Abstract:

Evaluating the impact of a Specialist Library and Information Service
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The mere fact that a library service is being used does not mean that the service makes a difference or has a positive impact on the user. This has significant implications for Special Library and Information Services (SL&IS) that have to constantly prove that they add value. Because impact has not been measured effectively, the majority of libraries still appear to measure performance quantitatively (how many books do we have, how many are used, etc.) instead of looking at the difference the service actually makes. In this paper we looked specifically at the impact an information service has on the ability of natural science researchers to perform their research effectively and efficiently.

A focus group, short survey and fifteen interviews were conducted with researchers that use SL&IS in their research at the South African Council for Scientific and Industrial Research (CSIR) - the largest research Council in Africa. The results showed that researchers feel that Library and Information Services has a positive impact on the research process. The two most important indicators of impact chosen by the researchers were firstly, time saved in information retrieval and delivery and secondly, higher success rate in research. In contrast with Poll's (2005) view, researchers felt that Library and Information Services do not necessarily impact on growing their skills and competencies or their attitude and behaviour as researchers.

The relationship between the librarian and the researcher also came to light as very important in the research process.

The study also identified further important indicators of impact which will serve as the foundation for a more in-depth research study.

1.   Introduction and Background

Libraries have, up until recently, measured performance mostly by using the input-output model (How many books do we have? How many items in the repository? How many are used?). However, just the mere fact that a service is being used, does not mean that the service is a valuable one, or that it makes a difference to the user.

A Special Library and Information Services (SL&IS) serves a customer or user with very specific information needs within a very specific context. However, libraries in general are increasingly required to operate on business principles, to compete for funding by showing return on investment, and motivating the acquisition and retention of specialised resources. According to White(2008:502) "Libraries are becoming more business-like in their operations and assessment due to service environment forces." This concurs with Poll's (2007) observation regarding the budget cuts and closure of some libraries.

In the process libraries are increasingly looking at business practices and measurements such as customer satisfaction and strategic alignment (White, 2008; Henczel, 2006); processes such as Total Quality Management (Sherikar, Jange & Sangam, 2006) to provide effective tools and techniques that may assist in:

- Attainment and retention of institutional income
- Proof of value and impact on research output
- Evidence of comparability with peer institutions, and
- Justification of a continuing role for libraries and SL&IS staff

(Town, 2006:114)

The proof of value and impact remains an ongoing challenge since those are "soft" issues, difficult to quantify (Markless and Streatfield, 2006). Poll (2007) states that traditional performance measurement and user surveys can show whether a library is effective and efficient in delivering its services. However, neither of these methods show whether and how users benefited from their

contact with library services. Measuring impact addresses this gap and can assist in showing whether users have benefited from their contact with the library.

The aim of this study was to set the ground work for a more in-depth study in the evaluation of the impact that SL&IS has on its users.

Poll (2005 & 2007) defines 'impact' as the ways in which library users are changed as a result of their contact with the library's resources and also that there is a change in a user's skills, knowledge and behaviour. In this context, impact is therefore defined as the effect the product or service has on the efficiency of the researcher. It is also the contribution the product or services makes on the effectiveness of the researcher.

2. Problem Review

The South African Council for Scientific and Industrial Research's Library and Information service (CSIRIS) provides a comprehensive service to researchers of Science Engineering and Technology (SET). The CSIR is the largest research and development organisation in Africa, accounting for about 10% of the entire African Research and Development budget (CSIR, no date). It follows that such a prestigious research and development institution must be supported with ready access to validated information to fuel its research, thereby enabling the CSIR to remain globally competitive.
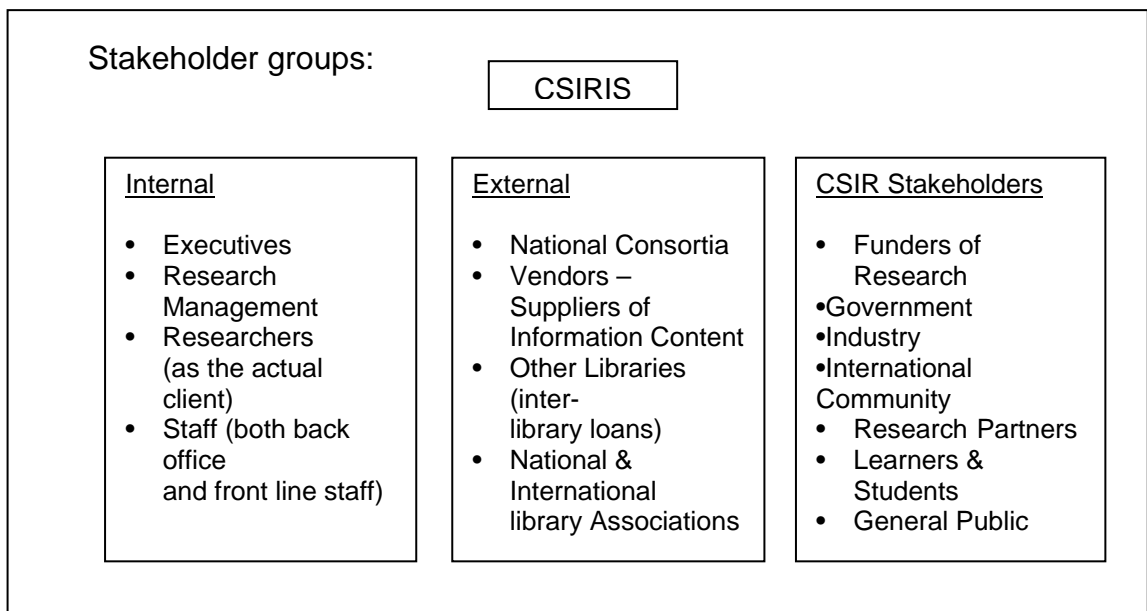
The mission of the service (CSIRIS) as a whole is to manage the delivery of appropriate information; preserve intellectual property; and to facilitate tacit knowledge connectivity by for example connecting knowledge workers. CSIRIS initiated a review process where, besides looking at the mandate, vision and strategy it also wanted to gain a better understanding of the actual impact it has on its parent organisation.

- **Stakeholder framework of CSIRIS**

The aim of measuring impact is to ensure that the internal customer's needs (scientific and industrial researchers in this case) are met or exceeded whilst also addressing the needs of other stakeholders. Ultimately the service should enable the researcher to produce quality research, thereby gaining recognition and further funding. Thus a positive spiral is created which allows the CSIR to continuously serve the greater research needs of the country. Evaluating the impact of the service should aid in identifying to what extent this is happening. It also allows for improvements where these are deemed necessary and for capitalising on those aspects that are showing visible impact.

This stakeholder framework (figure 1) puts into perspective the fact that many stakeholder groups, the Council for Scientific and Industrial Research (the CSIR) included, are affected by CSIRIS.

