Assessment of Sustainability Maturity Models for Business Transformation

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Abstract:
Business organisations, given their size, influence, and global impact on finite planetary resources, are the key economic drivers contributing to unsustainable growth. Sustainability Maturity Models (SMMs) were developed as a tool to assist organisations to recognise and incorporate practices identified as pivotal to achieving business transformation. The Strategic Sustainable Development (SSD) approach was used to develop an analytical tool to assess the robustness of two of the aspects of SMMs, specifically structure and process. Interviews with model designers were also conducted. The research team identified key strengths limitations of SMMs.

The analysis revealed that SMMs have strength in starting the conversation with leadership and charting the way ahead for organizations by clearly defining the maturity level success criteria.

These findings confirm the significant potential of SMMs infused by supporting process tools, to be a strong foundation for organisations on their sustainability journeys, aiding overall transformation of businesses. This in turn has the potential to shift the role of businesses in the larger socio-ecological system from being contributors to the sustainability challenge, to becoming active providers of solutions.

Keywords:
Statement of Contribution

The working process within the team was very volatile. Learning not only to embrace but also to value the diversity of team members’ background was key cornerstone of this process over the past six months. Numerous conflicts and misunderstandings showed how challenging, yet important is developing leadership skills and personal capacities. The subject of the inquiry added irony to this process. Studying business transformation triggered deeper processes of personal and group transformation. The research team was assessing sustainability maturity models for organizations and with its group work stumbled upon similar challenges, that we discovered as the limitations of the application of SMMs in companies, specifically: lack of common vision of success, rushed analysis of team members’ current strengths and areas for improvement, diffused actions, and underestimating of importance of strategic prioritization. Yet, the purpose bigger than our individual selves, and inner desire to be of service to global sustainability movement, kept the team together.

Experimenting with different leadership tools, including but not limited to brainstorming, ideation, prototyping, systems thinking, human dynamics, deep listening, giving and receiving feedback, theory of change, conflict resolution and dialogue, allowed the team to fully embrace the complexity and urgency of the paradigm shift needed in all levels of our existence. Have we succeeded? The answer to this question cannot be limited to the binary yes or no. However, on each step of this process, all team members were forced to, and also inspired to, step up, learn how to shift from reactive responses and quick fixes on a symptoms level to inquire into responses that address systemic root issues. Overall, it was a truly collaborative and iterative process. All team members at various points of time were working on all parts of this research, building up on each other’s ideas, contributing with own talents to the final result and growing to respect and value the diversity in the team.

Inna Chilik
For the duration of the past six months, Inna has developed her facilitation skills, and stepped into the process of shifting her management skills into facilitation and collaboration. She learned to combine and synthesise different ideas and viewpoints, focusing on what unites us. Her honesty and vulnerability created opportunities to hold a collective dialogue. In addition to that her critical mind, affection to structure and data visualization skills were of great value when creating the content for this report and the final presentation.

Kim L. Edens
Kim has been passionate about connecting with people outside of BTH from the start. She has shown leadership and dedication to this aspect of the thesis and secured interviews with designers of all models, adding significant value to our research. Kim was instrumental in preparing, leading, executing and transcribing all interviews. It is only through Kim’s contribution that we ended up connecting with so many interviews from key designers who are SMM subject matter experts. She is an excellent editor and asset in proofreading, spelling, grammar and finalizing the text. Kim’s leadership as a skilled facilitator were instrumental in maintaining cooperative and authentic dialogue in advancing the team process.

Kurt Klusch
Kurt has done a bulk amount of reading about SMMs and related literature. In doing this he is able to connect a lot of dots and he has come up with several breakthroughs on how we can conduct our research. Kurt is very active and likes to be involved, he is great with structured facilitation, strategic thinking and actions that require attention to details. Kurt is also our
master-mind behind creation of the rigorous analysis and coding tool. Kurt contributed a lot of content to the major chapters of the thesis for the team to build on.

**Peter Ralph**

Pete has proven to be great in analysis and logical sequencing. He is always on point with and it’s easy to follow. Pete provided grounded reasoning and offered a balanced perspective to our team discussions. His writing is logical and easy to follow. Pete is a task-oriented person, with the capacity to hold the space for the team processes if needed. Pete always had the bigger scope in mind and focused on the implications of interviews, model analysis or graphs could mean in terms of the team workload.

