

Management of knowledge creation and sharing to create virtual knowledge-sharing communities: a tracking study

1. Introduction

According to Bernier and Bowen (2004: 120), text-based online discussion forums bring about a 'virtual sociability' as a *pragmatic dimension producing real-time applied knowledge ... inherent in 'democratic network lives'*, while according to Arling and Chun (2011: 231) *few organizations truly understand how to manage knowledge to achieve their goals*. This was also spurred through the rapid evolvement of the 'science of networks' (Watts, 2007) and the popularity of online communication. Online discussion forums (also referred to as web forums, internet forums, message boards, discussion boards, bulletin boards, or forums) are web applications for discussions and the posting of user-generated content (Barker, 2008) and afford one example of an online social network or virtual community. An online social network is defined as a set of personal relationships in cyberspace where computer-mediated space integrates/facilitates knowledge creation and sharing and is characterised by groups of people with more or less specific, complex and common goals, value systems, norms, rules and a sense of identity which they want to enhance through electronic communication (Barker, 2006: 132). These forums can address an entire online social community or a specific topic, and the messages are usually displayed either in chronological order or as threaded discussions, or as a combination of both.

Various authors realise the importance of managing the effects of knowledge creation and sharing in these forums, emphasising that organisations need to manage these information knowledge settings constructively through interactive participatory communication, innovative solutions and control in cyberspace. Styhre (2003: 15) distinguishes between different theoretical perspectives to define the notion of organisations on the basis of knowledge-based resources or assets: the *transaction costs theorists*, who see the organisation as an equilibrium of minimised transaction costs; the *agency theorists*, who conceptualise the organisation as a package of contracts, tangible as well as psychological or emotional; and *knowledge management theorists*, who see the organisation as a collective of intellectual resources, implicating knowledge creation and sharing in various forms. The latter approach is specifically relevant in the context of this paper, based on the argument that successful organisations are characterised by the constant proactive creation of new knowledge and the fast dissemination and representation thereof through a commitment to and understanding of individuals in the organisation.

2. Literature review/Theoretical framework

2.1 Approaches to online social networks

Various researchers have proposed different models to investigate online social networks from, inter alia, a social, relational, learning, information exchange, knowledge management, information networks and members' needs perspective, depending on the discipline from which it is studied. Although specific models or frameworks have been developed to address specific research outcomes, a literature review indicates that the theoretical underpinnings of existing research in this field can broadly be categorised in terms of three main approaches, namely: representationalist; constructionist; and consumerist (Kimble

and Hildreth, 2005: 102; Streatfield and Wilson, 1999; Hersberger, Murray and Rioux, 2007: 136; Nonaka, 1991). Theorists following a *representationalist* approach focus mainly on measuring the usefulness and perceived ease of use of virtual communities. Because of the focus on technology, the most common model used to measure virtual communities in terms of this approach relies on the technology acceptance model (TAM). In the *constructionist* approach, theorists focus on the communication of knowledge in virtual communities using theoretical perspectives such as Streatfield and Wilson's (1999) 'deconstruction' of knowledge management approach; Nonaka's argument that tacit knowledge can be converted into explicit knowledge; the duality approach of Hildreth and Kimble (2002), which argues that knowledge has both harder aspects (where knowledge can be made explicit) and softer aspects (where knowledge is less structured and difficult or impossible to articulate, therefore tacit, which requires active interaction); and the community embodiment model, which draws on cultural notions of 'imagined community' and proposes that interactions within virtual communities are a linking of the physical and the virtual, personified by the imagined. Theorists using the *consumerist* approach focus mainly on obtaining insights into the consumer. Much research has been conducted in this regard, focusing on different consumer aspects, with the most recent approach being the four-tier pyramid conceptual framework proposed by Hersberger, Murray and Rioux (2007: 136), which emphasises the information-sharing behaviours that are critical for building those human relationships necessary for the development of online social networks.

2.2 *Knowledge management*

The theoretical basis chosen for this article is the knowledge management approach, which can be considered as an emerging theoretical approach linked to other theoretical traditions in social sciences. While this article does not provide an in-depth review of this theory, it does contribute to the proposed theoretical framework by giving a brief overview of pertinent considerations in managing knowledge creation and sharing in online discussion forums. Knowledge creation and sharing is defined as the generation, storing, representation and sharing of knowledge to the benefit of the organisation and its individuals to ensure comprehensive and understandable management initiatives and procedures in the organisation (Bell, 2001: 49). In terms of theoretical constructs, knowledge management includes three main components: interactive, technological and human. In considering the communication problems Shannon and Weaver (1949) identified based on their mathematical model of communication, the application of these components to electronic communication could be particularly valuable, as they have already been well established within the communication field. The three problems they identified were: technical problems (How accurately can the symbols of communication be transmitted?); semantic problems (How do the transmitted symbols convey meaning?); and effectiveness problems (How effectively does the received meaning affect human behaviour?). Ardichvili, Page and Wentling (2003: 64) go on to re-emphasise the human component of knowledge management, arguing that one of the crucial aspects to determine a virtual community's success is motivated by actively participating members of an organisation in these activities – thereby creating virtual knowledge-sharing communities. Earlier knowledge management studies focused mainly on the capture and dissemination of knowledge. In the mid-1990s, the focus shifted towards the CoP ideas, which saw the emergence in 1997 of the first community of practice (or communities of knowledge sharing) (Ardichvili et al. 2003: 66), referred to in the

virtual world as VcoPs. Although most traditional approaches to knowledge management assumed this knowledge to be relatively simple, more recent approaches realise that knowledge is in fact complex, factual, conceptual and procedural. A tendency still exists to follow the tradition in thinking of communication as the transfer and processing of information, but currently a move towards a focus on knowledge creation and sharing is evident. One of the key discourses of the knowledge management paradigm is hence the focus on explicit and implicit, embodied, tacit and narrative knowledge, and the 'absent presence' of the body (Nonaka and Takeuchi, 1995) as an essential part of everyday communication because it allows for the creation and sharing of knowledge.

2.3 Theoretical framework for the research

Drawing from the above, Barker (2008) proposed a theoretical framework to evaluate knowledge management in virtual communities, based on the following three main components and subcriteria (also referred to as the three Cs): content (technology), communication (interactive knowledge creation and sharing) and consumer (human). This theoretical framework is based on the categorisation of a viable theoretical synthesis which, according to Killick and Taylor (2009), should have been successfully employed in previous work of a similar nature and scope. In this case, the literature was derived from diverse fields of knowledge through a consistent frame of reference and terminology across both studies. The thematic analysis allowed for a deductive approach for the organisation and identification of key themes and issues based on three multi-dimensional levels, namely the micro level (individual interactions and processes); the macro level (structures); and the meso level (group behaviours and processes). If applied to the online discussion forum, it is argued that social organisational networks and systems involve interaction among a collective of individuals who may influence or alter the behaviour of others. The basic structure of the theoretical framework is presented in Figure 1.