Figure 1: Stakeholder framework of CSIRIS

Stakeholder groups:

CSIRIS

Internal	External	CSIR Stakeholders
• Executives • Research Management • Researchers (as the actual client) • Staff (both back office and front line staff)	• National Consortia • Vendors – Suppliers of Information Content • Other Libraries (inter-library loans) • National & International library Associations	• Funders of Research •Government •Industry •International Community • Research Partners • Learners & Students • General Public

It is imperative to keep the other stakeholders of CSIRIS in mind whilst focusing on any particular stakeholder, for example the researcher at the CSIR as the internal customer of CSIRIS. The more positively CSIRIS impacts upon the researcher and the research process, the more positive the effect

will be on the other stakeholders, such as the CSIR and its funders (both private and public).

- **Complexity of the concept: Impact**

Evaluating impact is difficult due to its inherent intangibilities and the fact that there are many factors that influence an individual's behaviour. Nonetheless, it is a necessary next step in measuring performance. Markless and Streatfield (2006) commented that policy makers, managers, practitioners and researchers will all come under increasing pressure to get to grips with questions of service value and impact. It is therefore clear that measuring impact in the L&IS context must be included in the overall measurement of performance.

It therefore requires a study of related concepts to facilitate the identification of measurable indicators of impact. Very often it is necessary to identify indicators of impact as the direct impact is not clearly measurable. Markless and Streatfield's (2006) view on an impact indicator is that an indicator is a piece of information that indicates something useful. Indicators must be seen in the context of what one is trying to do. Indicators can only give clues about the difference being made. They believe that it is extremely difficult to evaluate the actual impact of any service, as human beings are complex and are affected in many subtle ways by each experience. Impact indicators are usually a surrogate for impact: pieces of information that provide good clues, telling part of the story. The challenge lies in finding the strongest surrogates possible.

- **Evaluating and measuring impact**

Poll (2007) states that the difficulty in trying to measure impact (or higher order outcomes) is that there are multiple influences on an individual and that therefore it is difficult to trace users' changes and improvements back to the

library. Markless and Streatfield (2006) remarked that it is important to remember that quantitative approaches tend to encourage us to focus on providing more to a larger number of people i.e. economies of scale and on faster or more efficient provision, and unless we are careful they can lead us to concentrate on outputs and not on outcomes, hence the need to measure impact.

Poll (2007) added that traditional performance measurement and user surveys can show whether a library is effective and efficient in delivering its services. However, neither of these methods show whether and how users benefited from their contact with library services. Measuring impact addresses this gap and can assist in showing whether users have benefited from their contact with the library.

- **Measuring impact as part of Performance Measurement**

Most libraries have some form of performance measurement system in place, but why should impact be included in the overall performance measurement system? According to Poll (2005) libraries are changing from day to day. New services such as creating institutional repositories, managing portals and facilitating access to the most appropriate electronic journal platforms give rise to new expenses, changed work loads, new information resources and alternative services. Libraries need to justify the investment in the changes and prove the efficiency and positive impact of the new resources and services.

Poll (2007) points out that it is crucial for special libraries to show that they work not only effectively but also cost-effectively and that their results benefit the parent organisation, especially in the light of the number of special libraries that have experienced severe budget cuts (or have even been closed down) in the past decade. A service such as CSIRIS must therefore be able to justify its existence as an enabling service to the parent organisation: serving the customer optimally whilst remaining competitive and financially viable.

As the information environment changes, information professionals in special libraries are being forced to change their measurement and evaluation processes. They must not only capture data about how the library is perceived by clients and how the resources allocated for library services are being used (Henczel, 2006: 7), but also how the organisation is benefiting in (in this case) a research sense since that is the "business" of the CSIR, by maximising the efficient delivery of information to support researchers today and into the future.

Henczel (2006:8) goes on to say that "[w]here there is confusion about the purpose of a library service and where the benefits it can provide to the work of individuals and groups within the organisation are unknown, the service has an uncertain future. " This potential gap in understanding the interfaces between the CSIRIS and the research process may reflect negatively on the value of those services when the users have to evaluate the service, since Henczel (2006) describes the three standard categories of measurement of special library services as:
(1) Client satisfaction;
(2) Collections and usage; and
(3) Strategic alignment

White (2008: 500) observes that "To be effectively aligned, organizations need vertical alignment (strategy to people) and horizontal alignment (process to customers)." This he links to the Kaplan and Norton (2006) balanced score card (BSC) model where the components of the scorecard in essence require strategic alignment.

The SL&IS industry is experiencing a shift in focus away from monitoring processes and outputs using traditional performance indicators towards 'higher-order outcomes', 'impact' or 'achievement'. Or, to put it differently, – a shift from monitoring efficiency towards assessing effectiveness (Markless and Streatfield, 2006). According to Urquhart (2006) impact evaluation is a particular difficulty for the L&IS sector as it is so hard to get beyond the

immediate impact assessment, but even an audit of that, suitably designed, can provide indications of longer-term impacts.

- **The Impact of CSIRIS**

At the core of trying to gauge impact, lies the value of understanding the internal customer (the researcher and his/her work process) more intimately, in order to provide a service which impacts positively on the researchers and their research outputs. This will support the researcher in becoming more successful and their success will impact positively upon the organisation it works for (the CSIR). The CSIR then in turn impacts positively on South Africa and globally in terms of the scientific research outcomes that have been achieved (external research funding environment). This external research environment feeds back to CSIRIS and the researcher as well as the research process in terms of recognition, which allows the cycle of high quality research to continue. This spiral of impact is illustrated in figure 2.

As CSIRIS understand the researchers' information needs better, it can evaluate the service and products on offer in order to select those information products which best serve the researchers' needs. These products include external information suppliers which are procured by CSIRIS (thereby effectively outsourcing e.g. online journals) for the researchers' use. Information flow takes place and these external information suppliers in turn provide information which informs and improves the foundation of research at the CSIR.

Figure 2: The impact framework of CSIRIS

- **Service**

According to Zomerdijk and de Vries (2007), one of the most distinguishing features of delivering services compared to delivering goods, is the amount of customer contact involved in the service delivery system, following from the simultaneity of production and delivery of services. In today's competitive environment, organisations cannot afford to concentrate on just one set of performance objectives and are forced to perform well at multiple criteria simultaneously.

Segal-Horn (2004) defines 'front office' as that part of the service which has an interface with the customer and 'back office' as any part of the service delivery which may be carried out remote from the customer.

- **Changing role of the librarian**

In an information era, it is not surprising that the traditional role of the librarian is changing and it therefore warrants discussion.

Following Zhong's (2007) research into self-service in public libraries in China, he found that self-service has compelled librarians to change from 'helping readers' to 'helping readers to help themselves'. According to him, the role of the librarian is changing from the traditional service mode of collecting, processing and storing books and waiting for the user to come to them. A radical change will be made where librarians will take on the whole service (traditional and new) and will play more of an assisting role in guiding users through training and guidance in literature information retrieval. It stands to reason that this change will impact more intensely on some users and that others would barely notice.

The role of the librarian within the SL&IS context is discussed further under the results section.

