Managing Learning and Change: Factors Influencing the Effectiveness of Soft Systems Methodology

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Abstract

Soft Systems Methodology (SSM) aims to bring about learning and change in problematical situations. This study explored the application of SSM in the sugar industry and identified factors that play a role in achieving such outcomes. The qualitative research approach was used. Stakeholders were engaged in interviews and workshops. Data were analysed using thematic analysis. The findings were that critical factors such as starting conditions, time allocated, grouping of participants and prompts by the facilitator affect the SSM process. These factors – along with strategic initiatives led by significant participants that occurred behind the SSM scenes – were found to impact on the extent to which participants were able to confront the issues, engage in learning, and consequently take ownership of the implementation of the proposals directed at change.

Keywords: Soft Systems Methodology (SSM); systems theory; complex systems; qualitative research; sugar industry.

1. Introduction

While Soft Systems Methodology (SSM) aims to bring about learning and change in problematical situations, there is a need to examine which factors influence the effectiveness of this methodology. Pala, Vennix and van Mullekom (2003) make a call for systemic studies into the effectiveness of SSM as a methodology – to enrich the learning process of SSM users and practitioners and to produce knowledge about why and how SSM leads to its outcomes. Users of SSM need to be prepared for possible challenges in bringing about change and must be aware of how social processes occur (Brocklesby, 2007). Furthermore, competencies to ensure the success of the methodology must be identified, as well as insight into which of the SSM tools contribute to the success of the methodology and under which conditions – while accounts of facilitation by users should be provided (Pala et al., 2003). Such areas of exploration can be used to enhance the methodology (Salner, 1999).

The current SSM study was conducted in the sugar industry, in a developing country context. The identity of the mill area is not revealed for confidentiality reasons. The sugar industry is defined by diverse stakeholders who engage multiple activities in their own domains to eventually realise the final product. The main stakeholders are growers who grow the cane, hauliers who transport the cane from the grower to the mill, and millers who process the cane. There are also stakeholders involved at industry level. SSM was considered a suitable methodology to use in this context as stakeholders were found to pursue different goals and objectives, and have multiple perspectives on the problems in the industry and how best to address them.

The process that the practitioner followed in employing SSM will be reflected on in this paper, with consideration given to how learning and change is impacted on by factors such as facilitation, group processes, decision making, power, leadership, and conflict.

2. Literature Review

SSM is used by practitioners and academics in various applied disciplines and countries (Jackson, 2003). SSM provides an action-oriented and flexible means of addressing problematical situations – to bring about action to improve (Checkland & Poulter, 2006). Reference is made to 'problematical situations' as opposed to 'problem situations' "since

they may not present a well-defined 'problem' to be 'solved' out of existence", as argued by Checkland and Poulter (2006: 3). The four stages of the SSM cycle, as described by Checkland and Poulter (2006), will be briefly elaborated on. The methodology originally consisted of seven stages – but these are now condensed to four. The first stage is about ascertaining the problematical situation, along with an analysis of the issues, culture and power. Rich Pictures are commonly employed to illustrate stakeholders, structures, processes, and their concerns or interests.

The second stage involves constructing relevant purposeful activity models, based on a particular worldview. The description of the activity systems to be modelled is stated in root definitions, which illustrate the what, how and why of the system. The PQR (do P, by Q, in order to help achieve R) formula is also used to develop the root definition. A general model of purposeful activity is then presented using the CATWOE – to represent: Customers who are the beneficiaries or victims, Actors who are the people who do the activities, the Transformation, the Worldview, Owners who can prevent or change the activity, and Environmental constraints. In the third stage, the models are then used to debate differences between the real world and ideal world, as presented by the models. Ideas for action to bring about change that is desirable and culturally feasible are identified – with the aim of seeking accommodations in the fourth stage (Checkland & Poulter, 2006).

Different worldviews and perceptions of reality are examined and challenged using this systemic methodology. The aim is to enable learning that can result in action for improvement, and in so doing participants can determine what is feasible and desirable in their context (Jackson, 2003). Salner (1999) classifies SSM as a qualitative research methodology due to the analysis of verbal data and emphasis on interpretation and self-reflexivity. SSM is underpinned by the systems thinking approach, in that the methodology does not prescribe to the reductionist stance of the natural sciences (Checkland, 2000). SSM is a different form of research (action research), whereby the facilitator enters and participates in a human situation, and draws on such experience (Checkland & Poulter, 2006).

SSM, which embraces the soft systems approach, brought about a radical shift from the hard systems approach which was classified as functionalist (Jackson, 2003). The hard systems approach is realist, whereas the soft approach is subjectivist or constructionist (Christis, 2005). SSM is underpinned by the phenomenological and interpretive approach, and acknowledges that social reality is continuously reconstructed, and does not correspond to the view that social reality is static and best studied by the objective outside observer (Checkland & Poulter, 2006).