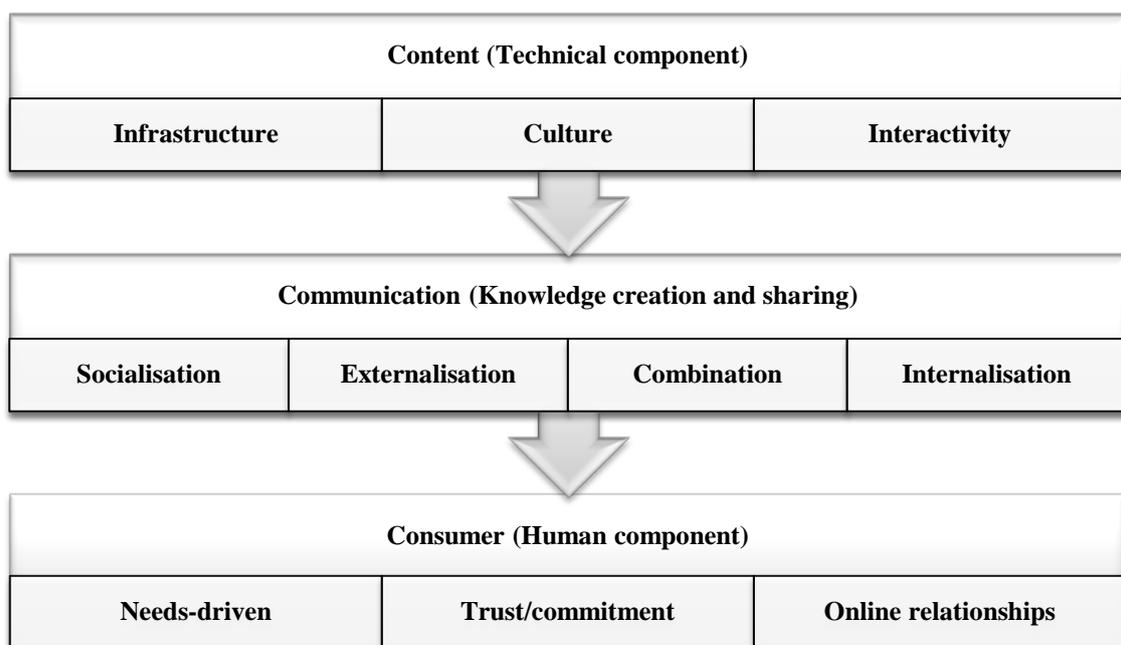


Figure 1: Theoretical framework to evaluate knowledge management in virtual communities

Central to this framework is the participation of all members of the online community in the creation and sharing of knowledge through their brand/service experience, which is ultimately derived from the interrelationship between the three Cs: *content*, which is enabled through technical infrastructure; *communication*, which allows for knowledge creation and sharing; and the *consumer*, which is needs-driven, derived from active participation and interaction to build trust/commitment, thereby creating or enhancing online relationships.

2.4 *Subcriteria and elements of the theoretical framework*

The subcriteria and elements of the three criteria (content, communication and consumer) are presented in Table 1.

Table 1: Subcriteria and elements of the three Cs of the proposed theoretical framework to evaluate knowledge management in virtual communities (adapted from Barker 2008)

[Insert Table 1]

The dimensions summarised in Table 1 are closely related to each other. Overlaps may exist and they might differ from organisation to organisation. It is, for example, difficult to separate content from the communication that takes place and the consumer that participates in this process. An alignment of the different criteria, subcriteria and elements is therefore needed to ensure the effective management of knowledge in this process.

3. Research methodology/Data analysis

3.1 *Research problem*

The main research problem is to address the lack of research on the management of knowledge creation and sharing in virtual communities, specifically in an online discussion forum. The main objective is to compare the initial findings of a study conducted in 2009 to indicate how the implementation of suggestions impacted on the management of knowledge creation and sharing in an online discussion forum with those of a follow-up study in 2012 involving the same online discussion forum. To do this, the paper distinguishes between the key concepts and particularly addresses the theoretical typology of content, communication and consumer in the technical, information creation and sharing, and human dimensions of knowledge management through a tracking study of the same online discussion forum during two specified time frames to identify trends and make recommendations on how to address the issue.

3.2 *Sample/Research procedure*

The unit of analysis was a website, which presented an observable and measurable unit for the dissection of the text into components, criteria, subcriteria and elements to be analysed. Important to note is that only the main 'threads' or 'first initiations' in the different forums, forum categories and forum subcategories were documented, and that not all the posts on a specific thread (which in some cases amounted to thousands) were included. The threads or first initiations included a combination of statements and questions which can be broadly be categorised as follows: individual views or statements,

statements to stimulate debate and obtain feedback from other participants, questions to ask opinions, questions to obtain information, and statements on asking for help or advice on specific issues

A nonprobability sampling method, namely convenience sampling, was used because the online discussion forum, viz. the SouthAfrica.com discussion forum, being an open forum for all, was conveniently available and easily accessible (Wagner et al, 2012; Keyton, 2015). Important aspects listed by various researchers like Maclaran and Catterall (2002), Taylor (1999), Ward (1999) and Soukup (1999) when collecting data in the virtual world were considered in this research, including that online research presents the researcher with idiosyncratic theoretical and methodological subject matters; identities are created, developed and discarded; participants have at least two bodies, real and digital, and may indeed have a number of multiple identities or personae within a single community or across multiple communities; characteristics of participants are 'unknown' beyond demographics such as age, gender, etc.; membership of virtual communities changes continually, demanding an 'opportunistic' approach to data collection; virtual research means rethinking certain methodological limitations, such as a lack of certain paralinguistic markers, less interviewer control (which can also be seen positively in both epistemological and methodological terms through the promotion of equal balance of power between researcher and participants) and, because of its asynchronous nature, less spontaneity in participants' responses (which will lead to more thoughtful, structured and edited responses, which might be more enviable as it allows for greater openness and revelation); online research is more than merely doing fieldwork and writing up the findings – the virtual 'field' is always present for the online researcher, which allows the researcher to continue to participate in VCs during the final stages of the research to verify his or her interpretation, and even permits collaborative interpretation, which can prevent objectification and ethical issues; and the anonymity of participants, greater 'control' over the situation and possibilities for equitable relationships between researcher and participants means that the virtual community 'speaks for itself'.

3.3 *Data collection and measurement*

Methods employed to measure the use of online social networks as virtual communities, linked to the theoretical underpinning, can broadly be categorised into three categories: methods to measure website usability and technological issues; methods to measure the behaviour of consumers, or consumer-orientated methods; and methods to measure the communication in virtual communities. This research adopted a combination of all three methods in a theoretical framework, using pre-defined inclusion criteria for the evaluation of an interactive website (Best, Manktelow and Taylor, 2014), specifically the SouthAfrica.com online discussion forum. A quantitative content analysis research design has been adopted in which content, text and messages were critically examined, categories and themes were identified and analysed, content was coded and interpreted, and the results were reported relative to the research problem and theory. Both substantive decisions (what and how to code) and technical decisions (how coding will be interpreted) were made during the coding process and interpretation of the results (Keyton, 2015). Three levels of division were used in the development of the coding system, namely message construction; a summary of criteria and subcriteria; and main links and sublinks (Wagner et al., 2012).

The use of the online discussion forum by different users or community members was monitored over the following two time frames: time frame 1 (TF 1), September 2009; and time frame 2 (TF 2), September 2012. The total number of registered users were counted which resulted to 28803 during TF 1 and increased to 40803 during TF 2. The three main criteria, subcriteria and elements in Table 2 were used as the three constructs of the theoretical framework to evaluate and measure the descriptions in the online discussion forum. This was quantified by using a combination of the following: counting of the number of links, monitoring the content and messages, observations through lurking in the background, counting the number of replies from 'experts' and/or registered users, monitoring the feedback and use of the discussion forum, levels of involvement, etc. For example, the element *navigation, speed and reliability* of the first criterion (content) and the subcriterion *infrastructure* were measured by counting the number of links, monitoring the speed and looking at the reliability of the technical layout to enter and use the discussion forum. Another example is the element *involvement* of the participants that was measured in terms of the number of participations in the discussion forum as well as the level of involvement. Similarly, the element *shared artefacts, language, rituals and traditions* was measured through the concept of 'lurking', where the researcher was a non-participative observer trying to understand the meaning transferred out to the community to get an understanding of how the organisation tries to shape the community's history, culture and consciousness. According to Evans, Wedande and Van't Hul (2001: 154), the concept of lurking connotes a way to learn the rules or norms of the community from the background to understand the language and subject matter before making a contribution and is more than merely netiquette or standards of conduct in virtual worlds.