Inna Chilik

Kim L. Edens

Kurt Klusch

Peter Ralph
Acknowledgements

“We don’t see things as they are, we see them as we are.” -Anaïs Nin

We are especially thankful to our primary advisor, Edith Callaghan for supporting us virtually from Canada and then in person at BTH, and our secondary advisor, Patricia Lagun Mesquita for their time, energy, keen insights and deliberations, and for guiding us through this process with humour and positivity.

We feel fortunate to have interviewed a soaring group of top sustainability professionals, who have been instrumental in researching, creating tools and successfully advocating sustainability in a time when the world needs it most. We would like to formally acknowledge and thank each person for their time and willingness to answer our questions. Listed in order of the scheduled interviews:

Daniela Pigosso (EcoDesign/Copenhagen, Denmark), Bob Willard (Sustainability Advantage/Canada) Professor Denis Loveridge (Business Sustainability Model/Manchester, England, UK) and Cristiano Cagnin (Business Sustainability Model/Sala, Brazil), Katrin Muff (Business Sustainability Typology/Lausanne, Switzerland), Dr. Rupert Baumgartner (CSS model/Graz, Austria), Dr. Stephanie Bertels (The Embedding Project/Burnaby, BC, Canada), Richard Crespin (CollaborateUp/Boston, USA), Gareth Kane (Terra Infirma/Newcastle upon Tyne, England, UK), Scott Johnson (FairRidge/San Francisco, USA) and Dr. Geoff Kendall (Future Fit / London, UK).

We send a giant parachute of respect, appreciation and love to MSLS 2019 staff members: Merlina Missimer, Elaine Daly, Pierre Johnson, Yannick Wassmer, Dana Gierke, Jayne Bryant, James Ayers, Rebecca Laycock, and César Levy Franca. Thank you for making our MSLS journey so extraordinarily rich in learning and memorable with special thanks to the founders Göran Broman and Karl-Henrik Robért, also in his role as supervisor.

We thank Anna Bookman and the library staff for giving us guidance on our academic literature searches and for letting us dominate our ground floor ‘office’, the ‘round room’.

We would also like to thank our MSLS 2018-2019 classmates for their help, guidance and support in all aspects of the thesis journey, both content and process. And finally, saving the best for last, we would like to thank our families, friends, flatmates and partners for being patient, loving and supportive throughout this entire process.
Executive Summary

Introduction
Since the Industrial Revolution, human influence has dramatically impacted the environment, thereby creating a new era called the Anthropocene (Lewis and Maslin 2015). This shift marks a fundamental change in the relationship between humanity and the Earth system. The world is facing a growing number of complex and interconnected challenges, like natural - or human-made environmental disasters, biodiversity loss, involuntary migration and interstate conflict (World Economic Forum 2018).

The current economic system, based on a “take-make-waste model” (Ellen MacArthur Foundation 2019) is a key contributor to unsustainability (Raworth 2017). It has evolved to treat financial returns and value creation as one and the same thing (Future-Fit 2019), viewing financial wealth generation as an end in itself, rather than a means to the end. Wealth and value creation should not be synonymous with a higher GDP, but instead with increasing trust in society, greater equity, healthier lives, and richer ecosystems (Future-Fit 2019).

The concept of sustainable business or corporate sustainability has hit the mainstream (SustainAbility 2014; MIT Sloan 2017; McKinsey 2017). Yet, there is no consensus on what sustainability means for businesses. Business transformation requires an ongoing iterative process where business models are continually evaluated, value creation is infused by systems thinking (Williams, Kennedy, Philipp, and Whiteman 2017) and sustainability is fully integrated into business strategies and practices (Bertels and Schulschenk 2015).

Numerous tools and frameworks exist to support companies on their sustainability journey (Correia et al. 2017; Bochert, Schneider and Wefels 2016; Adams et al. 2015; Pigossio, Rozenfeld and McAlonee 2013; Hynds et al. 2014). Sustainability Maturity Models (SMMs) provide a structure, represented by sequential levels, and process to transition businesses towards sustainability. The research team is particularly interested in SMMs that support company-wide transformation that apply to the whole organisation. Our primary research question is: to what extent are sustainability maturity models designed to support organisations to move strategically towards sustainability?