The hard systems approach entails clearly-defined objectives which are achieved through engineering, whereas human-activity systems are classified as messy and ill-defined (Khisty, 1995). Hard systems approaches are suitable at the operational level when there is clear agreement on the goals to pursue and the ways to accomplish such goals (Khisty, 1995). Hard systems methodology accepts goal-seeking behaviour, and uses words such as 'problems' and 'solutions' (Khisty, 1995).

SSM embraces the complexity paradigm (Khisty, 1995). Complexity in problematical situations is defined by different assumptions, as well as multiple relationships and views of reality (Checkland & Poulter, 2006). Problematical situations are dynamic and are composed of purposefully acting individuals – with ever-changing interactions resulting in novel occurrences, descriptions and actions (Brocklesby, 2007). Levy (2000) notes that multiple, complex interactions are visible in economic and social systems. From an ontological perspective, complexity theory discounts the concept of the rational actor with the aim of maximising an objective – as it does not consider the dynamic nature of systems (Levy, 2000).

SSM allows for the exploration of means to handle complexity, and does not seek a solution to an obvious problem (Checkland, 2000). Khisty (1995:106) notes that SSM is applicable "to deal with messy, confusing, and complex problems residing in the swampy lowlands". SSM is a systemic methodology that deals with problems in the real world (Khisty, 1995). Christis (2005) points to the reality of certain situations whereby it is not possible to define the problem – thus requiring a soft systems approach. Such problems in the real world require participation and learning, which are found in the SSM process (Khisty, 1995).

The SSM user should focus on the problematical situation, and the methodology with its set of principles should guide the user in flexibly applying it with the participants – considering their unique context (Checkland & Poulter, 2006). The facilitator's skills become critical in engaging participants in a learning experience and controlling group dynamics (Molineux & Haslett, 2007). Drawing out and working with multiple and possibly conflicting worldviews, especially in the debate and action stage, could be challenging for the SSM user. The facilitator therefore has to be adept in a number of areas, especially when acknowledging that intervention does not occur in a static context – but rather in a dynamic and unpredictable system.

Some of the challenges in facilitating SSM workshops, as found in previous research, are briefly discussed below. Kreher's (1994) study noted how difficult it was for the user to keep track of happenings which are critical in coping with complexity and ensuring coherence. Communication and consultancy skills are also required to manage SSM

interventions (Kreher, 1994). Luckett and Grossenbacher (2003) found that the composition of the group played a role in reaching accommodation in their research, as they involved implementers and not lower-level staff or the public – which according to them could have resulted in disagreements and conflicting perspectives, as well as another take on the political and cultural dynamics of the situation. Molineux and Haslett (2007) recommended that in order to maximise creativity from the SSM process, there should be a diverse group, sufficient organisational and senior management support, adequate time, a positive climate with a sense of challenge but also enjoyment, and intrinsic motivation and willingness to collaborate. It is a challenge for the practitioner in SSM to ignite the couplings, address the deep-rooted perspectives, get people to understand that their worldviews may not reflect reality, shift the situation, get the conversations to flow, and also manage the emotions (Brocklesby, 2007).

3. Research Methodology

The SSM study was conducted in the sugar industry and used an exploratory research design. The study drew on the qualitative research approach. The empirical component of the study commenced in July 2010. Ethical clearance was obtained.

Fieldwork consisted of semi-structured interviews and SSM workshops, as highlighted in Table 1 below. All interviews and workshops were conducted in the mill area. The interviews were semi-structured, conducted face-to-face, and on a one-on-one basis. The interviews enabled the stakeholders to share their in-depth opinions and perspectives on the problem. Interviews lasted approximately an hour and were digitally recorded and transcribed to facilitate data analysis. The workshops, each lasting half a day, were facilitated by the facilitator. The facilitator took notes during the workshops to enable data analysis. Data were analysed using thematic analysis.

Table 1. Description of interviews and SSM workshops

	Interviews round 1	SSM workshop 1	SSM workshop 2	Interviews round 2	SSM workshop 3	Interviews round 3
Purpose	Practitioner to gain initial understanding into problematic situation	Participants to construct Rich Pictures	Practitioner to present SSM tools to engage debate for participants to take action	Participants to propose recommendations to bring about action	Participants to take action	Participants to propose recommendations to bring about action
Date	13-15 July 2010	22 September 2010	27 October 2010	27-28 October 2010	22 March 2011	22-24 March 2011
Total participants	12	8	11	11	15	14
Breakdown of participants	6 growers, 3 millers, 1 haulier, 1 industry representative, 1 grower-miller body	2 growers, 3 millers, 1 haulier, 2 industry representatives	8 growers, 3 millers	8 growers, 3 millers	7 growers, 4 millers, 4 industry representatives	6 growers, 4 millers, 4 industry representatives

The purpose of the first round of interviews – held on 13-15 July 2010 – was to gain insight into the context. This was the first meeting between the facilitator and participants, and it was therefore important to build rapport. Interview questions were focused on understanding the goals of the various stakeholders, assessing communication and trust levels, challenges, mechanisms to address difficult matters, stakeholders' contribution towards ensuring success, and how the system could be improved. An initial analysis of this data revealed that there were stakeholder concerns mainly focused around cane quality, cane supply, mill efficiency, and the division of proceeds.

