

[DOI: 10.20472/IAC.2019.052.066](https://doi.org/10.20472/IAC.2019.052.066)

LIANDI VAN DEN BERG

North-West University, South Africa

THE VARIANCE OF INFORMATION MANAGEMENT BY SOUTH AFRICAN SPORT COACHES WITHIN DIFFERENT COMPETITIVE LEVELS

Abstract:

Information management of sport coaches is a crucial factor that contributes to their competitive success. In current sport competitions, it is not a matter of if coaches are collecting and using information, but how it is being managed to provide an advantage. In this respect, National Federations as sport governing bodies, should support and develop the information management skills and activities of coaches. Therefore, it is important to gain insight into how coaches from various competitive levels currently utilise the available information for enhanced competitiveness. This research followed a qualitative design with data collection performed through semi-structured interviews with high-level cricket coaches and their support staff. Deductive codes of person collecting data, skills of the person collecting, methods used (which includes technology), sources utilised, finances and value assigned derived from the first stage of the competitive intelligence 4Cs process model by Weiss (2002) were used to code the interview data. The inter- and intra-rater coding procedure was substantiated by strong Cohen's Kappa values of 0.80 and 0.78 for intra and inter-rater reliability. The findings indicated clear differences between coaches' data collection management within the various competitive levels. This sheds light on previously hidden practices of coaches, and adds to the current knowledge pool. Likewise, the findings highlight the contrast of extremely professional data collection management at the highest cricket competitive level, compared to situational, unprofessional, irregular and, in some instances, complete lack of data collection management at the lower competitive levels. The findings could guide the National Federations to develop coach educational programmes to enhance the information management process of cricket coaches across the various competitive levels.

Keywords:

Information management, competitive levels, sport coaches

JEL Classification: L83

The variance of information management of South African sport coaches within different competitive levels

1. Introduction

Information management by sport coaches is a crucial factor that contributes to their competitive success (Wright et al., 2012). The development of computer systems and software available for information analysis and storing, increased coaches' access to a variety of information management systems and opened up a world of data to explore (Wright et al., 2012, Hendrickson, 2012). The continuous performance analysis hardware and software improvements also increased coaches' demand for data and information (Lyons, 2005, Groom et al., 2011). The use of improved available data is still in its infancy, but increasing at a brisk progress especially within the sport of cricket (Najdan et al., 2014). In this regard, elite coaches direct the data collection process and obtain specific information related to their own identified key performance indicators (Wright et al., 2012). Coaches use the information they receive mainly to assess performance, diagnose problems or give corrective technical feedback to athletes (Lyle, 2002). In addition, coaches also use information to identify strengths and weaknesses of opposition and to formulate a competition strategy (Groom et al., 2011). It is evident that information collection and management has played an important role in the coaching practice for many years, and currently, professional teams from a variety of sporting codes cannot function without a steady influx of information to the coach and players (Groom et al., 2011, Hendrickson, 2012). More data and information is available today than in the past, and in current sport competitions, it is not a matter *if* coaches are collecting and using information, but *how* it is managed to develop interventions and strategies for a competitive advantage (McGarry, 2009). In spite of coaches' constant collection and use of information, very little is known about the specifics of coaches' information management (Groom et al., 2011).

As the sport industry has seen numerous informational developments over recent years (MacCauley, 2018, Hendrickson, 2012), so too the managerial functions of coaches has increased (Surujlal, 2004). The ability of coaches to plan, formulate strategies and counter opposition capabilities, has dramatically increased with the rise of the information era (Lyons, 2011, Surujlal, 2004). In this regard, with an increasing demand placed on elite coaches regarding new information management functions, it is imperative that coaches receive adequate training in this critical area (Surujlal, 2004). Within the UK this need for additional information management skills development has been addressed and coaches receive training regarding performance analysis at levels three and four of their Coaching Certificate (Hockey Coaching UK, 2008, Rugby Football League UK, 2011). In a similar manner, South African cricket coaches receive performance analysis and information management skills as part of the level three coaching certificate (Cricket South Africa (CSA), 2019). It is therefore important to gain insight as to how coaches from various competitive levels are currently utilizing the available information for enhanced competitiveness. Since there is a dearth of knowledge on exactly how coaches gain their competitive advantage (Wright et al., 2012), the aim of this study was to provide a) insight into current data collection management of cricket coaches from various competitive levels in South Africa, and b) to provide the cricket governing body with identified gaps in coaches' current information management practices that could be addressed through the development of coach education programmes.

2. Theoretical framework

Numerous studies have investigated data collection and usage by elite coaches in general, and many of them agree that coaches predominantly function in an unsystematic manner when it comes to data and information management (Groom et al., 2011, Wright et al., 2012). In order to clarify the research aims, the 4Cs Competitive Intelligence (CI) process model by Weiss (2002) serves as theoretical underpinning of this research. The use of a model allows researchers to organise findings according to specific properties of the information management occurrence of cricket coaches from a theoretical background for the enhanced understanding and explanation of the phenomenon (Henning et al., 2004). CI is a business domain function and defined as the ethical and systematic collection, analysis and management of external information that can enhance one's own organisation plans, decisions and operations (Strategic and Competitive Intelligence Professionals (SCIP), 2012). CI therefore provides a structure for organising and coordinating activities directed towards the collection and analysis of environmental and competitor information and has been widely used within businesses world-wide (Streamcrest, 2003). In this regard, coaches, just as their business counterparts, obtain competitive intelligence (CI) through collection and analysis of information on their competitors and the environment for decision making and countering of opponent strategy (Teo & Choo, 2001). The CI 4Cs process model of Weiss (2002) is a simple yet effective model and has potential for the exploration of the information management phenomenon in a sport coaching context. Since a domain-specific phenomenon can be transferred to another domain's research question to assist in determining the underlying principles and variables (Turocy, 2002), the 4Cs CI process model of Weiss (2002) was applied as theoretical framework to investigate the occurrence of information management process of high-level cricket coaches.