3.4 *Reliability and viability*

Reliability has been ensured through the consistency of the measurement, where constructs were measured and coded the same way each time under the same conditions at the same website (Wagner, Kawulich and Garner, 2012). Content validity was ensured through the comparison of the same items in the measurement tool (the theoretical framework developed from the literature review of the construct) with the relevant content domain for the constructs measured (Trochim, 2006).

4. **Results**

The results of the comparative analysis of the data obtained through the tracking study during the two specific time frames are subsequently discussed in terms of the following: the main criteria; the subcriteria and elements; and the main threads and first posts.

4.1 *Results on the main criteria during both time frames*

The criteria, subcriteria and elements listed in the theoretical framework were tabulated and weighted. Each of the three Cs was allocated an equal weighting of 33.3% and the subcriteria were weighted in terms of importance. For example, the criterion *content* was allocated a weighting of 33.3%, the subcriterion *infrastructure* a weighting of 11, *culture* 11 and *interactivity* 11 1/3. The elements of each of these subcriteria were allocated an equal weighting, and the total amounted to the weights assigned to

each of the subcriteria. The overall results of the measurement of the SouthAfrica.com discussion forum in terms of the main criteria (three Cs) of the proposed theoretical framework used during TF 1 and TF 2 are indicated in Figure 2.

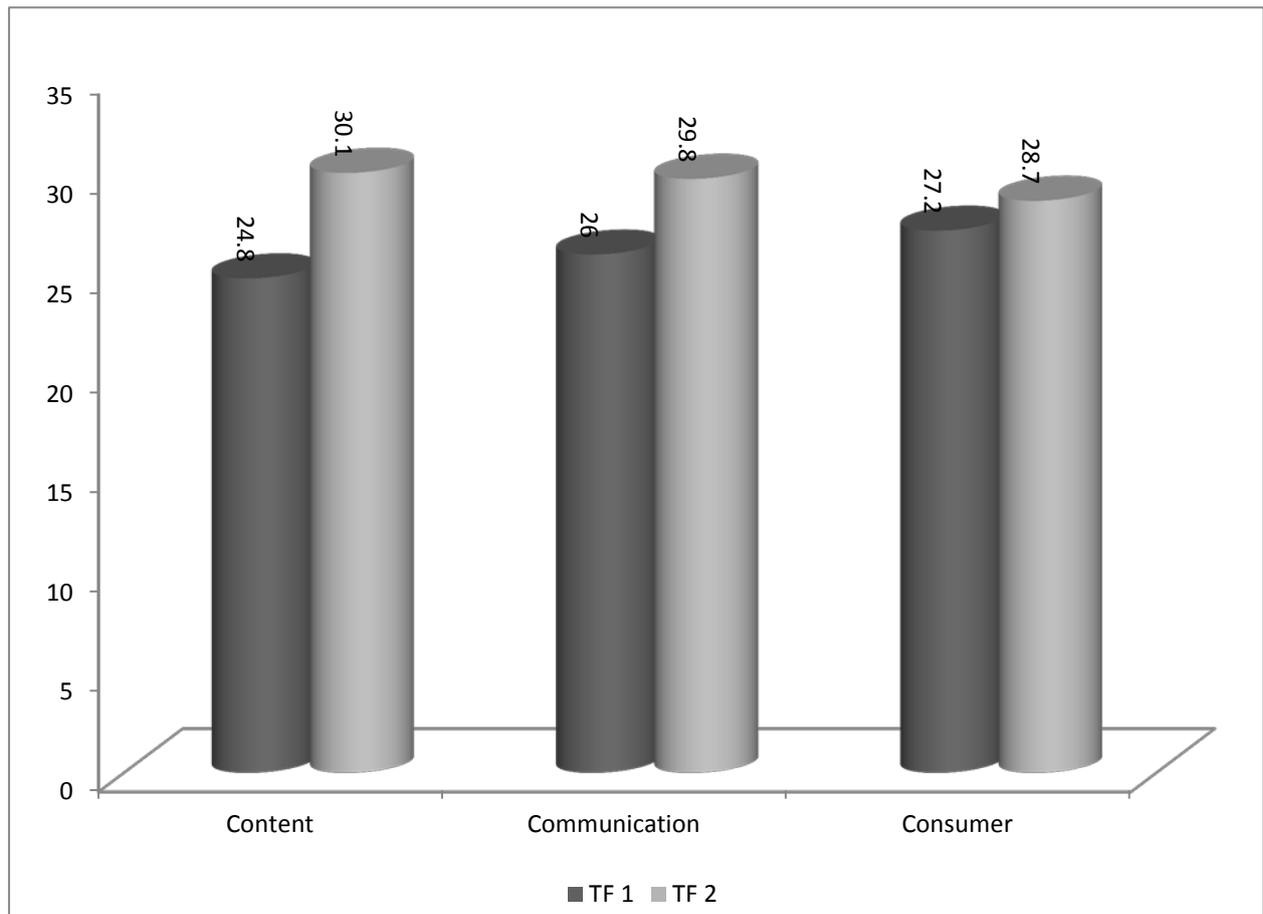


Figure 2: The results of the evaluation of the SouthAfrica.com discussion forum during TF 1 and TF 2 in terms of the main criteria (three Cs)

Figure 2 shows that during TF 1 the SouthAfrica.com discussion forum chat room scored the highest in terms of the criterion *consumer* (27.2%), mainly because of the high scores in terms of the elements *community feelings*, *social bonding* and *online relationship bonds* formed between the regular users of the online chat room. Although during TF 2 this criterion scored the lowest (28.7%), it was still higher than in TF 1, mainly because of the fact that it was much more *needs-driven* (especially in terms of the elements *interest*, *fantasies*, *feedback* and *online relationships*, which proved to be very high) and the *trust/commitment* (through loyalty and strengthened community feelings) which was formed between the members, which was also evident in the higher *involvement of participants* through a high number of posts on each thread and the fact that much more information was exchanged between the members.

The criterion *communication* scored second highest during both time frames, namely 26% during TF 1 and 29.8% during TF 2. During TF 1 intervention or knowledge management by people who identified themselves as *experts with know-how* (and in most cases provided substantiated data/feedback) was evident, whilst during TF 2 much more *knowledge was generated* through shared experiences to make tacit knowledge more explicit through dialogue, and *was used* by members and also, for data mining purposes, by the 'experts'.

During TF 1 the criterion *content* (24.8%) scored the lowest, but still fairly well, in terms of *interactivity* between members; the *ease of use* of the infrastructure and *accessibility* to the online chat room; as well as the *capturing and storing* of information, with a number of quotes being used and the data being stored and constantly referred to for the last five years. In contrast, during TF 2 the criterion *content* scored the highest (30.1%), mainly because of the improvements made to the infrastructure (especially in terms of the elements *navigation*, *speed*, *accessibility*, and *capturing and storing of information*); the culture created through elements such as *shared artefacts*, *language*, *rituals* and *traditions* (which addressed the different cultures in South Africa to a much higher extent than during the previous time frame); and the increased posts, which are an indication of the *interactivity* (through a better *designed interface*) of the online discussion forum.

4.2 Results on the subcriteria of the three main criteria during both time frames

The main findings in terms of the subcriteria of the three Cs, *content*, *communication* and *consumer*, are indicated in Figures 3 to 5. Although the elements are not specified in the figures, the total results of each are reflected in the overall results of the subcriteria. In other words, the results ascribed to each element were used in the calculation of the total results of the subcategories and are indicated in the discussions after each figure.