The practitioner then next interacted with participants at the first SSM workshop, which was held on 22 September 2010 in the mill area. This, in essence, represented Stage 1 of the SSM process, which entails discovering more about the problematical situation. This workshop consisted of having the participants engage in constructing Rich Pictures. The purpose of the workshop served to enable stakeholders to provide their perspective into who they considered to be stakeholders, and what the issues or concerns of such stakeholders were.

This allowed the facilitator to gain further insight into the problematical context, and, most importantly, to gather data which could complement initial data gathered from the interviews. Participants were provided with an overview of Rich Pictures, and were encouraged to use minimal words, and to utilise cartoons or stickmen. Participants were provided with a flip chart and markers, and were asked to visually represent who they thought the different stakeholders were, and what their issues were. Examples of Rich Pictures were also provided.

Participants were then divided into two groups. The first group consisted of a grower, two mill representatives, and an industry representative. The second group comprised a grower, haulier, mill representative, and an industry representative. The practitioner then attempted to provide minimal interference – but where needed asked questions to stimulate the creativity of the participants or answered their questions. Approximately one hour was allocated, and participants then had to present their Rich Pictures. Participants had to summarise their pictures, explain what it all meant, why they drew what they did, as well as present the challenges that arose in drawing the pictures.

Participants were thereafter asked to engage in a Knowledge Café exercise. This entailed having a table host who would lead the discussions throughout, and essentially elicit issues from the two Rich Pictures – and note them on flip-chart paper. Groups were allocated approximately 15 minutes per Rich Picture, and were then requested (everyone apart from the table host) to move to another group. There were thus eventually two tables, with each group having an opportunity to look at the two Rich Pictures. When the Knowledge Café was concluded, the flip chart was placed on the walls and participants were then requested to vote for the issues that they felt warranted attention. It was pointed out that this would allow the facilitator to direct energy to the most deserving issues. The workshop concluded with the practitioner requesting the participants to evaluate the workshop. Evaluations of each workshop were done after each of them concluded – and focused on participants describing their experience and whether they were able to think differently about the real world. They were also requested to reflect on how the workshop could be improved, and they had to draw lessons and provide suggestions on how the various stakeholders could move forward.

The facilitator then engaged in intense data analysis, to enable progress towards the next stage in the SSM process. Data from the initial interviews, as well as data (Rich Pictures, flip charts summarising the issues from the Knowledge Café, evaluation forms) from the first SSM workshop, were carefully examined. This analysis essentially culminated in the construction of the SSM tools (CATWOEs, Root Definitions and Conceptual Models) – which corresponds to the second stage of SSM. These SSM tools would be presented to the stakeholders to debate about how these ideal models compare to the real world. The relevant systems were: 1) appreciation of the different stakeholders; 2) improving the sustainability of small-scale growers; 3) improving mill efficiency; 4) the consistent delivery of quality cane; 5) improving communication; 6) increasing cane supply; 7) better division of proceeds; and 8) improving working relationships.

The practitioner was then ready to approach participants to debate about how the real world differs from the ideal world – as represented in the SSM tools that were constructed. This represented the third stage of SSM. The aim of the second workshop – which was held on 27 October 2010 – was therefore to present the SSM tools to the stakeholders so that they could discuss them, but was also to stimulate their thoughts on which systems could be of interest to them in taking action to bring about change (this is characteristic of the fourth and final stage of SSM).

The workshop commenced with a brief presentation reviewing the purpose of the workshop, and preceding stakeholder engagements. Three mill representatives and eight growers participated. Participants were asked to vote for the issues that most deserved attention (based on the eight systems that were developed). Stakeholders were most keen to work on improving the delivery of quality cane. They then had an opportunity to engage the relevant systems that they had selected – by way of a group discussion facilitated by the facilitator. Using the SSM tools as an initial basis to generate ideas, the practitioner then facilitated discussions between the stakeholders who shared their perspectives on the way forward. The workshop concluded with stakeholders evaluating the workshop.

The facilitator also took the opportunity to engage stakeholders in a second round of one-on-one interviews during 27-28 October 2010 – held immediately after the second SSM workshop. The interviews aimed to explore respondents' views on working relationships between stakeholders, transparency, leadership, communication, competitiveness and issues pertaining to cane quality, cane supply, the payment system and mill efficiency. These topics in the semi-structured interview guide essentially corresponded to the relevant systems that were developed in Stage two of the SSM process. The interviews were also important in giving stakeholders an opportunity to discuss their thoughts on the issues on a one-on-one basis with the practitioner – and were therefore particularly valuable to those who were not comfortable with expressing themselves in the workshop.