Conceptual Frameworks
The research team chose to use the Strategic Sustainable Development (SSD) approach as the conceptual lens within this paper (Robert 2000; Broman and Robert, 2017). This approach fulfilled the requirements of being systematic, scientific and robust enough to analyse and evaluate SMMs. Even though SSD consists of different elements like the funnel metaphor, a backcasting planning approach, a principled definition of sustainability, two key elements were used for the assessment: the operational planning procedure (ABCD) and the Framework for Strategic Sustainable Development (FSSD).

The ABCD mindset served as a lens to support and inform the research by providing the key process steps a SMM should have as a planning tool. However, the ABCD is not designed to be an analytical tool when used on its own, therefore the rigorous Framework for Strategic Sustainable Development (FSSD) is used to assist the ABCD mindset. The methodological process used by combining the ABCD mindset and FSSD, resulted in the creation of an analytical tool for the purpose of this research and is explained in full detail in the Methods Section of this paper.
Methods
Considering that the focus of this research is examining theoretical constructs (SMMs), rather than more concrete phenomena or outcomes (e.g. volume of emissions or profitability), qualitative research (Maxwell 2013) was selected for this study as a critical way to design and conduct the research. In order to achieve the thesis aim and to answer the research question, the process was split into three phases:

Phase 1: Analytical tool development. The authors developed an analytical tool to analyse SMMs. It represents merging the ABCD mindset and FSSD to generate a holistic, yet detailed understanding of SMMs composition. By defining criteria, it was possible to evaluate whether a SMM fulfils the process and structural requirements to be strategic, which in return helped to answer the RQ. The analytical tool consists of five FSSD levels broken down into 14 key criteria that were further broken down into 70 sub-criteria or codes.

Phase 2: The data collection phase included a literature search based on clearly defined search terms and inclusion criteria. Several exploratory interviews with practitioners were conducted to build on observations made during the literature search. Interviews with designers of SMMs were seen as a way to strengthen the research and also to gain in-depth knowledge about the background and conditions for creating the models, to understand the specifics, details, and application conditions.

Phase 3: Data Analysis included coding and data visualisation. All 70 sub-criteria had guiding statements to promote internal consistency. Supporting literature was then reviewed with relevant information added to the coding table. A high-level coding exercise was completed for four models as a group to promote internal consistency. The final stage of the data analysis entailed a review of the model designer interview transcripts to fill any missing gaps from the criteria and sub-criteria of the analytical tool. A chart was created for each SMM to list alignments or misalignments for the 14 main criteria. The research team did not assess the relative importance of each code and therefore, did not assign weights to any of the key elements. The purpose of this interpretation of the results was simply to serve as an indicator for the research team to recognise patterns or trends rather than a method to produce concrete statistical figures.

Results and Discussion
The research team analysed six SSMs, including three academic models: (1) Business Sustainability Typology by Muff and Dyllick (BST); (2) Business Sustainability Maturity Model by Loveridge and Cagnin (BSMM); (3) Corporate Sustainability Strategies by Baumgartner and Ebner (CSS); two practitioner models: (4) Sustainability Management Maturity Model by Johnson (SM3); (5) The CollaborateUp Sustainability Maturity Model by Crespin (CUSMM); and one hybrid model: (6) The Embedding Project Framework by Bertels (EPF). A graphic summary of the analysed SMMs is presented below. These figures are based on the analytical tool developed for this research. The pie chart symbols represent the alignment/ misalignment with the various criteria within the analytical tool.
Summary of results for the six analysed SMMs.

The intent of this research was to contribute to the transformation of businesses, the economy and thus promote a faster transition towards a sustainable future for the wider socio-ecological system. Businesses are in need of a clear path forward towards sustainability. The scope of this research was to evaluate whether SMMs are designed to support organisations to move strategically towards sustainability.
Step A: Future Vision of Success
Self-benefit/business case: None of the models presents a compelling business argument for why a company should utilise a sustainability maturity model to transition towards sustainability in the first place, nor why they should aim to progress towards higher levels of maturity. The research team believes that this is a gap and has to be taken into consideration. Providing a self-benefit business case will assist with engaging businesses who are not yet engaged in the implementation of sustainability practices, significantly increasing the scope of impact on the economic system overall.