Content

Content was measured in terms of three subcriteria, namely infrastructure, culture and interactivity, which were given equal weightings and added up to a third of the overall percentage (where each C equalled a third). The results of these subcriteria are presented in Figure 3.

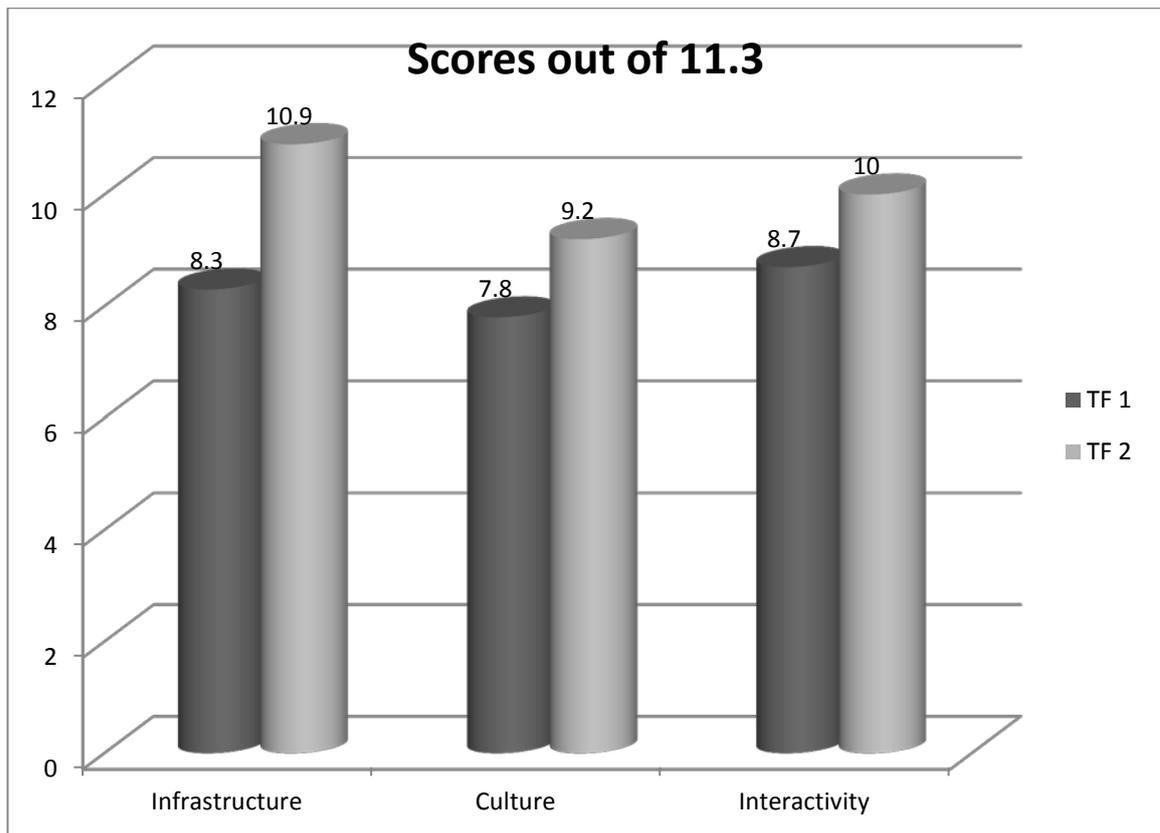


Figure 3: The results of the subcriteria of the first main criterion, *content*, of the SouthAfrica.com discussion forum

From the results indicated in Figure 3 it was clear that although during TF 1 the infrastructure was very good in terms of *navigation, speed, reliability* and *accessibility* and scored high in this section, very few *aesthetics* had been included which might have hampered the first impression of the forum. An interesting fact noted was that all threads were rated 5/5 (Excellent), which might be either a standard setting or coincidental – it is equivocal whether they could all score the same. An area for improvement during TF 1 was the *capturing and storing* of information through the centralised customisation of information, which resulted in a lower score. Furthermore, a *consciousness of kind* was not evident because there was no strong feeling binding the members together. The lowest score was given to culture, mainly because the representativeness of all cultural groups was not clear, especially as far as *shared artefacts, language, rituals* and *traditions* were concerned, but high *moral* commitment and strong group cohesion were apparent. Two areas of concern were the *customer focus* and *reliability* of the information communicated. Although there was good interaction, reaction and interventions by members who referred to themselves as ‘experts’ in most cases, some speculations and unfounded data were presented in certain threads by members themselves. No clear ‘management’ from the discussion forum itself was evident to validate the interface, except in the case of three messages where the community members were referred to relevant sites or sources. This indicated a general lack of knowledge management from the organisation’s side and that the information communicated was not organisational or knowledge-management driven, but more focused on individual or group communication between members. The *personal relationships* of the groups were extremely high, which contributed to the high score allocated to interactivity between members, followed by the elements of *ease of use, participation* and *designed interface*.

During TF 2, the scores were much higher than during TF 1. For example, the subcriterion *infrastructure* received a high number mainly because the *aesthetics* were more visible through improved design in the technology, better *navigation and reliability* were created through links and the credibility of information underscored by experts, *accessibility* improved through user interfaces, and the *capturing and storing* of information about the users made data mining possible because of centralised customisation. The second-highest score for this criterion was in terms of *interactivity*, which links to the *ease and speed of use* of information and the involvement of members in the online discussion forum. During TF 2, the criterion *culture* scored much higher than in TF 1, mainly because the topics and threads were much more representative of all cultural groups and customer focused, especially as far as *shared artefacts, language, rituals and traditions* were concerned, and a very high *moral* commitment and strong group cohesion were still apparent because the system allowed for *personal relationship-building* between members of the group.

Communication

The criterion *communication* was evaluated in terms of the following subcriteria with their relevant elements: socialisation, externalisation, combination and internalisation. The results are presented in Figure 4.

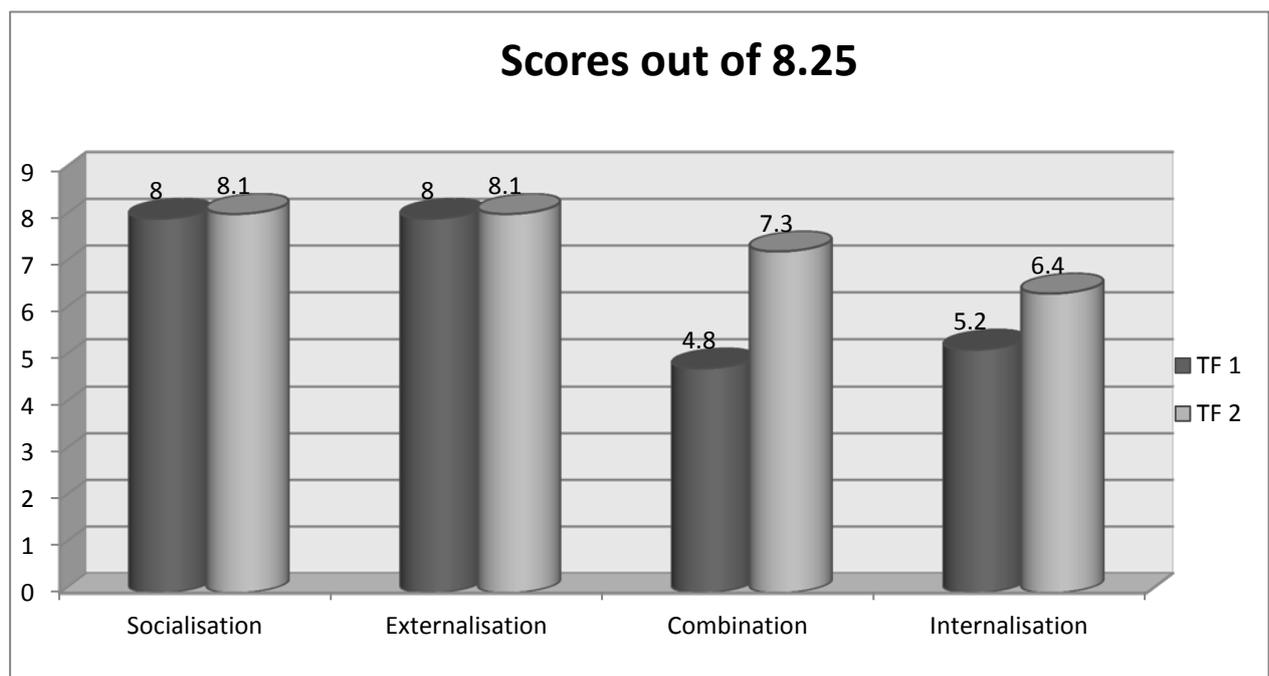


Figure 4: The results of the subcriteria of the second C, *communication*, of the SouthAfrica.com discussion forum