The facilitator then engaged in data analysis – drawing on data from the second SSM workshop and the October 2010 interviews. This analysis enabled the practitioner to identify areas for potential change, and to understand which recommendations were desirable and culturally feasible. The facilitator was able to see that participants were keen on exploring the following actions to bring about improvement to the problematical situation: reducing the number of hauliers, investing in replanting, improving cane quality, and providing mentoring for small-scale and emergent growers.

A third and final SSM workshop was conducted on 22 March 2011. The purpose of the workshop was to give participants a final opportunity to take forward discussions from the previous workshops and to encourage discussion on how they could further improve the problematical situation. Participants again had an opportunity to evaluate the

workshop, upon conclusion.

A final round of interviews on 22-24 March 2011, was held immediately after the SSM workshop, and concluded the fieldwork in the study. Interview questions centred on obtaining suggestions from stakeholders in order to improve on the various issues that were identified – such as miller-grower conflict, haulier inefficiencies, the payment system, communication, cane quality, and cane supply.

The SSM workshops and interviews were essentially aimed at moving from problem identification to getting stakeholders to take action to address the multiple, overlapping issues facing them.

4. Results

4.1 Starting conditions

A timely start appeared to be critical in facilitating the SSM workshops well, as the late arrival of participants disrupted both the practitioner and participants. Low participation in the first SSM workshop was identified as a challenge by participants – who indicated that broader participation would have been valuable. The practitioner sensed that it was important for the participants to warm up to the facilitator, to each other, and to the idea of participating in the research. This was to be expected, as these stakeholders were ordinarily based at the mill or on a farm.

Participation by the same people appeared to be essential to maintain momentum in the SSM workshops. This could have facilitated compatibility amongst stakeholders. This was detected in the second and third SSM workshops – with the arrival of new participants. This may have also affected outcomes, as time was required for the facilitator to explain the process to the new participants.

The 'old' participants who remained throughout the process were familiar with the research process, whereas the new participants had to be informed and could also not track the flow of events through the SSM workshops. New participants who lacked this perspective were fed information by other participants – possibly resulting in their worldviews being influenced. The practitioner also became aware that some stakeholders, especially those involved in miller and grower committees, had a systemic perspective, which enabled them to make a better contribution than the others. The practitioner noted how two participants in one of the workshops could only raise concerns pertaining to their farms.

Pressing, momentary concerns, such as the weather, had to be carefully managed, as this could have negatively impacted on other important issues and crept into valuable time – but yet were important for the stakeholders. Initial discussions in one of the workshops focused on the lack of rain and how the drought was affecting farmers and the miller.

It was important to be familiar with the professional jargon of the sugar-industry context. The practitioner realised how valuable it was to have critically analysed data from the initial interviews – before meeting stakeholders in the SSM workshops. It was also necessary to simplify the technical terminology of SSM. The degree of information to share about SSM was an important call to make, as it was necessary to inform participants about the methodology, but also to ensure that they did not lose interest. Participants may have been surprised at the interactive nature of the workshops where they were required to be active – rather than passive participants.

The choice to have participants construct the Rich Pictures rather than have participants critique a Rich Picture constructed by the facilitator – could have also influenced outcomes. Needing to draw was a source of frustration for a few, while others even wanted a second chance to adapt the pictures after having viewed the Rich Picture of the other groups. It also appeared that certain participants were more concerned about their lack of artistic ability, and hence did not seem to meaningfully engage in discussions while drawing.

4.2 Time allocation

Managing the time proved to be a challenge, as participants had extremely busy schedules. The workshops could only be scheduled for half a day – thus placing pressure on the practitioner to make the most of the available time.

4.3 Grouping

As reflected in Table 1, the workshops were attended by diverse stakeholders. Group allocation was a difficult issue. Self-organisation and forced grouping each have their own benefits and costs. It was also critical to consider whether it was better to have homogeneous stakeholders in one group, or to have diversity. The latter was selected as the best approach, in order to allow for rich discussions to emerge from the sharing of multiple viewpoints.

In the first SSM workshop, it was observed that the haulier (the only representative haulier) appeared to be

uninvolved and could have possibly felt overwhelmed by the miller and grower stakeholders who were rather emphatic in raising their own concerns.

There was awareness amongst group members of a difference in perspective, which some were able to acknowledge, openly challenge and justify – whereas others could not and may have withdrawn. A participant in one group in the first SSM workshop openly reflected on whether government plays a role – to which another participant immediately indicated that he was of view that it did not. The member who asked the question then disagreed and argued that it did, as government was involved in matters concerning land affairs. This difference in opinion was then brushed aside.

Managing emotions and conflict were particularly challenging in the third SSM workshop. Debate ensued between a grower and mill manager (who had previously not attended the workshops) – as the grower believed that the mill headquarters had lost contact with grower needs and was merely concerned about its shareholders. Both individuals stuck to their viewpoints and argued for nearly 15 minutes. The practitioner initially tried to intervene, but eventually let the argument take its course. There was both value and danger in such furious and explicit display of diverse and conflicting perspectives.