The 4Cs model represents data collection, conversion, communication and countering stages as part of the data and information management process to collect and create intelligence for competitive decision making (Weiss, 2002). The first stage of data collection is the focal point to this research and within the business CI domain includes aspects such as the *person collecting data*, *skills of the person collecting*, *methods used* (which includes *technology*) and *sources* utilized (Weiss, 2002). Likewise, aspect such as *finances* available and *value assigned* to information collection has been identified as additional key aspects within the first stage of data collection in CI (Dishman & Calof, 2008). These specific key components in the first stage of data collection in the 4Cs model underpin the investigation. In this regard, the *persons collecting data* very often is the coach, who is the main user of information (Bampouras et al., 2012). Ideally, at elite levels of sport competition, the coach directs the sport scientist or a performance analyst in the collection process (Bampouras et al., 2012). However, very few coaches below elite level have access to a skilled analyst and coaches are often the main *person collecting*, and who complete their own data collection and formal match analysis (Wright et al., 2012). The coach, analyst or person collecting data need specific *skills* such as good observational skills to accurately and consistently identify and key-in specific behaviours and events, as well as have good knowledge on the use of sophisticated software (Cooper et al., 2007, Wright et al., 2013). In this regard, *technology* plays an important role in obtaining and storing relevant data and the use of video recordings and the coding of matches remains the primary *method* of data collection (Lyons, 2011, Lyons, 2005). Performance analysis using coded video clips has become a necessity to elite coaches and the increasing number of digital resources and access thereof have created even more unique *methods* that coaches and analysts can utilize to collect rich data (Lyons,

2005). Other *methods* of data collection involves retrieving statistic from internet sites or match reports compiled by an analyst (Wright et al., 2012). All collected data has to be stored in suitable data bases, providing repositories of historical data as well as provide easy access to coaches for the most recent data (Lyons, 2011). Coaches prefer to use video footage or edited clips of their athletes' performances, since coded live recordings is a primary *source* of information (Wright et al., 2012, Moore et al., 2012).

The coding of matches can be understood as primary *sources* of information since the coach can assign specific data to be collected in this manner for his own informational needs (O'Donoghue, 2009, Sewdass & Du Toit, 2014). On the contrary, match and statistical data obtained from internet websites are regarded to be secondary information *sources*, since it was not explicitly collected for specific informational needs identified by the coach, but collected in general. (O'Donoghue, 2009, Dishman & Calof, 2008). The use of secondary data *sources* are important for data collection, however, the predominant use of secondary data sources will indicate that the informational needs of the coach does not direct the data collection management, which could be detrimental to the intelligence creation (Teo & Choo, 2001, Dishman & Calof, 2008). The data collection process needs a fair amount of funding since expert skills, very often that of an analyst, are needed, yet the distribution and availability of *finances* for sport at various levels, differs and influences coaching and management practices tremendously (Andreff, 2006). Professional team coaches very often have access to a full-time, expert analyst who provide the coach with *technology* based information (James, 2006), yet at lower competitive levels, a lack in *finances* often necessitates the coach to perform his / her own match and technical analysis (Wright et al., 2012). However, since performance analysis software has become significantly easier to use with some form of interactive help, and certain software versions have become more affordable, it is likely that coaches could use it increasingly in future (James, 2006). One of the determining factors for coaches to manage data collection and analysis is rooted in their *value they assign* or the impact it has on their coaching practice (Wright et al., 2012, Groom et al., 2011). Coaches with a philosophy that includes knowledge creation, usually supports data collection, analysis and usage since it adds *value* to the improvement of players as well as informing their strategy design (Groom et al., 2011, Wright et al., 2012).

3. Method

3.1 Design

The qualitative study used semi-structured interviews to allow for depth of enquiry into coaches and support staffs' data collection and information management (De Vos et al., 2005). This method allows flexibility for researchers to explore and organise information according to the research question (Henning et al., 2004).

3.2 Interview schedule

Four open-ended questions related to data collection, conversion, commination and countering were generated with additional probing questions on the needs, value and usage of information (Weiss, 2002) were included in semi-structured interviews with cricket coaches and support staff. University peers evaluated the interview schedule and provided feedback via interviews. The voice recorded interviews were transcribed after which the typed interview data documents were validated by the peers as authentic and reliable (Creswell, 2003). A qualitative content analysis was performed by coding the interview data using ATLAS.TI™ computer assisted qualitative data analysis software. The constant comparative method

(CCM) was followed to code the data and interviews were performed until data saturation was achieved (Boeije, 2002, Merriam, 1998). The codes created from the university peers' interviews facilitated changes to the interview schedule and finalized the schedule.

