to develop this literature for the voluntary sector. The uncertainty inherent in the research topic was low to medium. The core of this empirical research centred on a sample of ten Irish voluntary organisations. I interviewed four respondents in each of the ten organisations – the CEO, the accountant, a Board member and a volunteer – yielding a final total of 40 in-depth interviews.
In preparations for the interview process, I drew up an interview schedule in order to ensure that I gathered the required information in relation to three broad areas:

- General background information on each organisation in terms of age, service, clients, staffing, income, together with profiles of the respondents;
- Detailed information relating to control;
- Approaches to accountability.

This research instrument was used as a guide for all of the forty interviews undertaken, each of which lasted about two hours. The schedule of open-ended questions permitted a free flow of responses while also providing an overall framework for each interview. With such a large number of interviews, this approach was deemed necessary in order to ensure that the same ‘territory’ was covered in each individual encounter, thus providing overall comparability in the data collected. All of my interviews for Study B were recorded manually.

Having provided brief background sketches of our two pieces of research, we now move on to consider the central issue which relates to taping or manually recording interview data.

**To tape or not to tape?**

As outlined above, we used two contrasting methods of capturing interview data in the course of our respective research journeys. As we both managed to achieve our ultimate goal of a completed research project, this confirms that, in practice, both the route of taping interviews and that of manual recording of data can be effective in the craft of qualitative research, suggesting that there is no ‘one-best-way’ to tackle the
task of data collection. The decision to tape or not to tape is influenced by a number of key determinants. These include: (a) the nature of the research topic; (b) the willingness of the interviewee to be taped; (c) the interviewer’s preference and competence with either technique, as well as (d) the benefits and drawbacks of the techniques themselves. Each of these aspects of the decision is now considered in some detail.

The research topic

The less structured the nature of the topic under investigation is, the more exploratory the research. This suggests taking the taping route to gather data because of the need to probe for insights into the broad area under review, adding or discarding some questions and refining or changing the course of the research during the individual interviews. Thus in cases where the overall research issue is not well-defined, it is not possible to have a detailed, pre-determined list of questions. Rather, the researcher works from a list of broad topics that need to be explored. Adopting this approach gives the interviewee the opportunity to talk freely about events, behaviour and beliefs in relation to the topic. This type of interaction is often labelled an informant interview, since it is the interviewee’s perceptions which guide the conduct of the interview (Easterby-Smith et al., 1991). A lot of probing and discovery is required and much data may be garnered as ‘guidance’ rather than as raw data. The interview task represents a type of navigation of the research ‘river’ which inevitably involves a lot of meandering and wrong turns, before the destination can be reached.

Study A is an example of this type of research topic where I (Ruth) had little by way of guidance from previous research and initially my topic was very broad and
unstructured. Therefore I had to be very flexible during the data gathering process, using broad topics as a guide for conducting my interviews. Given this scenario, it would have been very difficult for me to record the interviews manually. Realising this, I opted for the taping route at the outset of my work.

In contrast when the research topic is more structured and the researcher is reasonably clear about what is to be asked during the interview, it is easier to use the manual method of recording data. For example, in Study B, the broad, open-ended questions to be asked were pre-determined, requiring less adjustment during the interview itself. In addition, the structure of the overall study, in terms of the number of case sites, is another aspect that has to be taken into consideration. As Study B was spread over ten case sites and 40 in-depth interviews, Treasa needed the guidance of a reasonably detailed interview schedule in order to ensure that the same issues were explored during each of her 40 interviews. Otherwise there was a danger that she would end up with patchy interview data. In contrast, Ruth’s study centred on a very detailed investigation, confined to two case sites. Therefore the need for consistency over a larger number of case sites did not arise.

In sum, it can be said that more structured research topics seem to lend themselves to manual methods, while the taping option is more suitable in a less-structured research arena.

**Resistance to taping**

Resistance to taping on the part of the interviewee can be an issue. In fact, sometimes the possibility of such resistance can be anticipated, leading the researcher to opt for
manual recording of the interview. This was the situation I (Treasa) encountered in Study B. Given the context of the voluntary sector, where many respondents might not have been accustomed to the use of a tape, I anticipated that some of them might be unhappy, if not altogether unwilling, to have the interview material taped. My research supervisor, who had extensive experience in this sector, agreed with this assessment. In this situation, because of the possible risks associated with using a tape, in terms of causing unease for respondents which could have a negative impact on the quality of the data gathered (Saunders, Thornhill & Lewis, 1997), opting for manual recording seemed to be a safer option. Accordingly, I settled for that route.