3. Research Design and Methodology

The research methodology followed for this paper was qualitative and explorative in nature. A qualitative methodology refers to the study of phenomena that occur in natural settings in all their complexity (Leedy and Ormrod, 2005). Data was obtained using focus groups, interviews and short questionnaires. Although numerical data was collected in a short questionnaire, the interpretations of the results consist of reflection on phenomena, and can be seen as qualitative.

- **The research question**

A specialist L&IS such as CSIRIS must be able to justify its existence as an enabling support service to the parent organisation, serve the customer optimally and remain globally competitive. Evaluating the impact of the service will aid in achieving this. Therefore, the research question is as follows:

What impact does the use of specialist Library and Information services have on researchers that use the service?

- **Research Objectives:**

The objectives form the constituent parts of the research question)

Objective 1:

To research the concept of **impact** as within the Library and Information services and to identify the most important indicators of **impact** for researchers using Library and Information services.

Objective 2:

To investigate the **research** process in terms of the relationship with specialist Library and Information services as well as the link between successful **research** outcomes and the use of specialist Library and Information services from researchers' point of view.

Objective 3:

To research **service** in the Library and Information services context and to identify the most important Library and Information **services** that researchers use in the research process.

Implications and aims of objectives

Impact (as part of performance measurement) is a very broad area of investigation, best suited to be gauged in the longer term. Due to the time constraints of this research, it is proposed to be the 'first phase' of an evaluation of impact of L&IS on its users.

Firstly, the impact of L&IS in general will be researched, followed by identifying the most important indicators of impact according to researchers that use the service. The impact indicators will then be incorporated into a recommended measurement instrument (framework/matrix) for use in 'phase two' of the study of impact of this service ('phase two' is not within the scope of this research).

It is proposed that there are many factors that influence the research process and objective two is aimed at investigating the link between L&IS and the research process. The further aim of this objective is to find out what role

specialist L&IS has to play in terms of successful research outcomes as well as how important this role is.

As a support service, CSIRIS assists in enabling researchers to do effective research, and the aim of objective three is to find out which of these services on offer are most important in the view of researchers that use the service. The most important services then identified will also be incorporated into a recommended measurement instrument (framework/matrix) for use in 'phase two' of the study of impact of this service. As mentioned above, 'phase two' is not within the scope of this research.

Secondary data

In 2007 the CSIR undertook a study into the generic research process. This study forms the base of the research conducted for this paper.

A schematic process was presented to the searchers and they were asked to comment on this process (CSIR 2007). The diagram was seen as a useful framework to conceptualise the research process, whilst discussing the impact of CSIRIS upon the research process. This was done to establish a common set of reference points during the interviews.

**Figure 3: The Generic Research Process (CSIR,2007)**
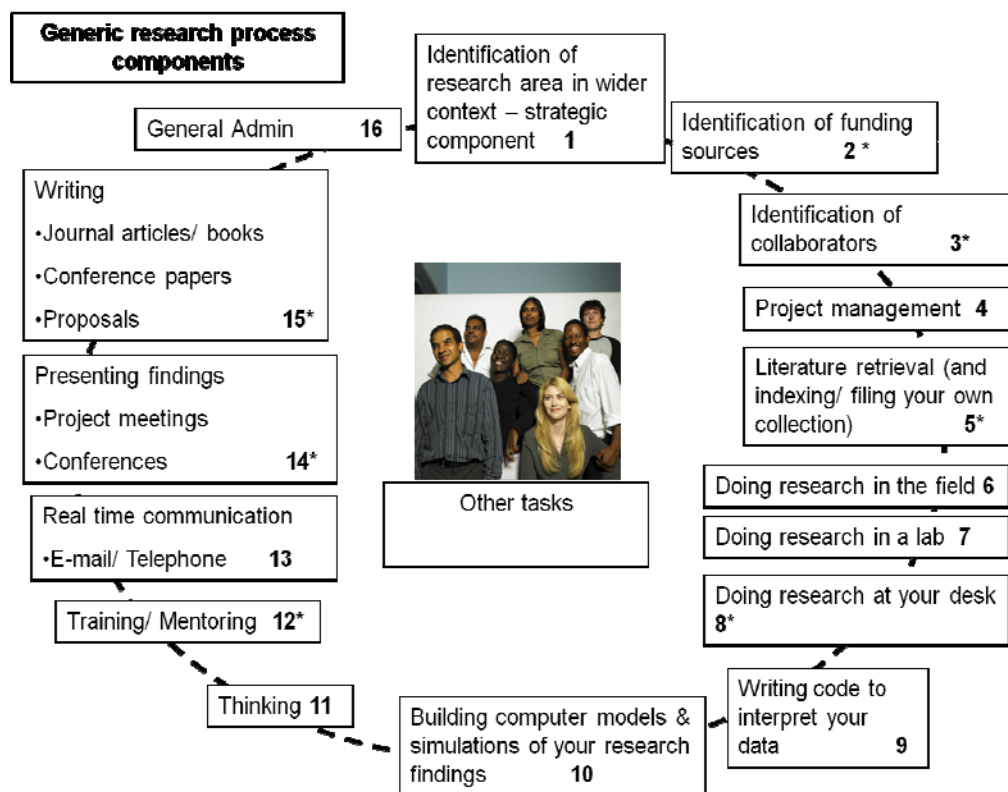
The following areas within the generic research process (figure 3), were where CSIRIS felt they were involved (to a lesser or larger extent):

- *Identification of funding sources (2)*
- *Identification of collaborators (3)*
- *Literature retrieval (5)*
- *Desk research (8)*
- *Training (12)*
- *Writing and presenting findings (14, 15)*

- **Research approach**

Figure 4 below illustrates the research design and methodology followed during the field research for this study. The four steps in the process are discussed below:

Fig 4: Research Design and Methodology for this study
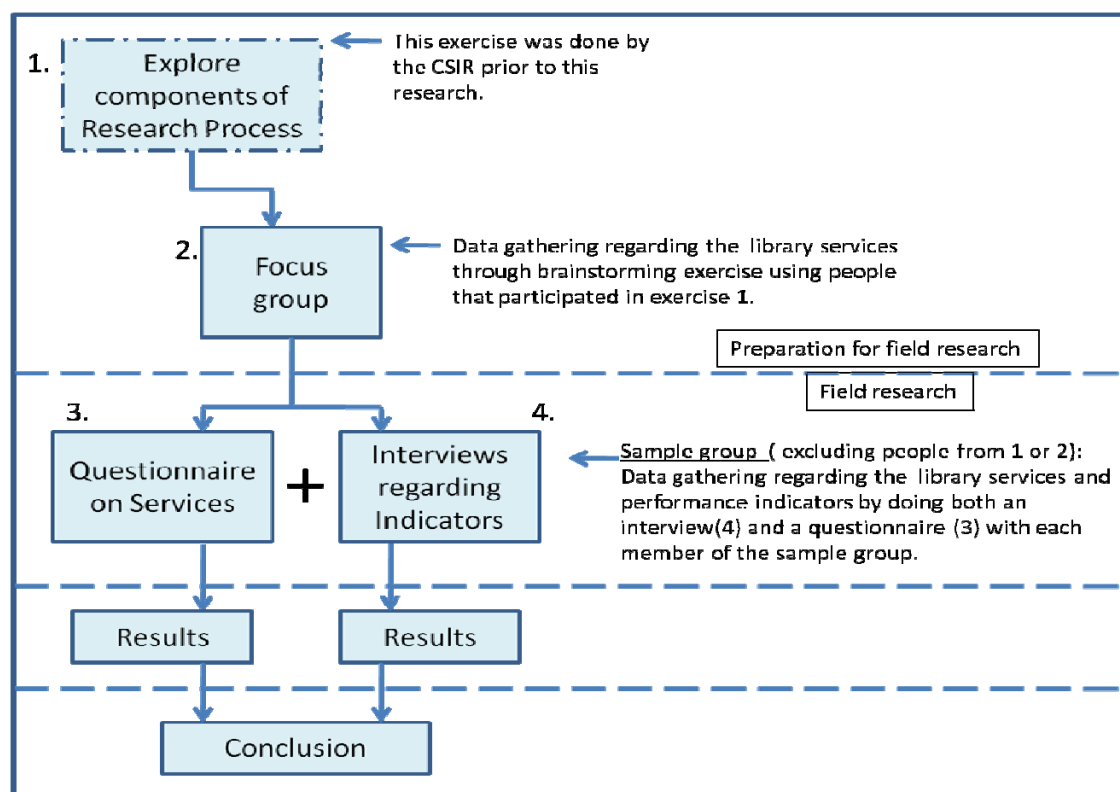
Step 1:   The exercise referred to is an investigation into the holistic research process and its interfaces with the library services (CSIR, 2007). The purpose of the exercise was to improve research efficiency. The research process diagram used in that exercise was also used as a point of reference during the field research for this paper.

Using this generic research process model for interview preparation proved to be a prudent approach as it served to firstly focus the discussions; and secondly to sensitise the scientists regarding the services available from their SL&IS.

Step 2:   A focus group as a data gathering method was chosen due to the fact that a certain amount of debate and subsequent consensus was needed in order to ascertain which elements of the Library and Information

Services (L&IS) were viewed as most important to researchers during the research process.

The focus group was comprised of researchers, who had been involved on the study regarding research efficiency by the CSIR. Since this group has already been exposed to the concepts of research and library interfaces as depicted in the process diagram, they were ideally suited to help identify those CSIRIS services which are deemed most important researchers in the research process.

Card-sort topics as a brainstorming technique was chosen for the focus group. The eight focus group members were asked to identify individually (on separate cards) the most important services of CSIRIS as used during their research. These were subsequently clustered into five groups that were given headings by members of the focus group. Thus the output of the focus group consisted of five themes. These themes were later compared to the results of the questionnaire (step 3).

The sampling of the focus group was purposive, judgemental sampling, whereby the researcher uses her own judgement about which respondents to choose, and picks only those who best meet the purpose of the study (Bailey, 1994). Fourteen of the participants that were involved in the research efficiency study (step 1) were selected and invited in order to maximise information to be gathered dealing the focus group. Subsequently eight researchers took part in the focus group.

Step 3: The short questionnaire was given to interviewees at the start of the interview in order to verify whether or not the most important services of CSIRIS indicated during the focus group, corresponded with the interviewees' views. The elements from the focus group were then used as the basis for the short survey, with an additional four elements (services offered by CSIRIS) added in consultation with Dr van Deventer of CSIRIS in order to cover the full spectrum of the services, as well as one open question (i.e. 'other').

Although bias may be reduced when respondents fill in surveys privately, the response rate was significantly increased as the interviewer asked for it to be

filled in whilst she was waiting (before the interview started), which resulted in a 100% response rate.

For the short survey, quantitative analysis was used via a spreadsheet in order to calculate the mode as the averaging method. The 'mode' as an averaging method is used to refer to the data item that occurs most frequently (Open University, 2006).

The result was then used to compare with the results gained from the focus group, in order to verify or contradict the most important elements of the L&IS in the research process as identified during the focus group. The eventual aim was to find the most important elements to include in the matrix that will be proposed to be used as a measurement instrument for measuring impact in the next phase of gauging impact at CSIRIS.

The short questionnaire was also used to focus the interview on the Library and Information services and the interfaces with the research process. It acted as a springboard in the interview towards impact and impact indicators.

Both the interview and short questionnaire questions were piloted against two members of the focus group, and subsequently adjustments were made.

Step 4:   A semi-structured interview was chosen as a qualitative data gathering technique to explore the intangible phenomenon of impact. The nine possible indicators of impact (Markless and Streatfield, 2006 and Poll, 2005) that was identified during the document and literature review, were presented to each of the 15 researchers during the interviews.

The sample population in this case consisted of the 808 scientific researchers within the five research units of the CSIR that use L&IS in their research. The sample group were emailed a document with background information in preparation for the interview in order to facilitate a productive discussion since the concepts under discussion are not necessarily familiar territory for these researchers.

Candidates for the interview and subsequent questionnaire were selected using a stratified random sampling process. The strata included race, gender, the research discipline, and experience. Within these strata the selection process was random. In view of he time constraints of these researchers, a total of 41 possible candidates were selected and subsequently invited with the aim of finally having three researchers from each research unit. Thus 15 researchers (three from each of the five research units) participated in the interview and subsequent questionnaire. These researchers did not participate in the initial research efficiency study (step 1) or the focus group).

Table 1: Demographics of Sample Population for interviews and questionnaire.

Total sample:	15
Gender:	
Male	6
Female	9
Race:	
Black	5
White	10
Research Unit:	
Biosciences	3
Built Environment	3
DPSS (Defence, peace, safety and security)	3
MSM (Materials science and manufacturing)	3
NRE (Natural resources and the environment)	3
*Experience:	
< 1jr.	2
1-5 yrs	4
5-10 yrs	3
10-20 yrs	1
> 20 yrs	5
*Approximate total research experience (CSIR and other institutions)	

The interviewer does not have specific background in L&IS and this served to minimize bias.

Leedy and Ormrod (2005) suggest that there is usually no single "right" way to analyse data in a qualitative study, but provide a general outline of a data analysis spiral, which was adapted and used as follows: Transcribing; identification of common themes, rating priority of themes based on time spent speaking about it and "passion" with which it was discussed; frequency of themes; indentifying of anomalies, summarising the interviews and finally synthesis.

- **Nine Indicators**

The nine possible indicators of impact were compiled from: Poll (2005), and Markless and Streatfield (2006). 'Peer recognition and acceptance' was used rather than Poll's (2005) suggestion of 'better social inclusion' as it was deemed to be more applicable to researchers in this context. These nine indicators of impact were presented to the fifteen researchers as part of preparation for and during the interviews.

1. Changes in attitude and behaviour
2. Higher success in research
3. Peer recognition and acceptance
4. Enlargement of the scope of resources used
5. Time saved in information search and delivery
6. Better knowledge of how to seek information
7. Changes in skills and competences
8. Improved confidence
9. Information overload (reduce or increase)

4. Analysis of Results

- *The general impact of the service on researchers*

The results showed that researchers perceive SL&IS to have a significant impact on those using the service. Researchers overwhelmingly stated that they could not imagine doing research without effective SL&IS providing the building blocks of research. Researchers interviewed felt that SL&IS makes

research better and that it also saves time that can then be spent on field research.