3.3 Participants

Cricket coaches with more than five years of coaching experience at university, provincial, club, national professional and international level, and/or with the national governing body's coaching qualifications were approached for inclusion in the study. Ethical procedures for informed consent and participation, as stipulated by Declaration of Helsinki regulations, were adhered to during the sampling and research process (World Medical Association, 2013). The use of purposeful sampling in this instance was deemed to be appropriate to gain insight into the specific activities of cricket coaches (Merriam, 1988). Coaches who consented to participate were asked if they had support staff involved with the team (assistant coaches, performance analysts or sport scientists) with at least three years' experience, or a tertiary qualification in the human movement science or sport analysis field, to also participate. Therefore, the use of snowball sampling added two assistant coaches and three analysts to the sample (Merriam, 1998).

Sixteen males and one female participated in this study of whom twelve were head coaches, two assistant coaches and three analysts. Nine of the fourteen participant coaches had between ten and nineteen years' experience, three coaches between six to nine years, and two coaches more than twenty years' experience. Five participants had a level 2, four participants a level 3 and five participants a level 4 coaching qualification respectively. Two of the participants were involved at national, six on franchise or domestic professional, four at provincial, two at premier and three at university level. One coach was involved with a female team, one with both women and men's teams and the rest coached male cricket teams. Between the three analysts, two had between three to four years' experience on university level and one more than ten years at international level.

For the comparative analysis, participants were divided into five levels of coaching in line with Cricket South Africa's (CSA) model of standard pipeline for players and coaches (Cricket South Africa (CSA), 2019). According to the CSA model, club and tertiary cricket were on the same level, however the researcher sub-divided this level into university and club level, since the interview data provided substantial differences between the two levels. This study's evaluation focused on the following five levels of university, club, first class provincial level, franchise professional and international level. The 4Cs CI model (Weiss, 2002) was used to evaluate the data collection and information management properties of the coaches in light of the different levels.

3.4 Data collection procedures

Ethical approval from the Ethics Committee of the institution was granted (NWU-00185-15-S1) and face-to-face, Skype or telephonic interviews were conducted with the coaches and support staff according to their preferences, since numerous coaches were not in close proximity. The researcher emailed the interview schedule to participants two days ahead of the agreed upon interview date so that they could familiarise themselves with the questions. The researcher transcribed voice recorded interviews verbatim and emailed it to participants for validation purposes. None of the participants objected to the authenticity and accuracy of the transcriptions which enhanced data validation (Creswell, 2003). Participants also

completed a demographic information questionnaire regarding age, gender, ethnicity, coaching experience, qualifications, successes and teams coached.

3.5 Qualitative data analysis

The literature review provided researchers with four deductive codes of: *person collecting data*, *skills of person collecting*, *method* (which includes *technology*), *sources* and *storing system* which are directly linked to data collection processes of analysts and coaches (Wright et al., 2012). Likewise, literature identified codes of *finances* and *value assigned* (to CI) (Wright et al., 2012, Groom et al., 2011), were additionally used as deductive codes during the interview data analysis. Researchers' content analysis process included the creation of a codebook as proposed by DeCuir-Gunby et al. (2011). A codebook contains codes, related definitions and an example of each code which directs the analysis process (DeCuir-Gunby et al., 2011). In this manner, a clear understanding of the deductive identified codes was reached. A code is defined as a meaning unit, which can also be viewed as a separate entity of meaning (Côté et al., 1993). The researcher, together with a skilled colleague, created and revised codes within the context of the data, referring to the code definition and examples (DeCuir-Gunby et al., 2011). Intra- and inter-rater content analysis reliability was established through the calculation of Cohen's Kappa - a change-corrected measure (Anderson et al., 2001). The primary researcher coded two interviews on separate occasions more than a week apart and obtained a strong inter-rater reliability (Cohen's Kappa = 0.79). The inter-rater reliability for this study was found to be $\kappa = 0.78$ when a research colleague coded two interviews independently. The moderate inter-rater reliability achieved could be ascribed to the lower expertise on CI of the research colleague. However, due to the fact that reliability of between the 0.80 and 0.90 range is considered to be rich in analytical value, researchers proceeded with the content analysis (Campbell et al., 2013). Data saturation was unequivocally reached with seventeen participants (Guest et al., 2006).

4. Results

The quotations were extracted from the interviews with coaches and support staff and evaluated according to the deductively created codes. The codes and quotations were placed into the different cricket competitive levels. Results are portrayed in Table 1 to 6 which includes the participant quotations under the deductive codes. The participant number is provided after the quotation as P(number). Table 1 shows that at university level, the coach, an analyst / assistant coach and players collected data and was placed under the deductive code of *person collecting data*. At club level only coaches collected, while at provincial level the assistant coach and coach collected data. At franchise level a full time analyst collected data in previous years, however, centralized professional analysts provided by the national governing body now collect and provide data and information to franchise coaches. At international level, a full-time professional analyst collects data. The *skills of the persons collecting data* is indicated in Table 2 and at university level the analysts were graduates within the Sport Science domain and received practical and theoretical training from lecturers and professional analyst. Analysts at university level varied between having cricket playing background, to having no background to the sport. Contrary to this, at club level, the coach mainly relied on past experience and no formal or informal analysis training was evident within the group of coaches at this level. At provincial level, the assistant coach who completed a level 3 coaching certification, collected data through video recordings. The analysts used at franchise level had cricket playing or coaching background, received in-house training and were deemed as a select few of the best in the country. At international level, the exact skills

of the analyst are not explicitly indicated, however he came from analysing at IPL league background and is deemed as the best in the country.