Sustainability Challenge: None of the SMMs analysed point out the sustainability challenge nor profile current trends such as the systematic decline of the natural resources or the decreasing potential to fulfil the needs of the steadily growing population. The research team believes that contextualising companies within the sustainability challenge will help to translate a sense of urgency and need to act.

Systems Perspective/ Thinking: Most SMMs (BST, CSS, BSMM, SM3 and EPF) support organisations to a great extent, in a practical manner, to understand the complexity and interconnections to other subsystems and the mutual implications of actions within these systems. The research team advocates that by adopting a systems perspective, reductionist thinking, unintended consequences and decision-making leading into path dependencies can be avoided. Acknowledging the interrelationships of organisations via a systems perspective also helps to promote collaboration among other organisations and sectors, which fosters business transformation.

Organisation as a system: SMMs examine the organisation itself as a system. The research team view this as a key aspect of being strategic as it helps to reduce compartmentalisation and siloed business units.

Sustainability Definition: It became apparent to the research team that there is no consensus between authors of different SMMs on what sustainability is and can lead to a misunderstanding of a common vision of success and trigger diffuse actions when businesses try to reach sustainability.

Organisational Aspects: The research team identified several organisational aspects, that are an important part of a business transformation, including leadership and proactive purpose. Leadership in support of sustainability transformation is imperative to successful application/implementation of SMMs. A proactive purpose is reflected in the notion that companies should not only be aiming to minimise and eliminate the negative impacts they may generate, but also proactively strive to contribute to the common good in society. All models capture this notion in the highest maturity level.

Backcasting is implicitly present in every SMM and represented through the highest maturity level, however, it is not based on principles, rather on criteria defined on each level using the model's sustainability definition.

Step B: Current Reality
Most SMMs do not provide a baseline assessment of the company’s current state, other than the maturity grid itself, which could be viewed as a high-level assessment. The statements describing each the levels of maturity across the various dimensions are high level and do not provide adequate support.
**Step C: Organisational Initiatives**

SMMs are designed to be used by organisations from various industries, geographies etc. The context of the conditions the organisations operate in is crucial to identify specific sustainability-related actions, thus most of the analysed SMMs do not have exact actions listed to reach higher maturity levels. However, according to the researchers, it is of vital importance to provide guidance to organisations on ways to generate such actions.

**Step D: Strategic Prioritisation**

Strategic guidelines for the prioritisation process are an important part of the business transformation journey. The research team discovered that most SMMs were not designed to provide specifics on how to operationalise or prioritise actions, and lack coherent strategic guidelines, which is considered a weakness or limitation of SMMs. Such guidelines should not only account for financial feasibility and return on investment but should also consider externalities by including social or ecological aspects in the decision-making process.

**Tools**

SMMs overall do not have specific tools available to support different steps of the implementation process (tools supporting ABCD process). The research team asserts that tools are needed to operationalise sustainability initiatives and thus in order for SMMs to support organisations to move strategically towards sustainability, this limitation should be addressed.

Additional insights in relation to the implementation of SMMs were recognised by the research team related to motivations, change management, human component, speed of transformation, application, and paywall. Considering the high speed of socio-ecological degradation, it is important to think about these aspects and focus on acceleration mechanisms.

**Conclusion**

Based on the analysis, the research team found that in order for SMMs to become effective tools for business transformation they have to confront some of their limitations, including a clear justification and self-benefit of why to transition towards sustainability, and a common understanding of the definition of sustainability. Addressing both can trigger collaboration and synergy between businesses and sector-wide transformation. Additionally, SMMs are good at describing what needs to be done, however, they are not at the level of detail that describes how to progress to higher levels of maturity. This is particularly present when determining the current reality of a business and when making decisions on how to prioritise between competing actions.