It was also felt that "CSIRIS does not receive a lot of attention but you cannot do research without it". Researchers generally acknowledged that SL&IS should be seen as having an enabling effect – CSIRIS enables the organisation's core competency of doing research.

Other themes in terms of the impact of CIRIS in general that transpired were that of time, quality and reliability of information. Researchers interviewed felt across the board that CSIRIS' service was excellent, and phrases such as "amazing people", "very helpful and effective", "very happy with the service" and "better information service than I've experienced anywhere else"; were not uncommon during the interviews.

It was also deemed important to keep the service internal, especially in terms of understanding the context of research within the CSIR - the CSIR is about "knowing in practice" and it was felt that an academic library for example, could not serve the subtleties involved in this, nor have the insight into the requirements of researchers at the CSIR.

Another recurring theme was that of planning and direction in research and the influence of high quality, validated information on this. It was seen as providing the building blocks and foundation of research. One interviewee quoted Isaac Newton to describe the importance of correct literature as a foundation of research: "I can see further because I stand on the shoulders of giants".
Another interviewee highlighted trust as an issue – the trust that the researcher places in CSIRIS not to procure articles that are of sub-standard quality.

- **Discussion of Interview Results: Indicators of impact**

On the whole, researchers seemed to take the SL&IS 'for granted'. Firstly stating that they do not use CSIRIS all that much at the start of the interview

and by the end of the interview becoming more aware of the services of CSIRIS (such as providing access to online journals); subsequently indicating that the CSIRIS products and services were essential, especially in the planning phase of research and that successful research would not be possible without an effective L&IS that provides them with the latest peer-reviewed information. They saw it as providing the building blocks for research.

Researchers interviewed felt that the most important indicators of impact were:

- Higher success in research
- Time saved in information search and delivery
- Enlargement of the scope of resources used
- Better knowledge of how to seek information
- Information overload (reduce or increase)

Figure 5 shows the summary of the results, showing the percentage of interviewees (out of the fifteen) indicating 'high', 'medium', and 'low' for each impact indicator.

Figure 5: Impact Indicators

Choice of impact indicators
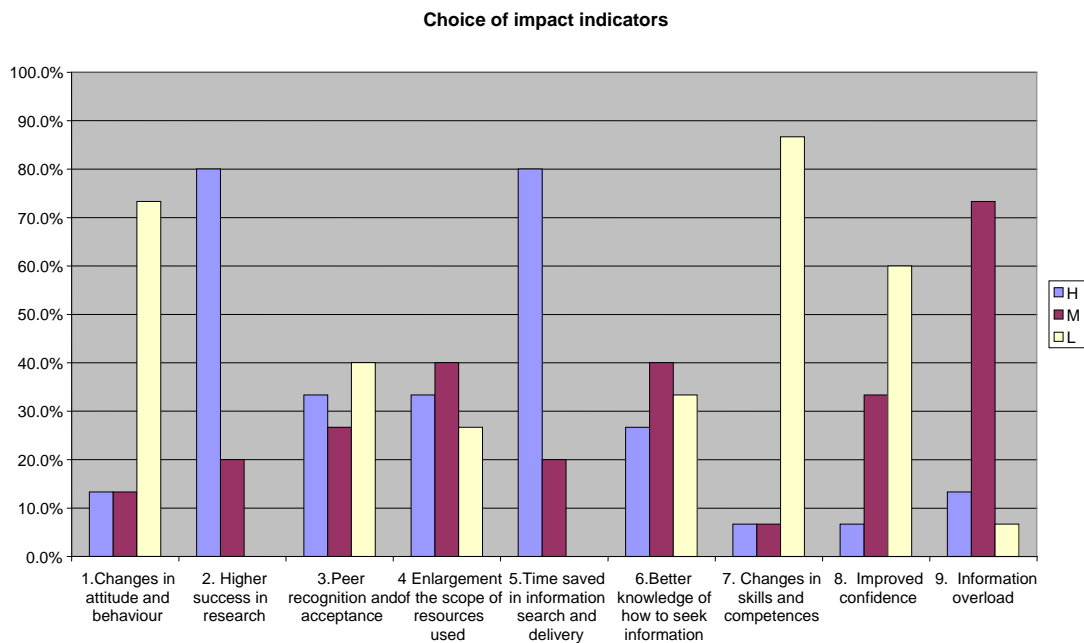
1. Changes in attitude and behaviour

Eleven out of the fifteen interviewees said that Library and Information services (L&IS) did not impact upon their attitude and behaviour. In most cases a definite 'no' was said, although two interviewees said that it may have an influence - not on attitude, but possibly behaviour in "the way you approach the research" and through the vision and direction in a particular project, but this was seen more in terms of direction than behaviour.

There was some confusion about this impact indicator – in many cases the question was asked: "Attitude and behaviour to what?" and one interviewee said: "Library and Information services is a service and has very little to do with an individual researcher's attitude."

The two interviewees that did say it was an important indicator were more junior researchers and were quite emphatic about the fact that validated information used influenced their attitude as a researcher in a positive way.

Poll (2005) is very pertinent in saying that one way of gauging impact is whether there was a change in behaviour and attitude. Clearly these researchers do not agree. On the whole, they said that there are too many other factors that would influence their attitude towards research, such as networking with peers (at the CSIR and internationally) and the researcher's own abilities and experience. It was also seen as linked with 'improved confidence' as an indicator by more than a third of interviewees.

2. Higher success in research

There can be very little doubt that this impact indicator should be included in the final framework/matrix (suggested measurement instrument for 'phase two' of the study of impact), as 80% of the interviewees said that this would be a primary indicator of impact.

Researchers interviewed felt that without L&IS, research would not be possible, especially in the planning phase of research. They also felt that successful research would not be possible without an effective L&IS that

provides them with the latest peer reviewed information. They saw it as providing the building blocks for research.

One interviewee (a very experienced researcher) said:
"Trying to do research without L&IS is like trying to drive to a destination without a car". Two interviewees saw CSIRIS as the "silent partner" of research - in the background, but essential for a successful research outcome. Another view was: "… the foundation of research is reliable information, but the researcher also judges the quality of information".
Approximately a third of interviewees felt that 'higher success in research' and 'peer recognition and acceptance' as indicators of impact are linked.

3. Peer recognition and acceptance

Peer recognition was described as having as few comments as possible on published articles, being able to publish in more prestigious journals and in general, whether or not the researcher was held in high esteem by their peers. One interviewee referred to this as the "cherry on top". It was viewed as most important by five interviewees and of medium importance by four interviewees. Many of these felt that it was linked in to 'higher success in research' as a sub-set.

One senior researcher said that there is no logical link between using CSIRIS and people thinking you are a great researcher and that there are many other factors that impact on research outputs.