Table 1: Coaches and support staff from various competitive levels quotations under the *person collecting data* code

Various competitive levels	Cricket coaches and support staff quotations on the deductive person collecting data code
University	<p>“...it helps a lot observing a team I find it the easiest. I (analyst / assistant coach) wrote down the notes and typed out the notes and gave it to each bowler.” P1</p> <p>“We took video analysts with us to Varsity Sport but we have video analyst who are employed by the university.” P2</p> <p>“I have come up with an excel spread sheet for during our week matches. We have 14 players and I have 3 players on the side of the field. One or two can help with the drinks, but we normally have one player sitting and doing nothing. So I try and get him to work on the computer so he logs every ball.” P2</p>
Club	<p>“For the normal club cricket, or amateur side of things, it is more dependent on the coach.” P5</p>
First class provincial	<p>“We video recorded every match and sometimes not even our own matches. The head coach would be with the team and I (as assistant coach) would go and record opposition.” P4</p> <p>“For the assistant coach and trainer to look up stats would be going a bit far, so I (as coach) do everything myself in terms of that (collecting data).” P17</p>
Franchise professional	<p>We used to have a full time analyst, not any more. Then I (assistant coach) did it for two years...it became a bit boring to sit and log the information for the videos. Now CSA employ people to come and do it for us. So each game is analysed, but not by us (by professional analysts).” P10</p>
International	<p>“The video analyst for the National team... he does a lot of that work, analysing what the opposition does, what the environment does. So before they start a test series against a certain country, he will have all the information about the venues they are going to play in and then kind of build a strategy with the team.” P3</p>

The *method* used to gather data is indicated in Table 3 and university level participants indicated a wide range of methods. Participants employed from making own notes while watching a match, filming and coding live matches, using an excel spread sheet, statistics from the internet to sophisticated sports analysis software. The club level coaches only mentioned the statistics of the matches completed that was sent to them via email on a weekly basis as method of collecting data. The provincial level participants used and analysed video clips which was performed with an ordinary video camera and laptop. Very specific video footage and statistical data was the method used by franchise level participants to gather and analyse data, whereas at international level, only the best technology and software packages are used to capture and code high quality videos. The international level participants also spoke to groundsman to gather data on the cricket pitch where the match will be played to supplement the data on the venue gathered from the internet.

Table 2: Coaches and support staff from various competitive levels quotations under the *skills of person collecting data* code

Various competitive levels	Cricket coaches and support staff quotation on the deductive <i>skills of person collecting data</i> code
University	<p>“The Honours in Sport Science is my last degree. I spent the whole of last year learning performance analysis underneath him (university analyst) and did a two-day course with an expert in Cape Town.” P7</p> <p>“...I played club cricket in England...” P1</p> <p>“...obviously the 2 people who did it is very professional, they know what they are doing.” P2</p> <p>“I have a diploma in Sport Sciences and we had a module of video analysis.” P1</p>
Club	<p>“Out of experience of travelling and having played at a lot of grounds, you as coach will know how the pitches will play.” P5</p>
First class provincial	<p>“I have a level 3 coach so he knows what he is doing when logging the data.” P13</p>
Franchise professional	<p>“Most of the analyst we train in-house have a cricket coaching and or playing background. It is easier to teach the system to a person who understands cricket more than he needs to understand computers. There used to be about 8 analysts – we only took the 4 to 5 best ones and teach him to analyse the matches.” P15</p>
International	<p>“He (the national team analyst) is very good.” P14</p> <p>“So for instance in the national team there is an analyst who has a strong background from learning in India who analyse a lot of games and provide a lot of information to provide a point of difference or cutting edge advantage.” P11</p>

Table 3: Coaches and support staff from various competitive levels quotations under *methods used (including technology)* code

Various competitive levels	Cricket coaches and support staff quotations on the deductive <i>methods and technology</i> code
University	<p>“Gathering information about competitors ...you can't really because there's no videos on the other teams. I would sit there in the corner and not video analyse but seeing their strong points. Making these notes helped a lot.” P1</p> <p>“At the moment I (analyst) have been doing everything on my own so I would film and I have learned to code live together.” P7</p> <p>“I have come up with an excel spread sheet which we use during our week matches...but we normally have one player sitting and doing nothing. So I try and get him to work on the computer so he logs every ball.” P2</p> <p>“And you can only get so much out of stats from the internet from the results.” P1</p> <p>“We use Sports code analysis software.” P7</p>
Club	<p>“On a weekly basis, an email gets sent out from the Union, with all the stats...” P2</p>
First class provincial	<p>“...the example I made was when you use video analysis and look at a video clip.” P5</p>

Various competitive levels	Cricket coaches and support staff quotations on the deductive <i>methods</i> and <i>technology</i> code
	"I bought a laptop and normal video camera and use it at our home stadium to collect data." P13
Franchise professional	"For Pro20 and 50 over cricket we do use video, because you have got more time." P16 "We only have video footage and then statistical data which is logged on a software program – it is a very specific number of parameters and then obviously then crick-info as a kind of third resource." P10
International	"We use the best technology and software packages. We have a video feed and as they play data and results are captured or coded. Also, all of the statistics on players and the grounds are available on the internet. We (analysts) even talk to the groundsman about the pitch he prepared." P15

The sources used to gather data is linked to the method and is indicated in Table 4. At university level, analysts only seemed to be utilized during special tournaments which was of a short duration. In this regard, the analyst recorded videos and analysed data for the team while at the tournament, however during the season matches, very little data was collected and available. Club level participants used score sheets and club administrative personnel to gather statistics from, while provincial participants utilized ESPN crick info website statistics as well as own videos recorded and analysed data. At franchise level, video footage was available, however the coach did not seem to be satisfied with the quality. In addition, a franchise coach asked the analyst to put a few video clips on a memory stick, while another used social media to obtain information. In addition, coaches at this level made and kept their own notes which they deemed valuable. At international level, the best video footage was sourced, it included a variety of angles and analysed videos with sophisticated software was also available. Discussions with groundsman and statistics available on the internet were also sourced at international level.