4.4 Prompts

Participants had to be prompted in the first workshop, when it was observed that they experienced difficulty with the construction of the Rich Picture. The actions of the practitioner, in for example, suggesting a certain stakeholder group in order to stimulate the creativity of participants, may have influenced the outcomes of the exercise. The practitioner also had to refrain from interfering with what emerged on paper. For example, it appeared that one group had over emphasised actual processes in the sugar-cane supply chain, such as illustrating effluent from the mill – whereas the other group had less on paper, but at the same time was able to articulate well the issues that exist with stakeholders.

4.5 Influence of significant participants

Senior decision makers or leaders were not present in the first two workshops and this was acknowledged by participants. The third workshop was different in that both the grower and miller leadership took part – possibly due to encouragement from those who attended the first workshop. The emergence of these two significant individuals appeared to add value, but also seemed to hamper the other participants from speaking freely, as was observed in the previous workshops. The presence of the leadership could have resulted in participants being guarded about sharing their views. It was noted that participants seemed to steer clear of contentious issues and thus did not really delve into the 'soft' issues such as communication, stakeholder appreciation and working relationships – which were raised as concerns in the interviews. It was, however, mentioned by the leadership and other participants that it was critical for them to attend and to be exposed to the various issues.

4.6 Strategic initiatives behind the SSM scenes

While facilitating the third workshop, the practitioner became aware that the grower and mill leadership were involved in strategic initiatives, to which most of the participants and even the practitioner had not been privy to. The grower leadership actually approached the practitioner before the workshop to mention that high-level dealings were occurring and that certain sensitive matters should not be raised during the workshops.

Not all growers were part of the leadership and were thus perhaps unaware of such developments. Staff at the mill may also have not been informed about these high-level interactions. The leadership – in the interviews and third workshop – stated that it was not feasible for everyone to know about strategic matters, and that interviews should only be conducted with people who are in formal, local structures. The practitioner was left wondering whether the attempt to have the participants take action did not possibly interfere with these discreet dealings between miller and grower leadership, who may already have had plans in place to address some of the issues. This, however, made the practitioner understand why ordinary participants were reluctant to volunteer to take action.

4.7 Confronting the issues

The Knowledge Café exercise was valuable in concluding the first workshop, as it provided a mechanism to pull together the content of the Rich Pictures, and to leave participants with a clear idea of issues which they had identified. It was

reassuring to detect confirmation of the problems (as represented in the eight relevant systems that were constructed) in the second workshop – based on the discussions between participants.

Much of the time in the second workshop had to be dedicated to discussions about the issues, despite some participants acknowledging that the problems were not new to them. The practitioner pondered whether SSM is less effective when stakeholders are well aware of the deeply entrenched issues, but are unable to take the initiative to bring about improvement.

Participants were not able to openly discuss matters of significance. Mention was made of the difficulty with freedom of expression in a diverse group, given the fear of damaging relationships. Participants indicated that not all ideas were captured and that some issues – that may have come to light with more time or a wider spread of participants – may not have been highlighted. The last round of interviews and evaluation forms highlighted that participants agreed about the issues which were identified, but it was clear that they were unable to fully engage with the findings, possibly due to issues around power.

4.8   Implementation and ownership

A significant problem arose during the second and third workshops when the facilitator suggested that proposals for intervention be taken forward, after stakeholders had easily identified actions. It was challenging to get participants to agree on who would take responsibility for doing this. Participants were reluctant to volunteer and often seemed to defer responsibility to the practitioner. The question as to how the practitioner could do this for the participants, was often raised.

A lack of time and resources (financial and human capital) to take forward the suggestions was noted. Some argued that even though there was agreement about the findings and about the need to address the concerns, further discussion was required to invoke a supportive environment for change. The complex nature of the sugar industry was also raised as an inhibitor to action, as it was pointed out that it was difficult to implement change in the industry. It was also highlighted that there had been some improvement and that there was continual change.

4.9   Value of SSM

Despite some initial difficulty in drawing, participants were quite impressed by the value of the Rich Picture exercise – which they described as interesting, thought provoking, and a mechanism for re-evaluating the problems. They appreciated that insight was gained into other stakeholders, and that they were literally able to look at the whole picture and not only at problems affecting one party. Participants acknowledged how important it was to understand how the actions of one group affected other stakeholders, and that stakeholders were operating in silos and acting according to their own agendas. It was also mentioned that the challenge was to identify links that could increase efficiency. The exercise created awareness for interdependence and skills to effectively handle complexity and multiple players.

The other two SSM workshops were focused on presenting the SSM tools to participants and having them debate and take action. Although stakeholders did not appear to directly engage the CATWOEs and conceptual models, these tools appeared to ignite initial discussions. These workshops were viewed as informative. The workshops were also practical and stakeholders enjoyed discussing issues that were plaguing the system. Participants described having had open, frank and good discussions, and being content that their input was acknowledged.