4. Enlargement of the scope of resources used

This indicator was viewed as most important by five interviewees and of medium importance by six interviewees. One interviewee suggested that it rather be referred to as 'broader range of resources used' and that this would make the concept clearer.

It was the view of another interviewee that this indicator is important, especially if a research project is of a multi-disciplinary and inter-disciplinary nature.

On the whole, interviewees were very impressed with the scope of resources provided by CSIRIS, most notably a researcher who had studied at Cambridge (U.K.) and another who had worked in Belgium; both saying that CSIRIS compared most favourably to the resources they were able to access whilst working and studying in the abovementioned countries. There was, however, also a few interviewees that said that the most recent information is not always available, and attributed this fact to funding and that (in their view) South Africa is a third world country and therefore lagging behind in obtaining cutting-edge information.

5. Time saved in information search and delivery

Time saved in information search and delivery was overwhelmingly viewed as very important, with 80% of interviewees seeing it as a primary indicator of impact. A typical comment was: "Time saved is a very important factor, it is good to have information at your fingertips", referring to online journals.

By saving time in information searches, the researcher can spend more time on field research and one senior researcher said: "Any researcher would say, if there is anything that can save me time – bring it on!". She also went on to say that there are extreme pressures on researchers' time at the CSIR and either one needs more time or a larger team ("time or team").

One junior researcher felt that time saved and better knowledge of how to seek information are the most important indicators of impact and that all the other factors flow from these two.

One interviewee also said that the time saved by a training course delivered by CSIRIS on online searching was "empowering".

Almost half of the researchers interviewed felt that 'time saved in information search and delivery' and 'better knowledge of how to seek information' were linked.

6. Better knowledge of how to seek information

Four interviewees chose this indicator as the most important and six as of medium importance. One interviewee saw this indicator as 'looking forward' (having picked up skills using the CSIRIS system that would save time in the

future). Most of the junior researchers, but also two very senior researchers interviewed stated that the training they had received from CSIRIS in online searching had helped a lot in their research process and that this was also linked to saving time in searches.

7. Changes in skills and competences

Thirteen interviewees did not feel that 'changes in skills and competences' would be a good indicator of the impact of L&IS.

This was seen by one interviewee as a "side effect of the service". Another stated: "No, I use information; it does not improve skills".

Skills were also seen as more practical and one interviewee said that alerts about workshops to build skills could possibly improve skills.

This result contradicts with Poll's (2005) view that impact has to do with how a user's skills has changed as a result of using L&IS.

8. Improved confidence

Nine of the interviewees, said "not at all" to 'improved confidence' as an indicator of impact and were very clear about the fact that improved confidence is not linked to L&IS used. One junior researcher however, felt that there is a causal link between information sources used and improved confidence as a researcher (i.e. knowing the information used was validated, high quality information and that her research was not a duplication; thereby adding value to her field of research).

9. Information overload

Although interviewees were not emphatic about this indicator (only two viewing it as most important) and eleven viewing it as a useful indicator of impact (of medium importance); it was suggested by the majority that it should be included as an indicator of impact (even though not seen as the most important).

There were evenly mixed views on whether L&IS increases or reduces information overload. Some felt that it depended on the keywords used during searches. Some felt that it was up to the researcher him/herself how effective

information is 'sifted' through. Filters were also viewed as important in reducing information overload. Two interviewees said that there can never be enough information and indicated that it all depends on how information is sifted.

Open question - Important factors that influence research

To the question: "What are the most important factors that influences your research?", the answers that were given during the interviews is set out in table 2. This question was asked in general and a conscious effort was made not to 'lead' interviewees, in order to gauge (as objectively as possible) where CSIRIS fits within the research process as a whole and thereby understanding better the link between research outcomes and the use of L&IS.

Information

Five interviewees said that information was one of the most important factors that influences their research. In terms of the link between L&IS and research it is clear that information is a very important factor, ranking the same as networking. It is interesting to note how 'information' ranks in comparison to the other factors deemed as the most important influencing the research process (figure 3).

According to researchers interviewed, effective information gathering provides the building blocks of research and is essential in enabling the researcher to have successful research outcomes.

Table 2: Most important factors that influence the research process

Factors indicated	How many	Expressed as %
*INFORMATION	Total: 5	Total: 33.33%
Finding relevant information	4	26.7%
Patent searches	1	6.7%
*NETWORKING	Total: 5	Total: 33.3%
Networking with other researchers	2	13.3%
Training/Mentoring	1	6.7%
International trends	1	6.7%
Subject 'champion' (leadership)	1	6.7%
*FUNDING	Total: 4	Total: 26.7%
Funding	4	26.7%
*RESEARCHER COMPETENCE	Total: 7	Total: 46.6%
Researcher's own competence	1	6.7%
Motivation/ quest for knowledge	1	6.7%
Appropriate presentation	2	13.3%
Imagination	1	6.7%
Having a 'core' focus	1	6.7%
Analysis of information	1	6.7%
*OTHER	Total: 5	Total: 33.3%
Equipment	1	6.7%
Government regulation	2	13.3%
Time	1	6.7%
*In order to provide clarity, topic headings were allocated by the authors by clustering the factors suggested by interviewees.		

Networking

Although only two interviewees pertinently said that 'networking' was an important factor in answer to the question: "What are the important factors that influence your research?" it was widely discussed by (especially senior) researchers during the interviews, stating that a researcher "cannot work in isolation".

"Having a subject champion" was discussed as part of networking as well as "training and mentoring" - in terms of "pointers, mistakes made by other researchers and problems encountered, can help to avoid such problems".

"Keeping up with international trends" was also discussed during an interview as part of networking (and also as part of literature searches).

Van Deventer (2007b) pointed out that 'identification of collaborators', i.e. networking is an area within the research process where CSIRIS is involved (figure 3).

Funding

Four interviewees indicated that funding is one of the most important factors influencing research.

One interviewee indicated that they must compete for funding and that even within their own department researchers have to compete for internal funds. Another interviewee underscored the importance of funding and pointed out that through funding a researcher actually "buys the time they can spend on a project". It seems that funding is an essential factor influencing the research process.

Van Deventer (2007b) pointed out that 'identification of funding sources' is an area within the research process where CSIRIS is involved (figure 3).

Researcher's own competence

"Researcher's own competence"; "imagination"; "motivation and the quest for knowledge" and "having a core focus" were all indicated as 'internal' factors (within the researcher self) that influences the research process. It was indicated that the researcher's own experience and competences impact upon the research process. This ranks highest on what researchers deem as the most important factor influencing the research process.

Other factors

Other factors such as government regulation; having the correct equipment to conduct research and time was also volunteered as important factors

influencing research. It is interesting that "time" was only mentioned by one interviewee, seeing as 'time saved in information search and delivery' as an impact indicator was given such high importance during the interviews. Time as a factor here was discussed in general and not time saved in terms of L&IS (as was discussed in the previous section under impact indicators).

- **Focus group result - Service in the L&IS context**

Box 1 shows the most important services of CSIRIS for the researcher as indicated by the members of the focus group (as per the card sort topics); and the subsequent clustering of these elements. As the members of the focus group were involved in a previous study on the research process, they were more consciously aware of the factors involved in the research process and what is important in research.