Table 4: Coaches and support staff from various competitive levels quotations under the *sources* code

Various competitive levels	Cricket coaches and support staff quotation on the deductive <i>sources</i> code
University	"So with regards to the video, that's where the two university analysts come in. They are really good because they break everything down. They record the matches – only Varsity Cup, not week by week. They will record it and cut it all down to for example per bowler. And obviously using my experience in playing I try and link that up with the information that we are getting." P2
Club	"I think if you go into planning, and especially planning against opposition, where we collect data from is obviously score sheets." P4 "So what I did basically is I got some stats from the club administrative personnel." P5
First class provincial	"We go onto ESPN Crick info, and each player has stats in terms of how many runs they have scored..." p17 "I bought a laptop and normal video camera and use it at our home stadium to collect data." P13

Various competitive levels	Cricket coaches and support staff quotation on the deductive <i>sources</i> code
	“The head coach would be with the team and I (as assistant coach) would go and record opposition.” P4
Franchise professional	<p>“We just get a basic video footage which is usable without it being totally perfect.” P10</p> <p>“I am glad I kept those notes now and sometimes we give out a lot of information.” P16</p> <p>“Yes there is a lot of information going around, like if you look on Facebook, look on Twitter, maybe – I will search a young player, he is about to make his debut tomorrow – he is going to put it on twitter.” P9</p> <p>“I go around with a memory stick, so after the game, I will say to the analyst what I want and they just put it on before I go home again.” P16</p>
International	<p>“At international games you can go to the different broadcasters and ask them for different footage with different angles.” P15</p> <p>“With the national side again we had the advantage of hawk-eye and coded-videos.” P11</p> <p>“Also, all of the statistics on players and the grounds are available on the internet. We (analysts) even talk to the groundsman about the pitch he prepared.” P15</p>

Finance available for support services is an important factor and Table 5 depicts the objective opinion of the participants at the various levels concerning this aspect. University level participants clearly stated that finances are not available to pay analyst on a continuous basis, but that they were utilized ad-hoc and usually for a specific tournament and of short duration. Club and provincial level participants indicated that finances are not available for analysts, while at franchise level the specialist analyst is centrally contracted and franchises do not have their own employed. The franchise level participant expressed a need for a full-time analyst, as this person was previously part of the team set-up. At international level, the participant expressed a need for more finances to employ developers of cricket specific analysis software, however the best software packages and technology and a full-time professional analyst is already funded. The value that coaches assign to gathering and analysing information for strategic decision making and to counter opposition strengths, is depicted in Table 6. Throughout all the different levels, it is evident that all coaches and support staff value information to a great extent. A university level a coach / analyst also expressed the importance of sifting through information and discarding irrelevant or low quality information. A club level coach expressed information of competitors to be the key, however, he also mentioned experience in knowing the opposition from playing them in previous matches as a valuable information source. At provincial level, coaches and support staff had opposing views, where one reiterated the importance of specific information needed to prepare specifically, whereas the other viewed analysis of information that can be taken too far.

Table 5: Coaches and support staff from various competitive levels quotations under the *finance* code

Various competitive	Cricket coaches and support staff quotation on the deductive <i>finance</i> code
---------------------	--

levels	
University	“Unfortunately from a finance point of view, it isn’t always possible, but we took video analysts with us to Varsity Sport but we have video analysts who are employed by the university, but they obviously are for all the sporting codes. So they can’t be with us full time, but they are available for our main tournament like USSA and Varsity Sport.” P2
Club	“We don’t have that kind of immediate video and stats feedback. The technology is just too expensive...and you have to have a full time person doing it.” P1
First class provincial	“If I had the budget, I would definitely have a full time video analyst, but I don’t have those resources.” P13 “...because on the level that we are at, matches are not televised...” P4
Franchise professional	“If I could have that level of analyst then it would be beneficial. We used traditionally in the past before CSA centrally contracted video analysts; then we used to log the games ourselves. You had an analyst as part of the set-up, but not to that degree. To go in depth as for the National side would be ideal.” P11
International	“Every country, especially New Zealand and Australia, they develop their own software. We have never gone that route since it costs a lot of money and you need full time developers.” P15 “We use the best technology and software packages. We have a video feed and as they play data and results are captured or coded.” P15

Franchise level coaches and staff highly valued information, however the aspect of the quality being of a lower standard when compared to international level, was a concern. The provision of generic information in an ordinary format, was not valued by the participants. At international level, information gathering and analysis is seen as vitally important, with added opinions that information on competitors will count for nothing when own players are not trained and mature enough or cannot execute the skills expected from them. Even though data is very important, the belief exists that it should not be over analysed.