The value of being able to raise and discuss issues was noted, and that issues were reaffirmed. Participants expressed satisfaction with having had the opportunity to share their views, and hear other stakeholder's opinions on the problems. Stakeholders noted the need for better communication, trust and innovative thinking. Participants were able to experience and view the conflict, mistrust and (mis)perceptions that exist, and see the need for increased transparency – as well as effective and open communication about common issues.

5.   Discussion

It is useful to agree with Khisty (1995), in stating that readers may be critical about the time taken to conduct the study or the way in which it was conducted – but that it was important to bear in mind that each human situation is unique and needs a unique remedy. Another consideration is that the SSM interventions, as pointed out by Brocklesby (2007), did not actually occur in the natural setting – but rather through workshops designed to have people engage problems. Such interventions do not have the natural structural coupling, and conversations may not flow as they would normally do in the real world (Brocklesby, 2007).

Checkland and Poulter (2006) recommend that individuals involved in the context conduct the SSM cycle – but that it can also be facilitated by knowledgeable people. The practitioner – being an external party to the sugar industry – noted this point, and analysed the initial interviews to gain insight into the study context. Checkland (2000) cautioned that the 'soft' in SSM did not mean that the study had to be conducted carelessly. Kreher's (1994) research highlighted the need for abstract thinking and thorough analysis in SSM studies, in order to avoid hasty conclusions about defining the problem.

SSM studies are not concerned with repeatability criteria, but data in SSM research must be easily accessible and explicitly outlined in terms of thinking and activity, in order to serve as evidence to back up stated conclusions, and for outsiders to comprehend the process and outcomes (Salner, 1999; Checkland & Poulter, 2006). This can also be valuable to complement research involving hard systems approaches which may be done in conjunction. It was useful, as recommended by Checkland and Poulter (2006), to consider the unique aspects of the problem situation and to realise that these were not standard problems. It takes judgement and interpretation on the part of the practitioner to recognise a problem situation (Checkland, 2000).

As described by Reisman and Oral (2005), the role of the SSM user can be compared to that of a physician, who, before making a diagnosis to lead to a treatment plan, must identify the symptoms, gather history, analyse records, conduct an examination, and perhaps order tests. Such an approach, which is equivalent to gaining a systems view, is used to gain a description of the system (Reisman & Oral, 2005). It was challenging to describe events involving many people with their diverse worldviews, and, as noted by Khisty (1995), it was not possible for the practitioner to comprehensively do justice in describing their lived experience.

The practitioner led the participants to focus on a few issues that were identified through the process of data analysis. It takes judgement on the part of the practitioner to decide which concerns deserve most attention (Jackson, 2003). All experiences and accounts are observer-dependent, and it is important for scientists and others involved in knowledge production to take accountability for choices and actions (Brocklesby, 2007). Checkland and Poulter (2006) are emphatic in stating that the onus is on the user, and not on the methodology, to engage in thinking. The practitioner has to be aware of his or her thinking during the SSM process, and should avoid formula-driven thinking or the imposition of structure, in order to identify new insights (Checkland & Poulter, 2006).

Khisty (1995) highlights that it is impossible for problem solvers to remain entirely neutral. Bergvall-Kareborn, Mirijamdotter and Basden (2004) point to how modelling in system design is constrained by personal perspectives and cultural feasibility. It is also important to bear in mind that the aim is not to identify a permanent solution – due to the inherent complexity (Checkland & Poulter, 2006). This was attested to by participants, indicating that there had been some improvement since the practitioner first intervened.

During the debate stage, as recommended by Checkland and Poulter (2006), the practitioner ensured that the models were close by – for referral when needed. It was however found that participants experienced difficulty in connecting with the root definitions, CATWOEs and conceptual models. These SSM tools appeared to merely facilitate rich discussions (Brocklesby, 2007).

Kreher (1994) found a strong correlation between client readiness for SSM, and participation and commitment. The involvement of stakeholders in SSM is critical, and increases the chance of seeing implementation accomplished (Reisman & Oral, 2005). Participants in this study demonstrated interest, and were able to identify actions. The SSM process may not necessarily produce the most effective actions, however, and it is necessary to examine the effectiveness of the actions before actual implementation in the real world (Pala et al., 2003).

Kreher (1994) found that students who conducted SSM studies experienced difficulty in getting stakeholders to take ownership of the intervention process. Checkland and Winter (2006) – in reflecting on SSM studies – noted that actual action and implementation rarely occurred, and when it did, usually involved undisputed matters at the tactical level. This could explain why participants chose to discuss cane quality, cane supply and transport, and not matters around soft issues (working relationships, appreciation, communication). The lack of guidance in achieving genuine participation in the comparison stage between the ideal and real world, have been found to be problematic (Jackson, 2003). Pala et al. (2003) also note that this stage does not provide clear enough recommendations, and that validity issues are picked up at this time (Pala et al., 2003).