It was also apparent in the research that tools to support each step are not suggested in the models. A robust change management approach is a pivotal factor needed to support SMMs success. Finally, it needs to be acknowledged that, like all models and frameworks, SMMs are a starting point in the business transformation process. Indeed, they can provide valuable guidance, however, require skilled and committed leaders to put them into practice in order to transform businesses and make a meaningful contribution towards overcoming the sustainability challenge.
Glossary

**ABCD Planning Process**: A four-step strategic planning process nested within the Framework for Strategic Sustainable Development. It is used to create a vision bound by the Sustainability Principles and develop a strategic action plan for how to achieve this vision (Broman and Robèrt 2017).

**B-Corps**: A a corporation that is certified by B Lab to meet specific standards for social and environmental performance.

**Backcasting**: An SSD planning method wherein actions are created from the perspective of an envisioned future (Broman and Robèrt 2017).

**Benefit Corporation**: A type of for-profit corporate entity that includes positive impact on society, workers, the community and the environment in addition to profit.

**Brundtland Sustainability Definition**: The Brundtland commission provided a philosophical definition: “To meet the needs of the present without compromising the ability of future generations to meet their own needs” (Robèrt et al. 2002).

**Business Transformation**: An organisation is changing its processes, systems or business model across a business to achieve measurable improvements in efficiency, effectiveness and stakeholder satisfaction (Müller and Pfleger 2014).

**Complex Systems**: A system that is constituted of a relatively large number of parts that interact in complex ways to produce behaviour that is sometimes counterintuitive and unpredictable (Robèrt et al. 2018).

**Dimensions**: A category within a maturity model covering different areas or aspects of scope (e.g. organisational dimensions, departments etc.) (Dyllick and Muff 2014).

**Community Capitals**: Any type of resource or asset capable of producing additional resources within communities; the resources in a community that have the potential to be invested, saved, or used (Jacobs 2011).

**Five Capitals**: natural, human/intellectual, manufactured, social and financial capital (Cagnin, Loveridge, and Butler 2005).

**Five Level Model (5 LM)**: Conceptual mental model developed to assist planning in complex systems by structuring information into five different levels: ‘system level’, ‘success level’ ‘strategic guidelines level’, ‘actions level’ and ‘tools level’(Broman and Robèrt 2017).

**Framework for Strategic Sustainable Development (FSSD)**: The application of 5 LM for planning in complex systems to a planning endeavour with sustainability as a desired outcome

**GRIPS**: An acronym that stands for: Get started, Reframe, Ideate, Prototype, Share; Consulting group SDGXCHANGE provides organisations with GRIPS, a five step process guidance and support on how to change from an inside-out to an outside-in perspective (SDGX).
Inside-Out: An organizational perspective, that is demonstrating where the business is contributing to the improvement of a sustainability issue (Dyllick and Muff 2015).

Maturity Grid: The tabulated format of maturity model, typically consisting of the different levels of maturity on one axis and the different organisational dimensions on the other axis with a descriptive statement for each possible combination of maturity and dimension.

Nested Systems: Systems which are subsystems of the socio-ecological system (e.g. organizations are subsystems of the economy and nested within the system economy.

Outside-in perspective: An organisational perspective that is looking at the relationship of business and the society from another angle, by asking the question how business can contribute effectively by solving global challenges, such change in perspective is a crucial step needed to move towards full-fledged true business sustainability (Dyllick and Muff 2015).

Planetary Boundaries Framework: A framework designed by Johan Rockström and Will Steffen that measures nine earth system boundaries that define the safe operating space for humanity in regards to the planets biophysical subsystems and processes (Steffen et al. 2015).

Private Sector: The private sector is the part of the economy, which is run by private individuals or groups, usually as a means of enterprise for profit, and is not controlled by the State.

SDGxCHANGE: A consulting group focused on implementing the sustainable development goals in organisations with GRIPS, a five-step process guidance and support on how to change from an inside-out to an outside-in perspective (SDG).

Strategic Sustainable Development: Strategic Sustainable Development (SSD) is a conceptual framework to support the strategic transition from the current globally unsustainable society towards a sustainable future. The SSD approach is grounded in scientific laws, is interdisciplinary in nature and is based on systems thinking (Robèrt 2000; Broman and Robèrt, 2017).