Table 6: Coaches and support staff from various competitive levels quotations under the value assigned code

Various competitive levels	Cricket coaches and support staff quotations on the deductive value assigned code
University	“It is very important (gathering information). For USSA we did analysis playing against our big enemies. I saw that this helped.” P1 “...so knowing the pitches that we play on, the environment that we are playing in is very important. It is important for coaches, especially with the information that is around today, you have to get with the times, if you are not doing it you are missing out. Any information that I can get, I am going to try and use. If it is rubbish, then I first sift through it, and if I don’t think it is worth it, I move on, but any sort of information is use try and latch on to it.” P2 “I’m not so sure how much they would do on their own. I know that it is absolutely imperative that I get footage of every single and coded and stats on every single opposition because I know how important it is to them (the coaches).” P7

Various competitive levels	Cricket coaches and support staff quotations on the deductive <i>value assigned code</i>
Club	<p>“I think it is very important especially when you get to a high performance level where the teams have their skill levels at a certain point. So there will be numerous variables that you need to consider as a coach in terms of your planning, in terms of how you are going to execute your plan to win games. So you made an example about the competitors that you are playing against, so that information will be key. Most of the teams, if you have played against them, you would have seen them once or twice or a couple of times, so you do have some sort of information about them. And then you look at how they score their runs, for example if it is a batsman, is he a guy that scores a lot of boundaries or is he a guy that scores a lot of ones and twos. That type of information will play a big part in your planning as a coach and for you to make sure that you are making the right decisions with your team.” P4</p>
First class provincial	<p>“I think it is very important, but I have the viewpoint it is about how you utilize it. I have seen instances where it is taken too far. It is as if the analysts think the players are like robots and through their analysis they can predict how the player will react in a match,” P13</p> <p>“I think it is naturally important. You know, if you want to prepare specifically, you need specific information.”P17</p>
Franchise professional	<p>“It is quite important for us as coaches because every game that we play it is very important that we get the info of the competitors and we are quite lucky since every game that we play in South Africa is recorded. So all the information that we need on certain players, the data coming through, maybe of a player that you have not seen much off.” P9</p> <p>“I think the key is the quality of information. That is a starting point. I think if you don’t have real high quality information then it is difficult to devise a strategy based purely on that information. So for instance in the national team there is an analyst who has a strong background staff in India who analyse a lot of games and provide a lot of information to provide a point of difference or cutting edge advantage. For us it is a little bit different, we only have video footage and then statistical data which is logged on to a software platform – it is a very specific number of parameters and then obviously then crick-info as a kind of third resource. So you do have those but it is fairly generic information so everyone has the same information. And then it is about using it in whichever way you feel the need and a lot of the time the kind of stats that are there are not stand outs.” P11</p>
International	<p>“I think it is vitally important (to gather information on competitors), I do however feel that before you can go that route, you need to have gathered all the information on your players. Because I think gathering all the information on competitors often count for naught if your players are at the right skill set and maturity level. They aren’t able to execute as you want them to because that then means nothing, so let’s assume that your players are at the level they are supposed to be and they can execute under pressure, not all the time, but consistently enough, then I think the gathering of information on competitors are critical.” P8</p> <p>“If you don’t have data, you can do nothing...on the other side, you have to</p>

Various competitive levels	Cricket coaches and support staff quotations on the deductive <i>value assigned</i> code
	be cautious. Many of us believe that you should not over analyse things – you can detect mistakes in everything.” P15

4. Discussion

The information management of coaches from different competitive levels vary tremendously. For comparative purposes, the quotations of the coaches and support staff were summarized in Table 7 and 8. From Table 7 it is very clear that at lower University level, coaches collected and managed data superiorly compared to coaches at the higher club level. The persons collecting, the skills they portrayed and the methods used at university level, far out-performed the club level coaches. University level coaches also used a variety of data and information sources and even though they had limited funds, they mainly leveraged funds for an analyst for special tournaments. This may be attributed to the high value they assign to the collection and management of data and information. Even though club level coaches also valued information, their methods used and sources utilized were limited and may be indicative to the complete lack in funds to perform data collection and analysis. Club level coaches showed simplistic data collection and information management skills, compared to university coaches who showed more data collection and information management activities, even though it was situational.

Table 7: Summary of coaches and support staff quotation codes on data collection for lower competitive levels

Data collection codes	University level	Club level
Person collecting data	University analyst Assistant coach Own players	Coach
Skills of person collecting data	Diploma in Sport Science- formal training as part of diploma (cricket playing background) Honours in Sport Science (no cricket background – analyst in other sporting coded): learned through shadowing	None to limited formal training and skills in analysis Knowledge on cricket through playing and coaching
Methods used (includes Technology)	Paper based and technology Notes Video recordings Laptop Excel sheet Internet statistics	Own experience / memory Provided data Internet statistics
Sources	Own collected data (through notes and excel sheet) Videos on opposition Internet statistics Notes	Score sheets Statistics
Finances	No funds during seasonal matches Limited funds – allocated for specific	No funds and personnel

Data collection codes	University level	Club level
	tournaments	
Value assigned to CI	Value information Find ways of collecting own data – note taking / players / excel sheet Sift through irrelevant data	Value information Limited data collection methods used
Collection baseline	Situational data collection and management	Simplistic data collection and information management