From the results in Figure 4 it is clear that during both TF 1 and TF 2 the subcriteria *socialisation* and *externalisation* scored very high, mainly because real sharing of knowledge took place through the *generation* of members' own interpretations of the tacit knowledge, and the *development* of knowledge which was done through members who identified themselves as 'experts' in the field and provided substantiated data supported with evidence, allowing for the sharing of *innovative communication* of knowledge. During TF 1 it was unclear whether explicit knowledge was *transferred* to the members,

resulting in the lowest score for this subcriterion. During TF 2 the subcriterion *combination* scored much higher than during TF 1, mainly because of the integration and categorisation of knowledge through the introduction of a systemising process and data mining, which allowed the *transfer* of knowledge to create value. The last subcriterion, internalisation, scored second lowest during both time frames, but indicated that the information provided (whether correct or incorrect) was *used* by the members to a large extent, which indicated that the explicit knowledge was made tacit.

Consumer

Figure 5 presents the results of the measurement of the third C, *consumer*, in terms of the following subcriteria: needs-driven, trust/commitment and online relationships. It is important to note that some of the elements of the subcriteria have not been used because they did not apply to the SouthAfrica.com discussion forum measured. These elements include aspects such as transaction, shared interface, emotional values and consumer satisfaction (because the main focus was on C2C communication).

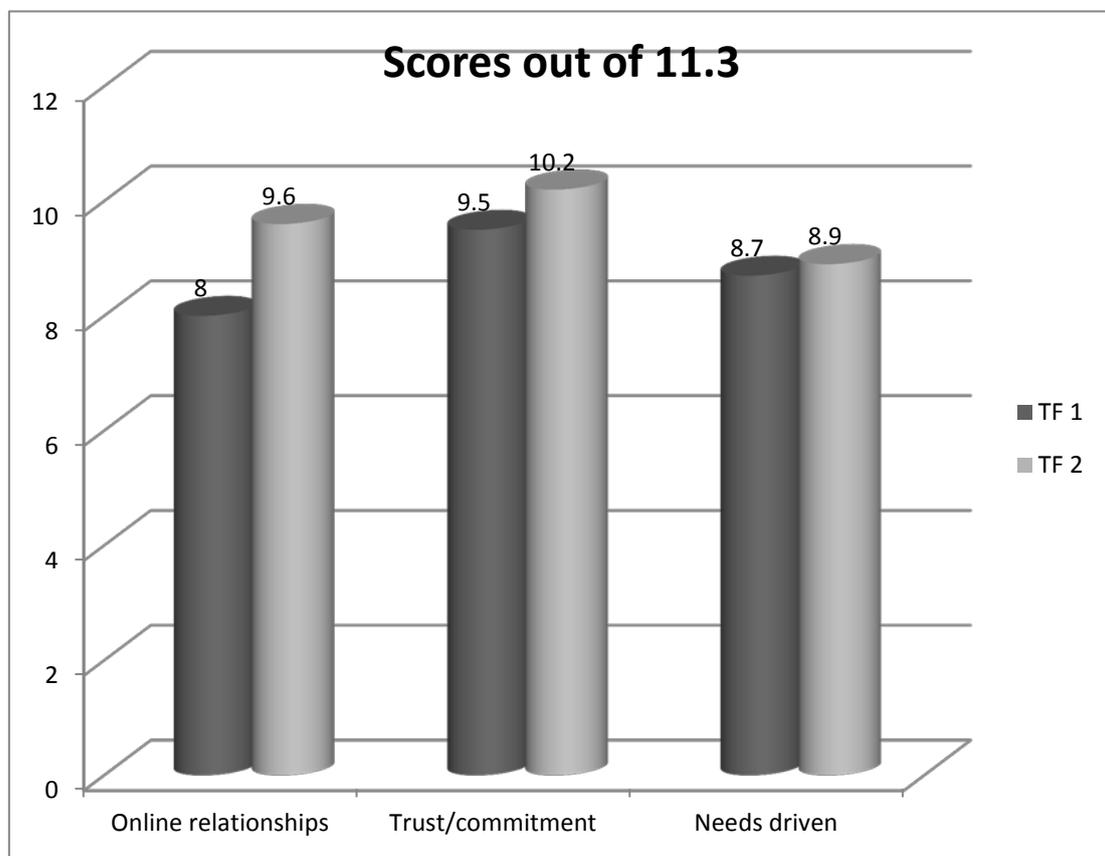


Figure 5: The results of the subcriteria of the third C, *consumer*, of the SouthAfrica.com discussion forum

As indicated in Figure 5, the highest score was allocated to the subcriterion trust/commitment during both time frames, mainly because of the *social bonding* that developed between the members as a result of the interactive and repetitive nature of exchange in these relationships. During TF 1 all members participated in the discussion forum anonymously through the use of ‘nicknames’ or ‘pseudo names’ such as “Woestynryer” (the member who initiated the most discussions on a wide range of threads), “Assassin”, “Scooby”, “Theja”, “Adonis”, “Joovilhar”, “Ches”, “Liza81” and “Benjyboy”, to name a few of

the most frequent users of the discussion forum. During TF 2 only a few members used pseudo names (such as “Pommie”, “Foambather”, “Giff833”, “mikkimouse” and “Abteka”), while most members used ‘real’ names (including “ThomasGrove”, “Mfundo Nkosi”, “Caleb Dun” and “Leigh Larkin”, to name a few), which made the bonds during TF 2 stronger and *strengthened community feelings* between some of the members who communicated interactively on a regular basis. The subcriterion with the second-highest score during TF 1, *needs-driven*, was ascribed to good *feedback* given to encourage knowledge sharing and to reinforce active learning through reference to substantiated data and references and links to other relevant sites. Whilst a slightly higher score was allocated in TF 2 in terms of this subcriterion, it scored the lowest of the three mainly because no real difference was observable during TF 2 other than the fact that a slight increase in *feedback* was notable from ‘experts’ on specific topics, which encouraged knowledge sharing and reinforced active learning. Whilst the subcriterion *online relationships* scored the lowest during TF 1, it scored second highest during TF 2, mainly because a strong *involvement* of the participants was prevalent, which enhanced the *relationship bonds* between the members of the community that communicated on a regular basis. During TF 2 the use of ‘real’ names also increased *personalisation* (the members started to know each other), which led to a higher level of trust and commitment between the members so that they participated more freely in the SouthAfrica.com discussion forum.