Sustainability Challenge: The systematic errors of societal design that are driving humanity's unsustainable effects on the socio-ecological system, the serious obstacles to fixing those errors, and the opportunities if those obstacles are overcome (Robèrt et al. 2018).

Sustainability Maturity Model: A sustainability maturity model supports companies in different phases of their transformation towards sustainability. It helps to review of the wide range of sustainability topics, using a structured approach, to define the internal agenda regarding these topics. SMMs help to create a roadmap for sustainability integration (moving to higher levels of maturity), increase the company’s sustainability performance and transform business practices along the sustainability journey.

Sustainability Journey: An organisation implementing actions which supports it to mature from being unsustainable to integrating sustainability aspects into its DNA (Willard 2012).

Sustainability Principles (SPs): Ecological and social Sustainability Principles, based on scientific laws and knowledge that define the boundary conditions for human society to support it to a transition to a sustainable future.
**Triple Bottom Line (TBL):** The triple bottom line is a framework or theory, coined by John Elkington, that recommends that companies commit to focus on social and environmental concerns just as they do on profits. The TBL posits that instead of one bottom line, there should be three: profit, people, and the planet. A TBL seeks to gauge a corporation's level of commitment to corporate social responsibility and its impact on the environment over time. (De Loura and Dickinson 2018).

**United Nations Global Compact:** A non-binding United Nations pact to encourage businesses worldwide to adopt sustainable and socially responsible policies, and to report on their implementation.
### List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>5 LM</td>
<td>Five Level Model</td>
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<tr>
<td>BTH</td>
<td>Blekinge Tekniska Högskola</td>
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<td>BREEAM</td>
<td>Building Research Establishment Environmental Assessment Method</td>
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<td>BST</td>
<td>Business Sustainability Typology - Mufi/Dyllick</td>
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<tr>
<td>BSMH</td>
<td>Business Sustainability Maturity Model - Loveridge/Cagnin</td>
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<td>CEO</td>
<td>Chief Executive Officer</td>
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<td>CF</td>
<td>Conceptual Framework</td>
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<td>CRR</td>
<td>Corporate Responsibility Research</td>
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<td>CSR</td>
<td>Corporate Social Responsibility</td>
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<td>CSS</td>
<td>Corporate Sustainability Strategies - Baumgartner/Ebner</td>
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<td>CSV</td>
<td>Creating Shared Value</td>
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<td>CUSMM</td>
<td>CollaborateUp Sustainability Maturity Model - Crespin</td>
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<td>EMAS</td>
<td>Eco-Management and Audit Scheme</td>
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<td>EPF</td>
<td>The Embedding Project Framework - Bartels</td>
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<td>FFBB</td>
<td>Future Fit Business Benchmark</td>
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<td>FSSD</td>
<td>Framework for Strategic Sustainable Development</td>
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<td>GBSN</td>
<td>Global Business Sustainability Network</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GDPR</td>
<td>General Data Protection Regulation</td>
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<td>GHG</td>
<td>Greenhouse Gas</td>
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<td>GRI</td>
<td>Global Reporting Initiative</td>
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<tr>
<td>GRIPS</td>
<td>Get Started, Reframe, Ideate, Prototype, Share</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>IR</td>
<td>Integrated Reporting</td>
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<td>IRF</td>
<td>Integrated Reporting Framework</td>
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<td>ISO</td>
<td>International organisation for Standardization</td>
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<td>IT</td>
<td>Information Technology</td>
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<tr>
<td>LCA</td>
<td>Life cycle assessment</td>
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<td>MSLS</td>
<td>Master of Strategic Leadership towards Sustainability</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organisation</td>
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<tr>
<td>PESTLE</td>
<td>Political Economic Social Technological Legal Ethical/Environmental</td>
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<td>PB</td>
<td>Planetary Boundaries</td>
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<td>PR</td>
<td>Public Relations</td>
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<tr>
<td>PREST</td>
<td>Policy Research in Engineering, Science and Technology Institute</td>
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<tr>
<td>ROI</td>
<td>Return on Investment</td>
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<td>RQ</td>
<td>Research Question</td>
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<td>SABS</td>
<td>Sustainability Accounting Standard Board</td>
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<td>SDGs</td>
<td>Sustainable Development Goals</td>
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<tr>
<td>SG</td>
<td>Strategic Guidelines</td>
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<tr>
<td>SIPOC</td>
<td>Supplier Input Process Output Customer</td>
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<td>SM3</td>
<td>Sustainability Management Maturity Model - Johnson</td>
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<td>SME</td>
<td>Small Medium Size Enterprise</td>
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<td>SMM</td>
<td>Sustainability Maturity Model</td>
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<td>SPs</td>
<td>Sustainability Principles</td>
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<td>SSD</td>
<td>Strategic Sustainable Development</td>
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<tr>
<td>SWOT</td>
<td>Strength Weaknesses Opportunities Threats</td>
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<tr>
<td>TBL</td>
<td>Triple Bottom Line</td>
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<tr>
<td>UN</td>
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1 Introduction