The five main elements (services and products of CSIRIS) in order of importance (relating to 'A' of the matrix/framework) were clustered under the following headings:

1. Literature searching and sourcing
2. Human Interaction
3. Reference report and data management
4. WIKI (subject specific information service)
5. Alerts (hands-off searches)

It must be borne in mind that the focus group members were not prompted as to the services of CSIRIS. They were asked to each list on cards the services they found most important in their research and it was subsequently clustered under the above headings. They were therefore not presented with the same list of services as the respondents of the short survey. This was deliberate; in order to find out from this group which parts of the service were most important to them, with the minimum of prompting. These five elements provided the basis of the short survey, with additional services added on that were not thought of by focus group members.

Box 1:   <u>Focus Group result - card sort topics</u>

Transcription of cards clusters (in order of importance):

1.   **Literature searching and sourcing**

- Web of science
- On-line journal downloads/subscriptions
- Electronic journal access off-site*
- Search for articles
- Database access (journals/patents)
- Google scholar
- Electronic journal access (coverage)
- Literature searches and article sources (on-line)
- E-journals
    - o   IEEE (Institute of Electrical and Electronics Engineers)
    - o   Science Direct
    - o   Nature
- Literature searches
- ABC index of journals (electronic searching)
- Access to journals
- Scopus (not on CSIRIS but University of Pretoria)*
- Google scholar
- Articles from Science Direct (literature search)
- Single point of access to on-line publications
    - o   Papers NB (single point of search)
- Literature sourcing
- Document purchases/delivery
- Ordering articles from outside S.A. through CSIRIS

2.   **Human Interaction**

- Librarian as a person
    - o   Human contact
- Handling difficult requests (human interface)
- Literature overview assistance
- "Search" Training
- Journal submission advice*
- List of software tools*
    - o   E.g. for communication, referencing, managing literature

3.   **Reference report and data management**
- Reference management*
- Maintaining repositories
- Paper Journals in CSIR library (water resources research)
- Electronic library catalogue
    - o   Access to Pretoria and other libraries in South Africa
- TODB – internal research space
- Collaborative Research environment*
    - o   Paper repositories
    - o   Own papers
    - o   Paper references
- Shared journal site via GroupWise

4.   **WIKI** (subject specific information service)
- Information portal management*
- Vortels (Group specific Intraweb page with frequently used links)

5.   **Alerts (hands off searches)**
- E-News
    - o   Add some out of the box items
- Alerts
    - o   Authors
    - o   Articles
    - o   Journals
    - o   Conferences
- Google keyword alerts
- News items of interest

 * Services that (according to the researchers that participated in the focus group) are not in operation but services they would like to have.

Short survey result

The result of the short survey contradicted in some respects with the focus group results:

Figure 6: Short survey result
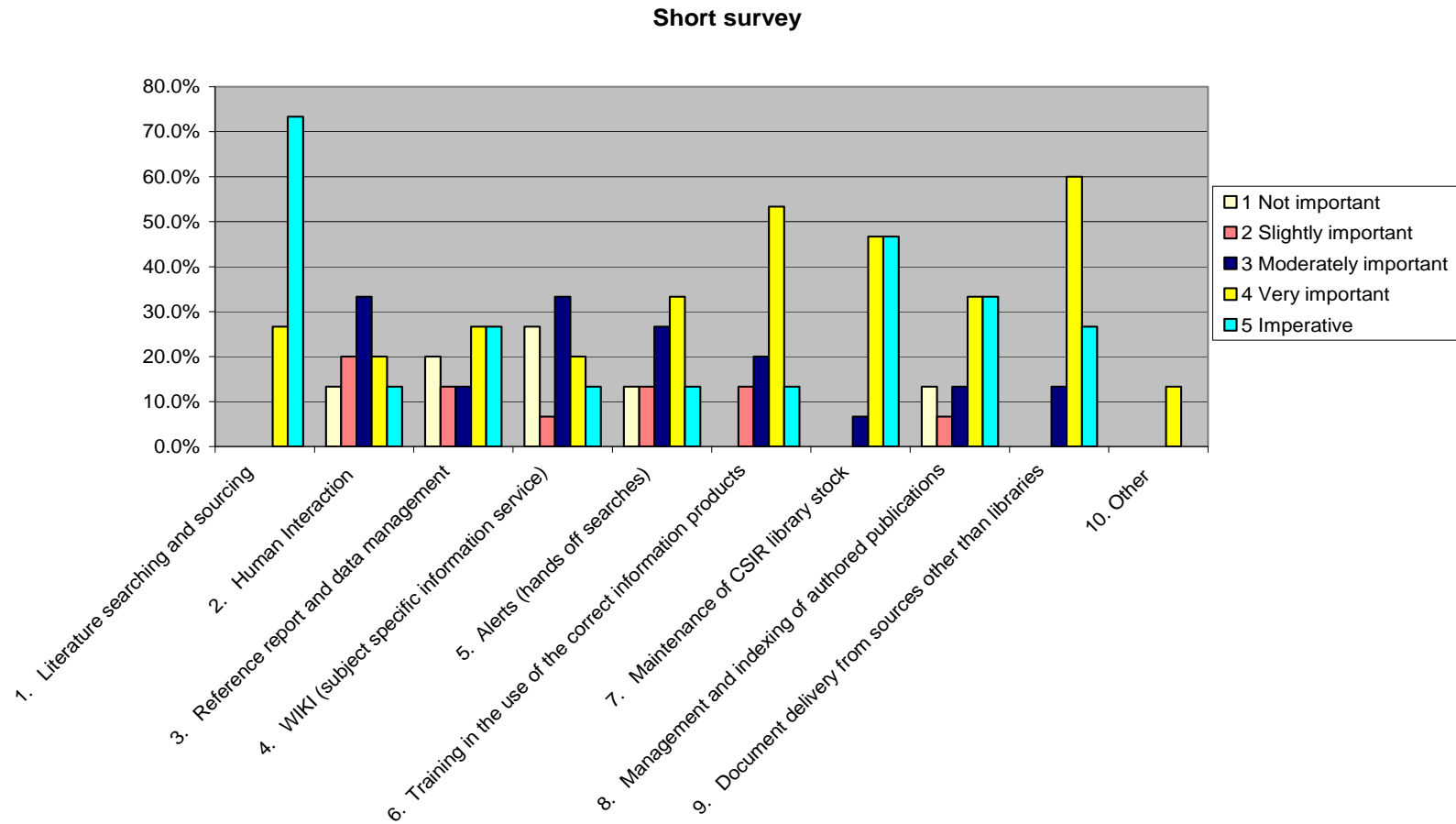
Short survey

- **Comparison between the focus group and short survey results**

It must be reiterated that the focus group result indicated the first five elements that were included in the short survey and that an additional four elements were added (in order to survey the full spectrum of the services of CSIRIS).

Some of these services were discussed in the focus group, although sorted under another heading. For example "search training" was listed as an important CSIRIS service during the focus group, albeit clustered under the heading 'human interaction'.