4.3 Results on the main threads and first posts during TF 1 and TF 2

During TF 1, the online discussion forum monitored experienced 115 first posts on a specific thread, ordered chronologically according to date, not topics. The researcher categorised the posts and threads in terms of ten broad categories in no specific order of importance, namely: 1) *politics* (including parliamentary issues, Nelson Mandela, Zuma, etc); 2) *culture* (like black people and Africanisation); 3) *geoFigureics* (like data on areas, cities, etc); 4) *nature* (such as snakes, leopards in the Kruger National Park, shark attacks, freak storms and blazes); 5) *history* (early South Africa, apartheid mass graves, and San people); 6) *crime* (considered in terms of serious crimes like murder, rape, mobbing, etc. versus minor crimes like hacking and speeding); 7) *products/services* (including threats on helplines, various product and service complaints, festivals, etc); 8) *community involvement* (like school projects, aids awareness, etc); 9) *entertainment* (events, clubs, choirs, beauty pageants, etc); and 10) *international issues* (including news and events in Africa, Zimbabwe, China, Malawi, India, Afghanistan, Israel, world debates and the USA, etc.) (Barker, 2008).

During TF 2, the information was already ordered according to forums (on specific topics), which was the complete opposite of TF 1, when the information was ordered chronologically according to dates. Another important difference is that during TF 2 the forum was subdivided into different sub-forums. Another interesting observation was that during TF 2 it was found that the recommendations made by the researcher after the monitoring of the online discussion forum during TF 1 had been incorporated, particularly the use of topics, sub-topics and postings. The site and postings were not ordered chronologically, but had ten broad categories (which they referred to as ‘forums’) with subcategories in the following order: 1) *guest book* (including the subcategories of messages from visitors on what they have to say and brief greetings); 2) *open board* (including subcategories such as the sharing of photo albums, buy-and-sell ads, jokes or cartoons, and searching for any topic); 3) *society* (which interestingly

enough is one of the proposed categories indicated for TF 1 under the category ‘politics’, namely South African politics, business in or with South Africa and current events in South Africa); 4) *culture* (which corresponds with one of the categories during TF 1 and includes a number of overlaps with the other categories in TF 1, with the following subcategories: cuisine, history, language, literature and film, music and art, religion, school projects and sport); 5) *personals* (including the subcategories personal questions and friendship networks, pen pals, genealogy and searching for people); 6) *gay and lesbian community* (where the subcategories include specifically stories worldwide and the gay dating network); *human rights* (specifically categories on stories about human rights issues in the South African context and internationally in terms of victims of the UNHCR); 7) *travel and tourism* (including the subcategories travel tips in and around South Africa, immigration information and moving/furniture); 8) *suggestions* (with subcategories like feedback to administrators and moderators, which can be seen as a proactive knowledge management step); *archives* (which provides a link to two subcategories, namely *mark forums read* and *view forum leaders*); and 10) *what’s going on?* (with subcategories providing information on currently active users and statistics on the 7246 threads and the 31080 posts of active members, which can be seen as the proactive use of information and database management).

The percentages allocated to each of the threads, which were ordered and ‘termed’ by the researcher in terms of subcategories during TF 1, are indicated in Figure 6.

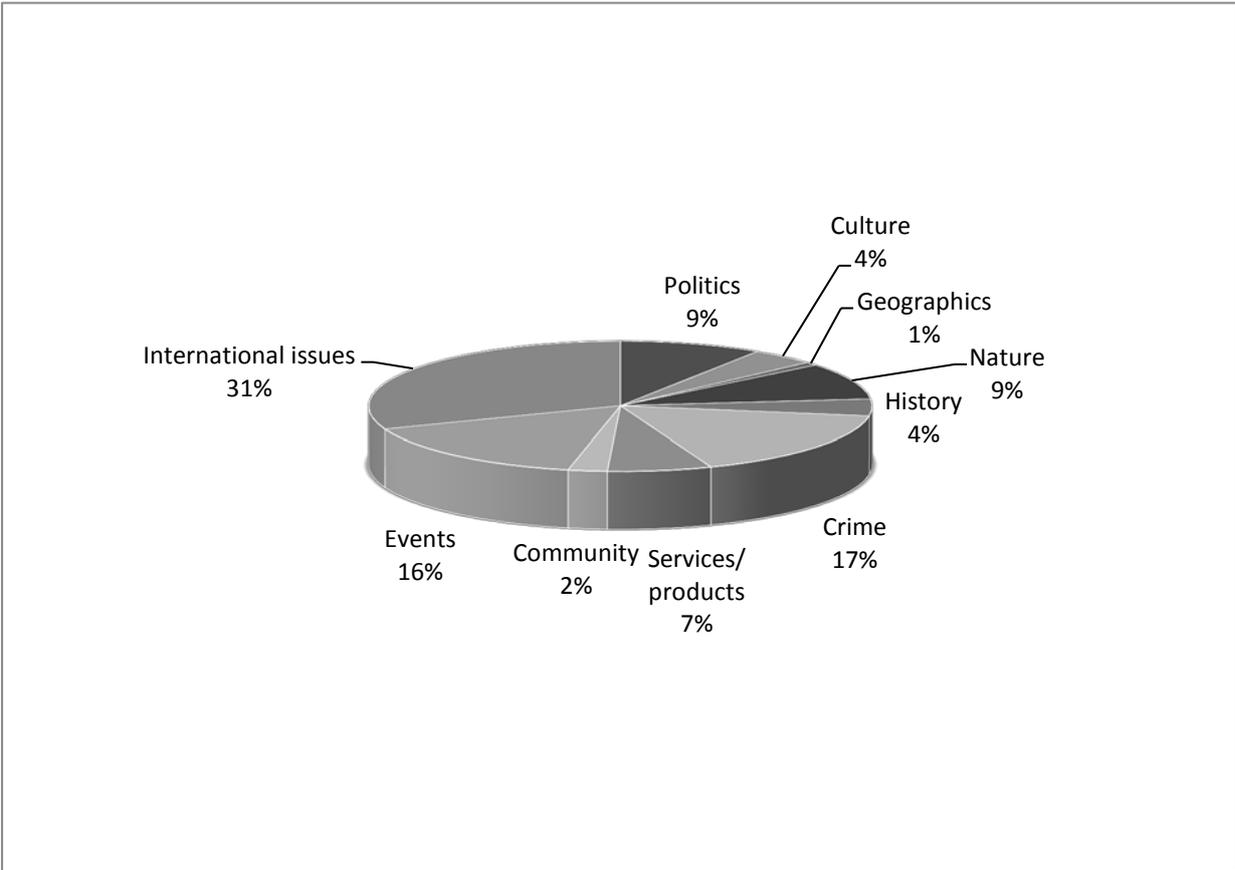


Figure 6: Main threads of the SouthAfrica.com discussion forum during TF 1

The calculations in Figure 6 were made in terms of the ten main subcategories or initiations as categorised above for TF 1. In terms of this, most initiations derived from *international news* (30%) (with a large number of threats on issues in Zimbabwe and Mugabe, followed by news in the USA, Europe and

Africa), followed by *crime* (17%) (which was a major concern in the South African context), *events* (16%), etc. Figure 7 presents the results of the main threads of the SouthAfrica.com discussion forum during TF 2.