In cases where the interviewer takes the broad decision to tape interviews but meets with resistance in a particular encounter, it has to be addressed. The reasons for the resistance must be probed. Perhaps it arises from a lack of trust in the research process (i.e., what will be done with the data, where will it be published, will the quotes be traceable back to the interviewee etc). It may arise simply from a lack of self-confidence or unfamiliarity with the technique, similar to the reluctance of some to speak to voicemail/ansaphones. Taking part in an interview is an intrusive process where the self is revealed to a certain extent. Lack of trust can be a serious issue, as it can give rise to interviewer and interviewee bias in the process of data collection, leading to doubts about the reliability and validity of the interview data (Robson, 1993). The lack of trust created due to the unease with taping, may lead to bias by the interviewer in his/her interpretation of responses, as well as more stilted responses from the interviewee or other response bias caused by the interaction with the interviewee and his/her perceptions about the interviewer. Therefore it must be dealt with at the outset.
The opening minutes of conversation can have a significant impact on the overall outcome of the interview. Bearing in mind that the respondent has demonstrated some interest in the project by agreeing to be interviewed, the researcher must try to build this interest into a positive relationship. In principle, the interviewee is willing to participate, but is sensitive to in-depth exploration on sensitive topics, which s/he does not wish or is not empowered to disclose. S/he must gently probe the reasons behind the reluctance to be taped and explain why a tape is being used. Very often, the real reasons may be the respondent’s lack of clarity about what data exactly is required, how it will be used and the precise purpose of the research. From the outset, the researcher must try to win the confidence of the respondent, by allaying his/her uncertainties about providing information, by giving an assurance of confidentiality as well as explaining how the data will be used. Also the researcher must demonstrate friendliness and credibility. The promise of the interview transcript may overcome any final resistance. In the case of a once-off interview, where all these efforts do not bear fruit, in terms of countering the initial resistance to taping, the researcher must respect the wishes of the respondent and resort to manual recording. However, if the study is a longitudinal one, involving a number of visits, the build up of trust and rapport over time may overcome the initial resistance to taping.

In Study A, I (Ruth) took some precautionary steps at the outset of each interview with a view to countering any resistance to taping that might be encountered. For instance, before commencing each interview, I undertook a number of steps in order to ‘set-the-scene’ for a positive outcome. While these are process issues and do not in themselves yield data, yet they are very important as they contribute greatly to
ensuring that the interview is successful in terms of providing the required information being sought. In each case, I commenced the encounter by explaining the purpose of the research and affording each respondent an opportunity to raise any points that might need clarification. I probed as to whether a tape could be used and then tried to reassure any doubts or unease of the respondent, but at all times was conscious that if I was unsuccessful in these attempts, that I would have to concur with the wishes of each respondent and switch to manual recording etc.

The question of confidentiality was raised also; I made it clear at the outset of each interview that all the material would be treated in confidence and that individuals would not be identified in the subsequent report of the research. Pseudonyms would be used to protect their anonymity for, as Taylor & Bogdan (1984:87) note wisely, ‘there are few legitimate research interests served by publishing people’s names. The risks are substantial’. I promised that later, when each interview had been transcribed, the record would be returned to that respondent for perusal. This process seemed to re-assure each interviewee. Cumulatively, these ‘preliminaries’ helped to put individual respondents at ease, leading to the establishment of a rapport which seems to have negated any concerns that could have arisen regarding taping of material. In other words, by being proactive in establishing a good rapport at the outset of each interview, I managed to counter possible resistance to taping.

In sum, a judgement has to be made by the researcher regarding the use and impact of a tape recorder on a particular respondent and these issues need to be clarified at the start of the interview. In cases where it has been decided to tape material, preliminary work on establishing a good rapport with the respondent at the outset of the
interaction, prior to producing the tape, helps to allay any fears that might exist regarding the actual recording of the main part of the interview.

**Interviewer competence - taping**

Another factor that determines whether or not to tape is the preference, familiarity and competence of the interviewer with either method. Turning first to taping, these are a few tips, which I (Ruth) found useful when using this method. While taping of interviews is much more than just a mechanical exercise, nonetheless the technical aspects of the ‘taping’ route must be mastered. There are two areas that need to be noted here. First of all, a fundamental requirement is that the equipment itself must be in perfect working order. Operating glitches, at worst, can lead either to a total or partial loss of valuable data, which a respondent may be less than willing to provide a second time. Even if this near-fatal flaw is avoided, minor interruptions can distract both the interviewer and the respondent. For instance, it is not a good idea to conduct an interview in a hotel lobby area, even if the armchairs and the ambience are particularly inviting! The background noise and the fact that the hotel manager is highly visible in this area of the hotel can create a lot of interruptions, as I learned to my cost. Common sense, a proper choice of location, as well as technical efficiency will facilitate the smooth flow of the interview and also make the respondent less aware of the tape.