The results indicate vast differences in the data collection and information management of coaches from the top three competitive cricket levels (Table 8). The gap between the first class provincial level to the franchise professional level seems to be substantial where coaches and assistant coaches with limited skills and only background playing knowledge collect data. At franchise level centralized analysts mainly perform the data collection task, and at international level a full time and highly skilled person is employed to perform that function. Even though first class provincial level coaches use numerous methods, including low quality technology, and a variety of sources to collect data, it compares poorly to the coded videos and high quality footage which is available at the two highest competitive levels. The almost non-existent funding at the first class provincial level may be the cause of the unprofessional, low level data collection and information management. On the contrary, the National Sport Governing Body is providing full-time, professional analysts at the two highest competitive levels. In this regard, even though the franchise level coaches value information and have access to centralized analysts, they don't

Table 8: Summary of coaches and support staff quotation codes on data collection for the top three competitive levels

Data collection codes	First class provincial level	Franchise professional level	International level
Person collecting data	Coach Assistant coaches	Centralized analysts Coach Assistant coach	Expert professional analyst
Skills of person collecting data	None to limited skills, none or limited training formal training on analysis Knowledge on cricket through playing and coaching Analyst training as part of CSA level 3 coaching course	Centralized skilled analysts Professional full-time Employed analysts Trained in-house Cricket background and knowledge Coaches use own knowledge and experience	International analyst as expert and leader in cricket analysis Training with IPL teams in India
Methods used (includes Technology)	Computer based available data Own technology and analysis method Limited occasional use of video recordings Internet statistics Basic video camera and laptop	Own experience Players memory Media available data Available technology Un-coded videos Coded videos	Technology driven Highest quality broadcasters' video Hawk-eye technology Performance analysis software
Sources	Internet statistics	High quality video	High quality

Data collection codes	First class provincial level	Franchise professional level	International level
	Own data / videos captured	Statistics Newspapers Social media Groundsman	broadcasters' video footage Own analysis Own statistics generated Internet statistics Groundsman
Finances	No to limited funds Used general team budget to buy basic video camera and laptop	No additional funds – centralized analysts available	Funds for full-time professional analyst and assistants Quality software analysis package
Value assigned to CI	Value information Seen as taking data collection and analysis too far	Value information Reject low quality and generic data and information Look for additional info in social media	Value information Guard against over analysis Value knowledge on own players
Collection baseline	Unprofessional, low level data collection and information management	Limited own data collection Irregular usage of centralized analyst and available information	Comprehensive, professional and high quality data collection and management

approve of low quality data and information coming occasionally from the analysts and therefore showed irregular use of this service. At the highest competitive level, information is highly valued, yet since there is so much data available, coaches need to guard against over analysis. The international level participants indicated the comprehensive and professional data collection and information management which is expected at this level to be able to compete on the international stage.

5. Conclusions

The aims of the study were answered since it provided a) insight into current data collection management of cricket coaches from various competitive levels in South Africa, and b) it provided the cricket governing body with identified gaps in coaches' current information management practices. In this regard, it is most apparent that at university level, more funding is available from the institutions themselves, since they want to be competitive within the university tournaments. The institutional and individual coaches' competitive strive, enhances the collection and information management at this level. A gap may arise if institutions cease to fund the information management activities, which would plunge this level to the same as that of club and first class levels. The clear gaps of limited data collection activities, limited information management skills and inadequate funding is most apparent at club and first class provincial levels. This may be a cause of concern to the sport governing body, since players and coaches need to progress through the different competitive levels to reach their highest potential at national and international level. With two of the five levels at a loss for data collection and information management, the pathway of player and coach development through the competitive ranks may be hindered. The practical implication of the findings

indicate that the sport governing body could address the gaps in providing sufficient funding at club and provincial levels as well as to incorporate data collection and information management skills training through newly developed coach education programmes. Another identified gap indicated that franchise level coaches indicated irregular use of the centralized professional analysts together with their own limited data collection and analysis. The findings enhance the knowledge pool on coaches' data collection and management activities at various competitive levels.

6. References

- ANDERSON, T.; ROURKE, L.; GARRISON, D.R. & ARCHER, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2): 1-17.
- ANDREFF, W. (2006). Sport and financing *In: Andreff, A. and Szymański, S. (eds.) Handbook on the economics of sport.* (pp. Cheltenham: Elgar.
- BAMPOURAS, T.M.; CRONIN, C. & MILLER, P.K. (2012). Performance analytic processes in elite sport practice: An exploratory investigation of the perspectives of a sport scientist, coach and athlete. *International Journal of Performance Analysis in Sport*, 12(1): 468-483.
- BOEIJE, H. (2002). A purposeful approach to the constant comparative method in the analysis of qualitative interviews. *Quantity and Quality*, 36(1): 391-409.
- CAMPBELL, J.L.; QUINCY, C.; OSSERMAN, J. & PEDERSEN, O.K. (2013). Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and agreement. *Sociological Methods & Research*, 42(3): 294-320.
- COOPER, S.M.; HUGHES, M.; O'DONOGHUE, P. & NEVILL, A.M. (2007). A simple statistical method for assessing the reliability of data entered into sport performance analysis systems. *International Journal of Performance Analysis in Sport*, 7(1): 87-109.
- CÔTÉ, J.; SALMELA, J.H. & RUSSELL, S.J. (1993). Organizing and interpreting unstructured qualitative data. *The Sport Psychologist*, 7(1): 65-75.
- CRESWELL, J.W. (2003). *Research Design. Qualitative, Quantitative and Mixed Methods Approaches.* Thousand Oaks, California: SAGE.
- CRICKET SOUTH AFRICA (CSA). 2019. *Coach Education* [Online]. Available: <https://cricket.co.za/category/15/Coach-Education/370/Coaching-Education/> [Accessed 17 July 2019].
- DE VOS, A.S.; STRYDOM, H.; FOUICHE, C.B. & DELPORT, C.S.L. (2005). *Research at grass roots.* Pretoria, South Africa: Van Schaik Publishers.
- DECUIR-GUNBY, J.T.; MARSHALL, P.L. & MCCULLOCH, A.W. (2011). Developing and using a codebook for the analysis of interview data: An example from a professional development research project. *Field Methods*, 23(2): 136-155.
- DISHMAN, P.L. & CALOF, J.L. (2008). Competitive intelligence: A multiphase precedent to marketing strategy. *European Journal of Marketing*, 42(7): 766-785.
- GROOM, R.; CUSHION, C. & NELSON, L. (2011). The delivery of video-based performance analysis by England youth soccer coaches: Towards a Grounded Theory. *Journal of Applied Sport Psychology*, 2316-32.