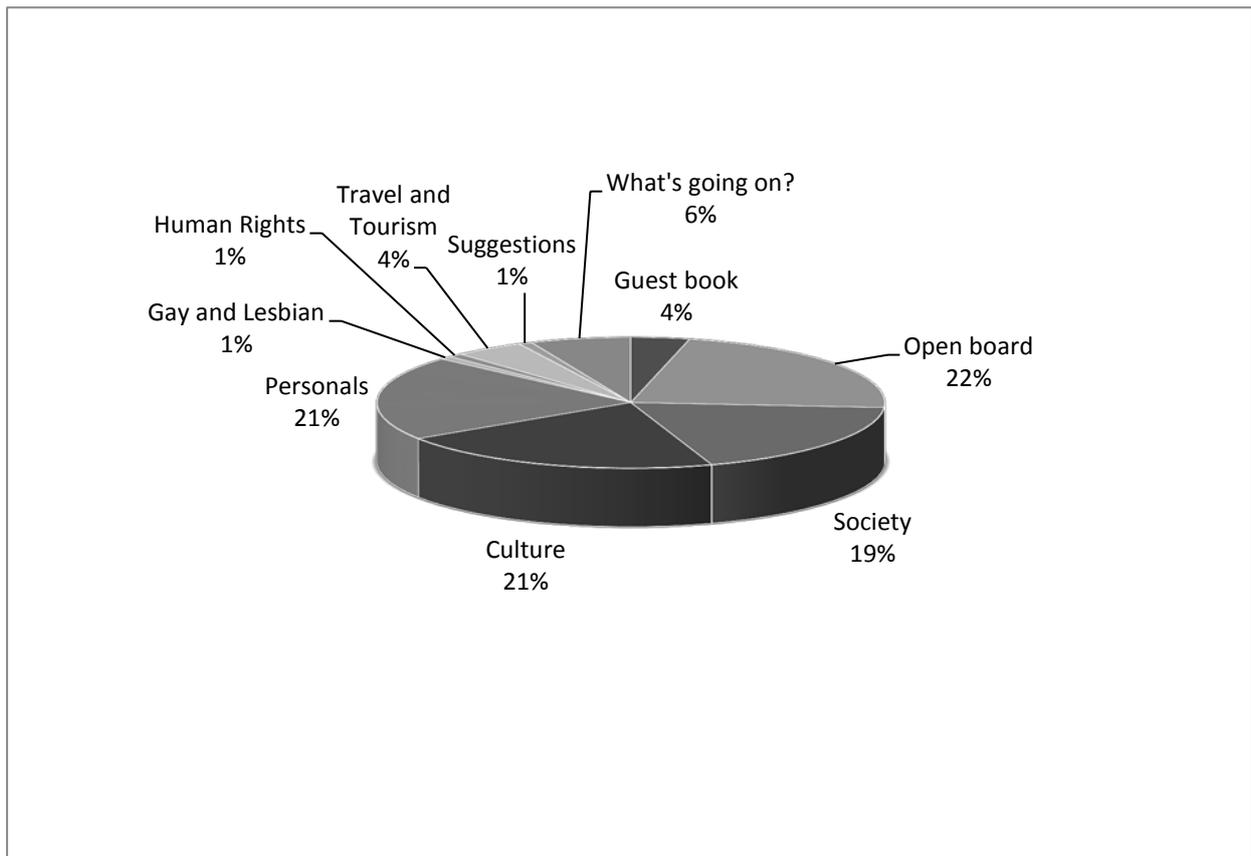


Figure 7: Main threads of the SouthAfrica.com discussion forum during TF 2

The calculations in Figure 7 were made in terms of the ten main forums or subcategories as categorised on the forum itself for TF 2. In terms of the results, most of the threads were on the *open board* (22% with 1742 threads and 7186 posts), followed equally by *personals* (21% with 1617 threads and 2466 posts) and *culture* (21% with 1615 threads and 7360 posts). Although the latter two scored equally in terms of number of threads, it is clear that the posts on *culture* were almost 30% higher than in the *personals* thread, with the most posts in the subcategory *religion* (3716 postings). Interestingly, during TF 1 the subcategory *culture* as a thread scored only 4%, compared to a score of 21% during TF 2. Another interesting observation is that the lowest percentages went to *human rights* (1% with 60 threads and 432 posts) and *gay and lesbian community* (1% with 69 threads and only 219 posts) in spite of the fact that these are currently dominant and much debated topics, with activists in these South African communities taking an active role.

5. Conclusions

Based on the main objective of this article to address the lack of research on the management of knowledge creation and sharing in virtual communities, specifically in an online discussion forum, the findings of the comparative analysis indicate that many ways exist to determine whether the management of knowledge creation and sharing through intervention by an expert is purposeful. Specifically, the three

main components of the knowledge management approach were utilised, with a particular focus on the interrelationship between the three Cs: content, which was mainly enabled through technical infrastructure; communication, which allowed for knowledge creation and sharing; and the consumer, which was needs-driven, deriving from active participation and interaction to build trust/commitment and thereby creating or enhancing online relationships. The use of these components with their relevant subcategories and elements demonstrated that rapid and proactive responses to postings on an online discussion forum are crucial. Based on the results, two main findings are evident: knowledge intervention by an expert in the organisation is possible (and indeed needed as a proactive means) to ensure that new knowledge is created and shared by individuals in the forum on a continuous basis; and a good theoretical foundation or framework can illustrate the importance of various aspects which should be considered to obtain useful results from the participants or members of the forum through knowledge management. From the findings it is clear that the emphasis in the content component on improved infrastructures to ensure accessibility, navigation, speed, and the capturing and storing of information is necessary to create a culture in which individuals feel they are committed based on reliability and the interactivity that takes place. Furthermore, the subcriteria of the communication component, namely socialisation, externalisation, combination and internalisation, allow for intervention in terms of knowledge generated through shared experiences and models to connect these individuals through tacit knowledge where this knowledge is made explicit by experts through a systemising process that allows the transfer of this knowledge to the individuals in order for them to use it. Lastly, in terms of the consumer component (in this case the participants in the online discussion forum), the findings indicate that intervention should address the subcriteria in that it should be needs-driven to ensure that individuals maintain interest, it should enhance online relationships through a shared interface and proactive feedback by the expert, and it should ensure loyalty and strengthened community feelings through the building and enhancing of trust and commitment; and long-term online relationships will be ensured if individuals are involved in the discussion through the exchange of information (trading and socially) and if they receive value from the interaction through the personalisation of information and rewards/gratification in the online discussion forum and can learn from the experience of an expert with the necessary know-how.

In terms of limitations of the research and findings, it is argued that the information obtained through the tracking study produced results without recourse to other models, which are usually based on more subjective premises. It would therefore be recommended that this article be seen as an exercise of exploration into the knowledge management intervention process, but should probably be simplified for future analysis. Although the main contribution of the study is that it augments to the limited empirical research in this area and provides a theoretical framework for future research in this field, it is limited by the fact that it only focused on the measurement of knowledge management in one online discussion forum. Another limitation is the fact that limited insight into consumers' behaviour has been obtained, mainly because of the use of 'lurking' in one online discussion forum.

However, the originality of this approach lies in the attempt to consider a distinctive approach to point to the simplest levels of analysis by choosing 'differentiation' as a key word to guide the approach, something which is sometimes lost in more complex analyses. The main implication for practitioners and researchers from a practical point of view is that the application of the basic principles of the knowledge

management approach illustrates that the management of knowledge creation and sharing through experts is possible, and the wealth of information obtained during the two time frames produced results which can be used by managers of these forums in future. It is worth mentioning that one of the key findings that stands out is that the participants in an online discussion forum quite often regard those members who manage the online discussion forum as 'experts', but that organisations then run the risk that the knowledge created and shared might not support, and/or be detrimental to, the overall objectives and brand of the organisation. Every choice regarding information creation and sharing should thus follow the same line of thought to translate into the context of the communicative potential of the brand in its different dimensions to create and build on shared values, and this should be done by experts from the organisation itself. The study demonstrated that whilst content, communication and consumers are associated with knowledge management in virtual communities, this might differ from organisation to organisation, depending on the amount of intervention through knowledge management. However, the tracking study enhanced the findings of the first study and indeed indicated that organisations can use this theoretical framework to evaluate and translate these constructs in their online communities to strengthen the relationships and manage the information creation and sharing through intervention by an expert.