Similarities between the short survey and focus group results
The following similarities between the short survey and focus group results were found:

Literature searching and sourcing

This item was indicated as the most important CSIRIS service by the focus group as well as most important from the result of the short survey.

Reference report and data management

This was also indicated by both the focus group and short survey respondents as important – four respondents of the short survey indicated 'very important' and four respondents indicated 'imperative'.

Alerts (hands-off searches)

Alerts (also referred to as 'hands-off searches), relates to when a librarian sends alerts via the intranet to researchers with any information (e.g. journal articles, conferences, training courses) that could be of use to the particular researcher's subject of research.

Alerts was also indicated by both the focus group and the short survey respondents as relatively important. Five short survey respondents indicated 'very important' and two indicated 'imperative'.

Contradictions between the short survey and focus group results:

The following contradictions between the short survey and focus group result were found:

WIKI (subject specific information service)

A WIKI is a subject specific information service and collaborative internal website used by researchers on joint projects at the CSIR in order to share information. Four respondents indicated 'not important' and five respondents indicated 'medium importance'.

As it transpired during the interviews there were many respondents that did not know what a WIKI was, and many did not use this service.

'Human interaction' (Librarian as a contact person)

The term 'human interaction' was decided upon during the focus group in order to cluster those elements of the service where the librarian as a person enters the picture. However, it was found during the interviews that this term had caused confusion (this may be why it was ranked relatively low).

As the short survey was given to interviewees before the interviews started, the importance of the librarian as a contact person only came to light later on in the interviews (and this may have skewed the short survey result in terms of this element). During the course of the interviews, almost all interviewees spoke about 'human interaction', but would refer to it as the librarian or Information Specialist's help in finding information.

It was the 'front office' aspect of the service – the librarian or Information Specialist who assisted researchers in finding difficult to come by books and journals and assisting in searches that caused interviewees to use terms such as "amazing service".

Also, those researchers that have a personal relationship with a librarian were the ones that found the librarian's assistance indispensable – someone they could

contact who understood their information needs and oftentimes being pro-active by sending alerts to the researcher about books, journals and conferences pertaining to their particular research projects. As one interviewee stated: "There needs to be a specific person who understands what you need".

Another interviewee saw 'human interaction' as something specific i.e. handling difficult cases such as obtaining a rare book or journal article that is not readily available. He also suggested that human interaction could be a mechanism for bridging differences in skill level – a librarian would assist a junior researcher in a different way than an expert researcher. It was also suggested that if L&IS was outsourced, it would be the human element (contact with the librarian that understands the needs of the researcher), that would be lost.

Additional elements that ranked high in the short survey

As mentioned above, an additional four elements were added to the focus group end result and presented in the short survey. Of these added items, elements that were ranked very high during the short survey were:
'Maintenance of CSIR library stock'; 'document delivery from sources other than libraries' and 'training in the use of the correct information products'. It must be mentioned again that training was indicated as an important service during focus group (see box 2) but was clustered under the heading 'Human Interaction'.

- **Summary of results**

The results of the interviews, short survey and focus group was discussed in this chapter:

Interviewees overwhelmingly felt that CSIRIS does have a positive impact on their research in general. 'Higher success in research' and 'time saved in information search and delivery' were viewed as the most important indicators of impact. 'Changes in skills and competences' and 'changes in attitude and behaviour' were viewed as the least important indicators of impact. 'Researcher's own competence' was indicated as the most important factor that influences the research process.

'Information' and 'networking' ranked as second most important factors that influence the research process. The most important CSIRIS service from the results of both the focus group and short survey, was 'Literature searching and sourcing'. The librarian as a contact person came to light as very important during interviews.

5. Conclusion

Impact is best suited to be studied in the longer term. Therefore, it is recommended that further in-depth research into the impact of a SL&IS on the researchers that use the service is conducted. This further study purposes to reach an international population of scientists in order to get a wider input regarding the impact indicators.

It is envisioned that the measurement instrument developed following our research can be adapted for use in impact studies in Research Libraries, SL&IS as well as in Academic Library services.

'Higher success in research' and 'time saved in information search and delivery' were viewed as the most important indicators of impact. It is therefore recommended to focus upon the aspects of the service that bring about optimal impact within these areas.

Even though 'changes in skills and competences' and 'changes in attitude and behaviour' were viewed as the least important indicators of impact, it does not mean that these indicators should be ignored. The challenge is to find surrogate indicators that would allow researchers and other stakeholders to acknowledge these factors.

The librarian as a contact person came to light as very important during interviews. This aspect brings to light the importance of having a librarian as a contact person in order to assist in searches and, in particular, difficult to come by resources. This has important implications upon the perception that the move towards solely relying on online searches by the researcher is acceptable. It is

the authors' view that removing the 'warm body close to the client' may have a negative impact on the quality of research.

It is clear that much work still has to be done before measuring impact within the SL&IS becomes a standard tool for evaluation. However, it is comforting to know that those researchers interviewed overwhelmingly felt that the SL&IS does have a positive impact upon their research.

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Final product – Measurement instrument

As mentioned before, the matrix/ framework was developed as a result from this research. In the 'CSIRIS/ Impact indicator matrix' - the X axis is referred to as **B** and the Y axis as **A**.

Column **A** is concerned with the most important services (elements) of CSIRIS that are used in the research process. The focus group and the short survey were aimed at gauging which elements of the L&IS are most important during the research process.

B of the matrix is the more intangible aspect of the research i.e. the impact indicators. This was developed during and following the interviews.

This measurement instrument is the end result of this research and is intended to be used in further studies relating to the impact that library services has on its users.

> **We invite readers to adapt this instrument to their particular library's services and use it in gauging impact of their services on users of their library.**
> **Any feedback in this regard will be appreciated.**
> ***Contact details: Erika [erika_botha@iafrica.com]***

Matrix/ measurement instrument for survey (Spreadsheet).

	Higher success in research	Time saved in information search and delivery	Enlargement of the scope of of resources used	Better knowledge of how to seek information
Does CSIRIS make a difference in your research?				
Section 1:				
Please indicate on a scale of 1 - 3 the difference you feel CSIRIS products and services (A) makes on each of the Research factors (B)				
Scale:				
1 = this service makes little difference in terms of this factor				
2 = this services makes some difference in terms of this factor				
3 = this service makes a big difference in terms of this factor				
B: RESEARCH FACTORS				
	Higher success in research	**Time saved in information search and delivery**	**Enlargement of the scope of of resources used**	**Better knowledge of how to seek information**
A: CSIRIS PRODUCTS AND SERVICES				
1. Literature searching and sourcing				
2. Librarian / Information Specialist as a contact person				
3. Maintenance of CSIR library stock				
4. Training in the use of the correct information products				
5. Alerts (hands-off searches)				
6. Document delivery from sources other than libraries				
7. Reference report and data management				
Section 2:				
Please choose a, b or c and state why?				
Do you think that CSIRIS:				
a) Helps to reduce information overload				
b) Increases information overload				
c) It depends				
Please state why?:				

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