One rarely has seen the interview room/area in advance, nor the precise location of sockets or the type of plug allowed by the socket, so it is necessary to be prepared by bringing along an adaptor and a long extension lead in case of difficulties. Battery back-up is advisable as another precaution. It is essential that the ‘operator’ (i.e., the
interviewer) is familiar with the machine being used. The best way to avoid any technical pitfalls is to buy high quality state-of-the-art equipment and then practise beforehand by undertaking a ‘dry run’, which will highlight any difficulties. I got a full demonstration and the manufacturer's instruction manual from the shop assistant, who sold me the equipment. Once the interviews have been taped, the next task ahead is to have the data transcribed.

Sorting and transcribing tapes: In Study A, as individual interviews lasted between one and three hours, this meant that a number of tapes had to be used for each session. Therefore, in order to avoid confusion down the line, I knew it was very important to label each tape beforehand, noting date, name of respondent and tape 1,2,3 etc of total X. Then, I tied together the bundle of tapes for each interview. While this may seem rather elementary, if I had not done so, I would have ended up with a confused jumble of tapes, having to play maybe 20 in order to locate the one I required. I found that good ‘housekeeping’ was of enormous benefit in the overall research process.

Getting the information in order was the first step. Then it had to be transcribed to facilitate its usage at the analysis stage. It has to be acknowledged that transcription of tapes is a tedious process, at best. Yet it has to be done. If you do not undertake the work yourself, you need to source someone to do it who has a reasonable understanding of the content. Otherwise it will be very difficult for the transcriber to make sense of the taped material and you may end up with inaccurate data, at best, or incomprehensible data at worst. I was fortunate in locating a transcriber/secretary who did an excellent job both in terms of quality and speed. To assist her with the task, before she started the work I spent some time explaining the project to her. Also
I provided her with a copy of the topic outline I had used during each interview and this gave her some idea of what to expect, rather than having to tackle the transcription task ‘cold’. Her valued assistance meant that I was relieved of the burden of transcription, while obtaining an excellent account of each interview.

As the information from individual interviews has to be analysed eventually, giving some thought to the layout of the transcription before it is typed up can pay dividends later. I arranged to have it set out clearly in question/topic order, in accordance with the actual course of the interview, with clear delineation of the transition between topics. Then I inserted replies to any questions that were asked informally (and recorded manually) when the tape had been turned off, into the relevant section of the interview transcript.

Collecting documentary evidence: In addition, when I collected documentary evidence to support comments made during the interview, I noted this on the transcript with a coded number for each item collected. I took copies of relevant reports and annual accounts and these were very useful to me later in making sense of the pricing routines.

Interviewer competence - Manual recording of interviews

The taping of interviews involves a certain passivity; the tape is like a ‘dumb assistant’. It runs and records the interview as the interviewer listens and interacts with the respondent. In contrast, manual recording involves the need to listen, think, assess, edit and then write down the comments, practically all at the same time. This is very demanding of the interviewer who must be active, alert and conscious of the
need to identify and write down the salient points and quotes, while at the same time conducting the interview. One needs training to listen, edit and write, without disturbing the natural flow of the interview.

A word or two about the actual interview schedule used with the manual method of recording, may be apposite here as it is important to get it right in terms of physical layout, (as well as content). The actual interview schedule, which I (Treasa) used in Study B for all 40 interviews, was quite long and detailed. It was informed by the literature and preliminary fieldwork. While it is not necessary to go into excessive detail here on its content, it is worth highlighting some aspects in relation to its layout. It was set out very clearly in main topics and sub-topics, as I considered that it was necessary at this stage to have some clarity regarding the areas I wanted to cover in the course of the interviews.

In the physical layout of this document, plenty of space was left between each topic, enabling me to record individual responses in the appropriate ‘slot’. Even though it might appear rather trivial, it is worth stressing that this ‘spacing’ issue is very important. When I had set out each topic on a separate page, it facilitated me both in the manual recording during the interview itself and in the subsequent analysis of the data that I had gathered. If the initial manual recording of the interview data is all cramped together, it makes the analysis task immeasurably more difficult. (I learnt this lesson about ‘spacing’ the hard way. When the interview schedule for my first few interviews did not have sufficient space in which to record responses in the appropriate slot, I had to re-write all the notes from these interviews. Once I became aware of my error, I amended the layout and had no further difficulty.)
When interviews are recorded manually, an annotated version of the interview is written down, based on the researcher’s judgement of what is important. This happens because, unlike taping which captures *everything* (both relevant and irrelevant) that has been said, every word of an interview cannot possibly be transcribed manually. Thus it is suggested that the manual method should be chosen only by a researcher with considerable prior experience in undertaking and manually recording long, open-ended interviews. Such a person can edit as the interview progresses, making judgements about what is important to record.