A growing understanding of knowledge management in virtual communities, specifically online discussion forums, and the proposed theoretical framework can be used as a possible area of future research to contribute to further assess this phenomenon in future. An exploratory validation of the framework has been proposed, and it appears to provide insight into how intervention through knowledge management in knowledge creation and sharing can be managed. This attempt may encourage organisations to support this approach towards online virtual communities which present the opportunity to 'manage' such communities in future. The analysis revealed that knowledge management is possible and could be highly effective where such knowledge management is performed through significant intervention by experts in the information exchange process. The importance of further research in virtual communities to ensure the management of information creation and sharing is evident in the following quote by Gómez (2007: 232): *Without cross-fertilization, the virtual communities of interest may end up reinforcing large, dispersed groups who share narrowly focused concerns.*

References

- Ardichvili, A. Maurer, M. Li, W. Wentling, T. and Stuedemann R. (2006). "Cultural influences on knowledge sharing through online communities of practice", *Journal of Knowledge Management*, 10(2): 94-107.
- Arling, P.A. and Chun, M.W.S. (2011). "Facilitating new knowledge creation and obtaining KM maturity", *Journal of Knowledge Management*, 15(2):231-250.
- Barker, R. (2008). "Measuring knowledge management in a virtual chat room: a case study", *Communicatio*, 34(1):1-24.

- Bell, D. (2001). *An introduction to cyberspace*. Routledge: London.
- Bernier, R. and Bowen, J.P. (2004). "Web-based discussion groups at stake: the profile of museum professionals online", *Program: Electronic library and information systems*, 38(2): 120-137.
- Evans, M. Wedande, G. Ralston, L. and Van 'T Hul, S. (2001). "Consumer interaction in the virtual era: some qualitative insights", *Qualitative Market Research: an International Journal*, 4(3):150-159.
- Gòmez, R. (2007). "The nostalgia of virtual community: a study of computer-mediated communications use in Columbian non-governmental organizations", *Information Technology and People*, (3):217-234.
- Hersberger, J.A. Murray, A.L. and Rioux, K.S. (2007). "Examining information exchange and virtual communities: an emergent framework", *Online Information Review*, 31(2):135-147.
- Kimble, C. and P. Hildreth. (2005). "Dualities, distributed communities of practice and knowledge management", *Journal of Knowledge Management*, 9(4):102-113.
- Keyton, J. (2015). *Communication Research*. 4th Edition. McGraw-Hill Education: North Carolina State University.
- Maclaran, P. and Catterall, M. (2002). "Researching the social Web: marketing information from virtual communities", *Marketing Intelligence and Planning*, 20(6):319-326.
- Miles, M. and Huberman, A. (1994). *Qualitative data analysis: an expanded sourcebook*. Sage Publications: Thousand Oaks, CA.
- Nonaka, I. (1991). "The knowledge-creating company", *Harvard Business Review*, November-December:96-104.
- Nonaka, I. and Takeuchi, H. (1995). *The knowledge-creating company*. Oxford University Press: New York, NY.
- Streatfield, D. and Wilson, T.D. (1999). "Deconstructing knowledge management", *Aslib Proceedings*, 5(1):67-71.
- Soukup, C. (1999). "The gendered interactional patterns of computer-mediated chat rooms: a critical ethnoFigureic study", *The Information Society*, 15:169-76.
- Styhre A. (2003). "Knowledge as a virtual asset: Bergson's notion of virtuality and organizational knowledge", *Culture and Organization*, 9(1):15-26.
- Taylor, T.L. (1999). "Life in virtual worlds", *American Behavioral Scientist*, 43(3):436-49.

Wagner, C., Kawulich, B. And Garner, M. (2012). *Doing social research: a global context*. McGraw-Hill Higher Education: London.

Ward, K.J. (1999). The cyber-ethnographic (re)construction of two feminist online communities, *Sociological Research Online*, 4(1).

[Table 1]

Subcriteria (content)	Elements
Infra-structure	<ul style="list-style-type: none"> • <i>Aesthetics/Figureical control</i> (images, Figureics, animations etc. that are visible and present the first impression of like or dislike of the VC) • <i>Navigation, speed and reliability</i> (design of the technology, hardware/software and technical support to those performing their tasks) • <i>Accessibility</i> (design of the user interface) • <i>Capture and storing</i> (of relevant information about stakeholders through centralised customisation of information)
Culture	<ul style="list-style-type: none"> • <i>Consciousness of kind</i> (the feeling that binds individuals to the other community members and community brand) • <i>Shared artefacts, language, rituals and traditions</i> (to reproduce and transmit meaning in and out of the community and which perpetuate their history, culture and consciousness) • <i>Moral responsibility</i> (reflects the feelings that create moral commitment, duty or obligation and encourages group cohesion) • <i>Customer focus</i> (whether the information is directed to their needs) • <i>Reliability</i> (of the information communicated to ensure that it is perceived as valid and in line with expectations)
Interactivity	<ul style="list-style-type: none"> • <i>Flexibility and ease of use and participation</i> (of information) • <i>Speed and reliability</i> (of the design of the technology) • <i>Designed interface</i> (to allow shared interest, interaction/involvement, two-way communication and dialogue between the community members)
Subcriteria (communication)	Elements
Socialisation	Socialisation (when synthesised knowledge is <i>generated</i> through shared experiences, shared mental models and technical skills to connect people through tacit knowledge)
Externalisation	Externalisation (where tacit knowledge is made explicit to ensure that conceptual knowledge <i>development</i> takes place and it is made possible through knowledge articulation and knowledge of experts)
Combination	Combination (the process where explicit knowledge is transformed through the integration and categorisation of knowledge using a systemising process and data mining and this knowledge is then <i>transferred</i> to the consumer and can create value through the innovative communication of knowledge)
Internalisation	Internalisation (where explicit knowledge is made tacit and this knowledge is then <i>used</i> by the consumer)
Subcriteria (consumer)	Elements
Needs-driven	<ul style="list-style-type: none"> • <i>Transaction</i> (facilitates the buying and selling process through information delivery) • <i>Interest</i> (interpersonal communication where participants interact intensively with each other on specific topics and attract new participants) • <i>Fantasies</i> (which allow participants to create and share new stories, personalities, experiences and environments through interpersonal interactions and social experimentation) • <i>Relationship building</i> (which is created through the sharing of certain life experiences and bringing together of members) • <i>Shared interface</i> (also referred to as “piggyback” and is when VCs opt to amalgamate online with other providers to offer a wider range of information, thereby reducing overheads and obtaining increased competitiveness to capitalise on the member’s interest) • <i>Feedback</i> (provided to members to encourage knowledge sharing and to reinforce active learning in VCs)
Trust/commitment	<ul style="list-style-type: none"> • <i>Loyalty or e-loyalty</i> (indicated through the combination of repeat purchase behaviour, as well as social bonding) • <i>Emotional values</i> (of the consumer to explain brand selection decisions) • <i>Strengthened community feelings</i> (depend on the value the individual assigns to the membership – the stronger the feeling, the more stable the community will be)
Online relationships	<ul style="list-style-type: none"> • <i>Involvement</i> (of participants in the communication that takes place) • <i>Social relationship bonds</i> (formed when repeated exchanges lead to positive judgments on the behaviour of the other party) • <i>Exchanges</i> (of information, trading and socially, between members) • <i>Consumer satisfaction</i> (the evaluative response of the product purchase and consumption)

experience where the consumer compares the expected value with the received value)

- *Personalisation* (of the communication that takes place which occurs when the consumer is involved and has a bond with the community)
- *Rewards/gratification* (when the consumer perceives the relationship as having an expected and received value of the interaction)
- *Expertise/know-how* (of those who create and share knowledge including involvement of other members of the community to participate and learn from the experience of others)