This study highlighted the role of high-level strategic initiatives, to which the practitioner and ordinary participants were not privy to. SSM conversations may not have been acceptable to certain participants (Brocklesby, 2007). It could be that attempts at bringing about change can interfere with possible plans that decision makers already have decided on. Participants may not gain new understandings from the SSM process, due to circumstances involved (Brocklesby, 2007).

It was found that the issues could not be deeply interrogated, and as Kreher (1994) notes, it may have been

difficult to address the fundamental root causes due to restrictions on time and other matters – which result in symptoms being treated quickly. This could explain why participants were able to easily list actions, but not to implement them. Stakeholders identified a lack of time and resources as a challenge, and also that it was difficult to bring about change in the sugar industry. It is also important to realise that SSM challenges people's worldviews and taken-as-given assumptions, and that this process may cause discomfort (Checkland, 2000). Furthermore, Checkland (2000) asserts that what could be an issue for one person, could be considered normal for another.

Power dynamics, as found by Jackson (2003), were found to affect the SSM process. Those in power could have taken centre stage and ensured that other participants did not discuss sensitive matters. Molineux and Haslett (2007) argue for participants to feel safe in SSM workshops – but this could be challenging when stakeholders discuss significant matters that could lead to conflict. Jackson (2003) states that Checkland may not have given adequate consideration to the construct of power, especially if one acknowledges that the world is characterised by power differences and that power is a natural part of social settings. Kreher (1994) however argues that matters related to power and politics do not only arise in SSM – but in any method that addresses real situations.

The presence – but also lack of powerful stakeholders with decision-making abilities – played a significant role in this study. Jackson (2003) points to SSM being better suited to pluralist situations characterised by joint understanding about required actions, and not so much for situations where there is major conflict or coercion. The absence of powerful individuals resulted in stakeholders being able to discuss matters more freely, but when the individuals concerned appeared, the atmosphere became more guarded and discussions did not result in real change.

The nature of the conversations and those that are dominant at a given point will influence the way in which people provide an account of the world, and accompanying actions that are identified (Brocklesby, 2007). Cordoba and Farquharson (2008) note that SSM should be enhanced to show participants their current role and behaviour in power relations, but also to demonstrate how to act once they become aware of this. SSM is considered futile in bringing about meaningful change by those who acknowledge that the world is beset with disagreements, coercion and conflict of interests (Jackson, 2003).

Molineux and Haslett (2007) argue that SSM workshops – particularly when designing Rich Pictures – should be a pleasurable experience to participants and it is important to have a positive group mood. Participants described the benefit of identifying issues and jointly discussing them – but did have difficulty in drawing Rich Pictures, which, according to Molineux and Haslett (2007), can be expected as it may require skill. Molineux and Haslett (2007) emphasise that Rich Pictures can facilitate breaking paradigms. The practitioner was also able to gain a holistic view, as also found by Brenton (2007) – which is consistent with the systemic nature of SSM.

SSM – as a methodology – could have helped participants to better handle social complexity, which according to Levy (2000) should entail focusing on innovation and flexibility, rather than mechanistic structures to deal with complexity. Outcomes and action from strategic plans are less important than addressing concerns, connectivity, and power relations (Levy, 2000).

SSM is of a sense-making nature, in that the methodology allows participants to comprehend the complexity, but is also action-oriented due to resultant changes in perceptions, structural or process change which can occur (Checkland, 2000). This study did not lead to structural or process change, but it can be argued that participants were able to view the complexity and experience a change in perceptions, as they described being able to view the concerns of other stakeholders and the effect of their own actions on others. Brocklesby (2007), however, challenges the view that a change in worldview necessarily leads to dramatic and lasting changes. The argument of changing worldviews also comes under scrutiny – due to neglecting to acknowledge how challenging it is to achieve this without focusing on how organisational, political and economic structures actually influence worldviews (Jackson, 2003).

Participants may have walked away better equipped to deal with social complexity, as presented by the interconnections between stakeholders who are diverse, purposeful agents, and engaged in the pursuit of multiple objectives. Jackson (2003) however argues that SSM has been viewed negatively due to the lack of guidance in constructing complex adaptive systems. Participants may have also realised that the problems they were dealing with were not simple, but were instead viewed differently by each stakeholder and that it was not possible to develop a quick and easy solution. Brocklesby (2007) however raises the limitations of 'non-stickability' and the momentary nature of understandings that arise in interventions like SSM.