At the beginning of each interview, I (Treasa) focussed on getting the ‘climate’ right. As mentioned previously in relation to Study A, while this is a process issue, it does contribute to the success of the core interview. Therefore it cannot be ignored. Accordingly, before embarking on the actual data collection, I talked for a short while to each respondent about my interest and previous experience in the voluntary sector, which had motivated me to undertake the research. This helped to establish a good initial rapport. Then I outlined the aims of the study and explained about the interview schedule. I gave an assurance of confidentiality and anonymity, as suggested by Taylor & Bogdan (1984), regarding information disclosed in the course of each interview as I felt that this would contribute to putting the respondent at ease. At this stage also I checked if it was all right to make some notes as the interview progressed.

While this preliminary stage of the interview sometimes took time, I felt it was time well spent as it helped in building up trust before entering into the core of the
Interview. I consider this ‘setting the scene’ stage of the interview to be very important, irrespective of whether the interview is being taped or manually recorded. If you do not manage to get the interviewee ‘on side’ at the outset, the subsequent interview will be less than satisfactory in terms of data collected. Therefore my advice is to give it as much time as it takes in order to ‘get it right’. When each respondent seemed at ease, I then proceeded with the main part of the interview, using the interview schedule to keep it on track.

Once I had clarified at the outset this need to record data, the actual note taking during the interview itself did not pose any problems. Regarding the actual notation of the interview material, while I had no formal training in taking shorthand, over the years I had developed my own version of the art, which proved adequate for the job in hand. I found that each respondent, as s/he saw me writing, seemed to understand that I needed brief pauses in order to jot down points as they arose and made this time available to me, without having to ask specifically for it. Maintaining eye contact as much as possible right through the interview kept the momentum going. Also I found it useful to make brief appropriate comments such as: ‘That’s interesting’ / ‘I see what you mean’ etc., in order to avoid any long silences as I wrote, which might break the flow of the conversation.

The overall process involved a delicate balancing act between asking questions and taking notes, with eye contact acting as the ‘glue’, keeping it all running smoothly. The fact that I had an interview schedule, which identified the topics I wished to cover, provided a reasonable structure for each interview while also allowing ample
scope for comment and elaboration on individual issues. In fact it was very useful in preventing the interview from going ‘off track’.

At the conclusion of each interview, I had my data. However, as it was manually recorded, the record was not as comprehensive as if I had taped every word. Therefore, I realised that it was really important to make the most of what I had gleaned by going back over my record immediately afterwards. Accordingly, in order to ensure accuracy and comprehension of my interview data, on return to my car after each interview, I read over the relevant interview notes, fleshing out my inevitable abbreviations and deciphering my scribbles. This drill was very important as it enabled me to ‘unscramble’ unclear writing while the interview encounter was still fresh in my mind. (In contrast, it will stubbornly remain a blur if you defer the ‘de-coding’ to a later time.) Once again, while this rule may appear basic, it is better than having to contact the interviewee later, admitting that you cannot interpret your own handwriting! If your pride does not allow for such an admission, the alternative involves having to omit one or more potentially good quotes because you cannot make sense of them. Either of these courses of action would have to be labelled ‘unprofessional’.

Due to the challenges associated with accurate manual recording, many novice researchers may prefer to rely on the ‘dumb assistant’ so as to allow greater focus on the content and conduct of the interview. Indeed many unstructured interviews are ‘guided conversations’ (Lofland, 1971) where the interviewer joins in, interjects and seeks clarification of meaning, requiring the respondent to repeat explanations, so the tape is the obvious choice. Most student researchers should be advised to tape the
interview because the ability to transcribe quotes etc. required for the manual method demands well-honed skills.

Taping: benefits and drawbacks

Finally, the relative advantages and disadvantages of taping or manual recording need to be assessed, once the other three factors discussed above have been considered. Undoubtedly, taping an interview ensures a full, unedited record of the ground covered in the course of the discussion and this is available to the researcher who can replay it afterwards. However, in order to analyse the data post-interview, all the material gathered on tape must be transcribed and edited. This can be a costly exercise if contracted to a secretary. Ruth was fortunate enough to get a grant from the Research Committee in the university to fund this work. So a tip here for other researchers is to explore ways of getting financial assistance for research tasks such as transcription which can be off-loaded.