- GUEST, G.; BUNCE, A. & JOHNSON, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18(1): 59-82.
- HENDRICKSON, H. (2012). View from the field: Business intelligence in the sports world. *Sport Marketing Quarterly*, 21(1): 68-69.
- HENNING, E.; VAN RENSBURG, W. & SMIT, B. (2004). *Finding Your Way in Qualitative Research*. Paarl, South Africa: Van Schaik.
- HOCKEY COACHING UK (2008). *1Sst4sport Qualifications: Level 3 Certificate in Coaching Hockey Candidate Pack Part One*. Leeds: Coachwise Ltd.
- JAMES, N. (2006). The Role of Notational Analysis in Soccer Coaching. *International Journal of Sports Science & Coaching*, 1(2): 185-198.
- LYLE, J. (2002). *Sports coaching concepts: A framework for coaches' behaviour*. London: Routledge.
- LYONS, K. (2005). Performance analysis in applied context. *International journal of performance analysis in sport*, 5155-162.
- LYONS, K. (2011). Sport coaches use of cloud computing: From here to ubiquity. *International Journal of Computer Science in Sport*, 10(1): 26-35.
- MACCAULEY, K. 2018. How technology can transform sport businesses. Inside Indiana Business. 28 Aug 2018 ed. <http://www.insideindianabusiness.com/story/38971837/how-new-technology-can-transform-sports-business>.
- MCGARRY, T. (2009). Applied and theoretical perspectives of performance analysis in sport: Scientific issues and challenges. *International Journal of Performance Analysis of Sport*, 9128-140.
- MERRIAM, S.B. (1988). *Case Study Research in Education*. San Francisco, CA: Jossey-Bass.
- MERRIAM, S.B. (1998). *Case Study Research in Education: A Qualitative Approach*. San Fransisco, CA: Jossey-Bass.
- MOORE, A.; TURNER, D.J. & JOHNSTONE, J.A. (2012). A preliminary analysis of team performance in English first-class Twenty-Twenty (T20) cricket. *International Journal of Performance Analysis in Sport*, 12(1): 188-207.
- NAJDAN, M.J.; ROBINS, M.T. & GLAZIER, P.S. (2014). Determinants of success in English domestic Twenty20 cricket. *International Journal of Performance Analysis in Sport*, 14276-295.
- O'DONOGHUE, P. (2009). Interacting performances theory. *International Journal of Performance Analysis of Sport*, 926-46.
- RUGBY FOOTBALL LEAGUE UK (2011). *1Sst4sport Qualifications: Level 3 Certificate in Rugby Football League Candidate Pack Part One*. Leeds: Coachwise Ltd.
- SEWDASS, N. & DU TOIT, A. (2014). Current state of competitive intelligence in South Africa. *International Journal of Information Management*, 34185-190.
- STRATEGIC AND COMPETITIVE INTELLIGENCE PROFESSIONALS (SCIP). 2012. *Strategic and Competitive Intelligence Professionals* [Online]. <http://www/scip.org>. Available: <http://www/scip.org> [Accessed 30 January 2015].
- STREAMCREST 2003. Understanding competitive intelligence.
- SURUJLAL, J. (2004), *HRM of professional sports coached in South Africa*. PhD, Rand Afrikaanse Universiteit.

- TEO, T.S.H. & CHOO, W.Y. (2001). Assessing the impact of using the internet for competitive intelligence. *Information Management*, 3967-83.
- TUROCY, P.S. (2002). Survey research in athletic training: the scientific method of development and implementation. *Journal of Athletic Training*, 37(4 (Supplement)): 174-179.
- WEISS, A. (2002). A brief guide to competitive intelligence: how to gather and use information on competitors. *Business Information Review*, 19(2): 39-47.
- WORLD MEDICAL ASSOCIATION (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *Journal of American Medical Association*, 310(20): 2191-2194.
- WRIGHT, C.; ATKINS, S. & JONES, B. (2012). An analysis of elite coaches' engagement with performance analysis services (match, notational analysis and technique analysis). *International Journal of Performance Analysis in Sport*, 12(1): 436-451.
- WRIGHT, C.; ATKINS, S.; JONES, B. & TODD, J. (2013). The role of performance analysts within the coaching process: Performance Analysts Survey "The role of performance analysts in elite football club settings". *International Journal of Performance Analysis in Sport*, 13240-261.