Learning in the SSM process can be about the area of application, the methodology, and the concepts employed in the methodology (Checkland, 2000). Figure 1 (below) was constructed based on the practitioner's experience of conducting SSM workshops, and outlines factors impacting on the facilitation of SSM.
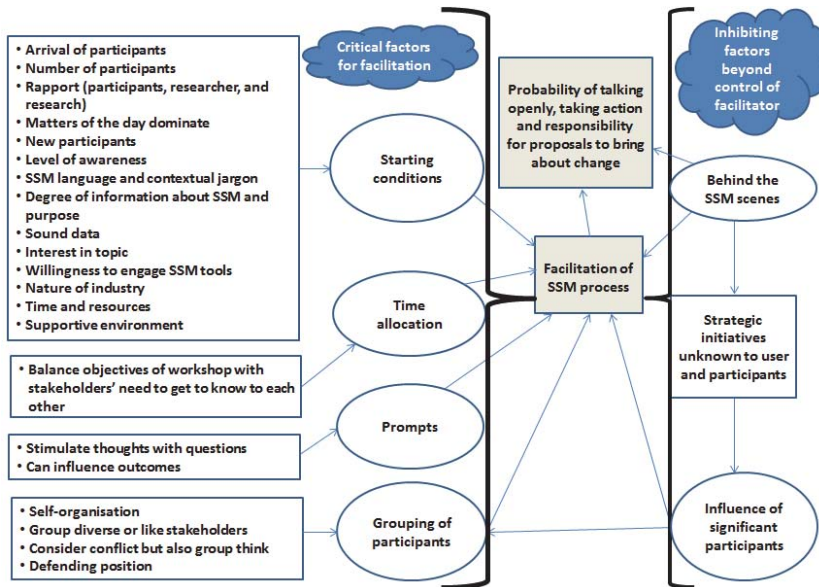
Figure 1. Factors impacting SSM facilitation

Critical factors for facilitation are categorised into four broad themes: starting conditions, time allocation, prompts, and grouping of participants.

The facilitator should consider the effect of the following starting conditions on the SSM process: the time of arrival of participants, how many participants are present, the facilitator and participants having to establish rapport and also with other participants and understanding the idea of the research, matters of the day dominating and possibly overshadowing the process, the arrival of new participants who did not attend former workshops, the level of awareness and exposure of participants, use of SSM language and awareness of the contextual jargon, the extent to which the facilitator goes into detail about SSM and the purpose of the research, the need for sound data to understand the context, the interest of participants in the topic, a willingness to engage the SSM tools, the nature of the industry and its ability for change, time and resources, and a supportive environment.

The facilitator – in allocating time for the various SSM exercises – should balance the need to maximise time with the stakeholders' need to get to know each other. The facilitator may consider introducing prompts if participants struggle to get started, but this could influence outcomes. The grouping of participants is a particularly important consideration; the facilitator can allow stakeholders to self-organise, or could decide to group diverse or like stakeholders, and should note that conflict and group-think could arise from these scenarios. The facilitator should be prepared for the possibility of stakeholders defending their position and how this will impact on other participants and the process.

The facilitator will have to consider that there may be inhibiting factors beyond his or her control, which will impact the SSM process. These could include strategic initiatives that are occurring behind the SSM scenes – that the practitioner and other participants are unaware of. This will most likely be led by significant participants, who, if attending the workshops, will certainly affect the facilitation of the SSM process, and will need to be considered when deciding on how best to group such individuals.

The factors that have been discussed will affect the facilitation process, and will not only impact on the extent to which participants can talk openly – but also on whether they can take action and responsibility for proposals to bring about change.

6. Conclusion

This research which was conducted in the sugar industry was aimed at investigating factors that influence the effectiveness of SSM. The methodology helped participants to identify and discuss issues, and to draw out the multiple perspectives that they hold. Stakeholders could not, however, openly discuss issues or take action to implement proposals to bring about change. The construct of power was found to be visible, as both the lack and presence of

significant stakeholders with decision-making abilities, were found to impact the SSM process. An interesting finding was that strategic initiatives that the practitioner and other participants were unaware of, were occurring in the background, and that the SSM process could have interfered with them.

Lessons learned from applying the methodology, included the critical need to draw on sound data from thorough analysis of interviews. Complementary data from interviews are especially necessary when there are constraints in the workshop setting – preventing stakeholders from freely expressing themselves. The debate stage may be the most challenging to facilitate due to the dynamics that may arise. If the culture is not conducive, then stakeholders may only choose to discuss safe topics, and will be limited in the extent to which they are able to implement identified actions. The politics and power dynamics of the problem situation are particularly relevant in influencing how the facilitator is able to surface and challenge worldviews, bring about learning, and determine what is feasible and desirable.

The interpretivist and constructivist nature of SSM places great responsibility on the practitioner to draw on various skills and to become immersed in a dynamic problem situation – and so to enable change. It is challenging to emphasise relationships rather than sheer goal seeking. Stepping into and leading conversations in conditions characterised by unpredictability, power struggles, and multiple perspectives, demand an array of skills. Such skills include, but are not limited to: judgement; interpretation; self-reflexivity; communication; listening; decision making; trustworthiness; upholding ethics; problem solving; analytical, critical thinking; leadership; project management; planning; organising; negotiation; conflict resolution; flexibility; and accountability. Practitioners need to be aware of the impact of significant stakeholders in enabling or inhibiting change. SSM users should take into account the skills required to facilitate learning and change, and to consider the factors that can impact the effectiveness of the methodology.

7. Acknowledgements

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