If the research coffers are empty, the time consuming transcription has to be done by the researcher. Robson (1993) warns that a one-hour recording may take up to ten hours to transcribe. So, think of the time required to type up 50 hours of interviewing, particularly if you are not a trained secretary with good typing speeds! Then, the process of distilling and editing the transcript has to be completed and it may yield relatively few quotes from, say, 40 pages of transcript. The advantage is that it is a permanent, vouchable record of the interview from which direct quotes may be extracted.
In contrast, the manual method of recording data makes an edited record available immediately after the interview. As it eliminates the considerable cost of transcription (in terms of either money or time) and greatly reduces the post-interview editing task, this makes it much easier to handle the data. In fact, in Study B, once I had completed my 40 interviews and had read over them, clarifying my ‘shorthand’, I was ready to analyse the data. The time saved here, when compared to the input required to transcribe and edit tapes, helped to shorten the overall research process. This can be a significant consideration in any research project which has to be completed within a fixed time frame.

**Making the decision**

Mindful of the advantages of each method, it is up to the researcher to discern which approach – tape or manual – is apposite in a particular research encounter and to take action accordingly. The choice is not dichotomous as, in practice, many researchers make notes while the tape records. If the interviewee objects to taping or even seems uncomfortable with it and efforts to allay these concerns are unsuccessful, it may be prudent to settle for the manual route.

Probably a good general guiding principle here centres on the issue of establishing rapport. As it is a vital component of engaging in an open and frank discussion, which allows the capture of the required data for qualitative research, the method selected should serve to nurture this rapport. In practice, this calls for matching the method to this requirement in each case. The reality is that the respondent is the ‘customer’, so the maxim that *the customer is always right* needs to be respected. As
has been shown in our two studies, both methods worked equally well for us, given their different contents and contexts.

**Final reflections**

It should be evident from our presentation so far that the decision to tape or not to tape is somewhat more complex than is suggested in many of the standard textbooks on the subject. Some of the important ‘ingredients’ that need to be factored into the ultimate decision include: the nature of the topic being researched; the sectoral setting of the study; the preferences of individual respondents and the preference and competencies of the researcher.

All of this points to the fact that there is no ‘one best way’ to capture data in qualitative research. Rather, these factors need to be considered in the context of the specific research being undertaken. What works in one study may not be successful in another. Even within one study, variations in the approach to data gathering may be necessary. If a particular respondent does not wish to have an interview taped, do you, the researcher, try to ‘convert’ him/her to acquiesce? Even if you succeed this far and turn on the tape, what effect does this initial reluctance to be taped have on the ensuing interview? Does it reduce the level of rapport? As a result, does this impact negatively on the quality of the data collected? Would the interview have proceeded more smoothly if you had abandoned efforts at ‘conversion’, resorting to manual recording when faced with the initial reluctance to taping? How would this later decision affect the quantity of data collected?
When faced with dilemmas such as this, the researcher has to make a judgement call regarding the more appropriate route to take in gathering data. A balance may arise between capturing a greater volume of data that is constrained in character, or settling for manually recording less data which is given more openly. Unless it is a longitudinal study, research interviews are often once-off encounters. This reality means that there is little opportunity available to build up trust and rapport over time.

All of this suggests the need for flexibility on the part of the researcher during the data-gathering journey. At the start of a study, you may plan to tape all interviews. However, this pre-determined strategy might have to be modified, if tape-shy respondents appear in your study cohort. As they are the providers of the information you seek, you must be prepared to play the game their way, adapting your initial strategy accordingly. Conversely, if you set out to record interviews manually, some respondent may seem impatient with this slower recording process. In such a case, having a tape recorder on hand could address the demand for speeding up the process. The broad guideline for the researcher is to make every effort to facilitate the wishes of the respondent, while not compromising his/her own need to gather good quality data.

In conclusion it has to be said that the research journey is not straightforward. Rather it tends to throw up challenges along the way. Be clear about mapping out your route, in terms of the information you are seeking. Gather it either by taping or manual recording, depending on its appropriateness in the particular situation. Then you are set toanalyse your findings in order to reach your final destination of a well-executed
study. It’s not a totally smooth passage, but with practice, flexibility and patience you should meet with success and satisfaction at the finishing line. We hope that some of the tips we have shared with you will be helpful in completing the research circuit.

REFERENCES