The goal of this thesis is to discover whether the design of Sustainability Maturity Models (SMMs) support organizations strategically on their transformation journey. This research focuses on the process and structural analysis of SMMs using the Strategic Sustainable Development (SSD) lens. The intention is to outline how SMMs contribute to SSD and how they can be supplemented to promote a faster transition towards a sustainable future. The findings will hopefully support sustainability practitioners, organizational decisions maker and designer and also add the broader discussion in the field of sustainability science and business transformation.

1.1 The Sustainability Challenge

Since the Industrial Revolution, human influence has dramatically impacted the environment, to a point where a new era has emerged, the Anthropocene (Lewis and Maslin 2015). This shift marks a fundamental change in the relationship between humanity and the Earth system. The world is facing a growing number of complex and interconnected challenges—from extreme weather events, natural disasters, biodiversity loss, ecosystem collapse, and water crises to human-made environmental disasters, the spread of infectious diseases, large scale involuntary migration and interstate conflicts (World Economic Forum 2018).

A call for action against climate change is gaining traction worldwide (WeAreStillIn 2019; Greenpeace 2019). Citizens are uniting and demanding that organisations are held accountable for irresponsible business practices such as industrial pollution and greenhouse gas (GHG) emissions (Harvey 2019). A hundred companies alone are responsible for an astonishing 71% of the carbon emissions produced since 1988 (Lukacs 2017). In 2018, 3M was sued for dumping millions of pounds of toxic chemicals over the last 40 years causing extensive groundwater pollution and public health problems (Bellon 2018). Bad business practices and harsh employee working conditions are being exposed warranting a paradigm shift in how business is conducted (Banker 2018; Sheffi 2018; Press Association 2017, China Labor Watch, Chamberlain 2018). Further, business corporations are being pressured by stakeholders to integrate corporate social responsibility (CSR), where business operations are aligned with practices that benefit society (Rocha-Lonaa et al. 2017). A paradox exists where the innovational progress that created the current environmental and societal deterioration can offer hope in finding the solutions needed (Rockström 2014).

1.2 The Economic System

The current economic system is a key contributor to unsustainability (Raworth 2017). It has evolved to treat financial returns and value creation as one and the same thing (Future-Fit 2019), viewing wealth generation as an end in itself, rather than a means to the end. Gross domestic product (GDP) became the predominant measurement of national welfare (Foreign Policy 2011) and with that mindset, one of the primary goals of the economy became to simply to grow its production and consumption.

Business-as-usual projections estimate that global economic output will grow by 3% per year from now until 2050, doubling the global economy in size by 2037 and almost tripling it by
2050 (PwC 2015). The question arises whether indefinite growth of production and consumption is possible on a finite world? The economy does not exist in isolation. It is nested within the socio-ecological system it is a part of (see Figure 1.1) an interaction of various economic agents.

The current economic system is based on a “take-make-waste model” (Ellen MacArthur Foundation 2019). This coupled with the growth of production and consumption makes growth in biophysical throughput (raw materials needed for the production and disposal of waste generated from the consumption) inevitable, undermining the capacity of Earth’s biosphere and lithosphere (ecological system) to regenerate. Indeed, each year Earth Overshoot Day measured by Global Footprint Network is getting earlier, marking the date when demand for ecological resources in a given year exceeds Earth’s capacity to regenerate. In 2018 it was 1st of August, stating that 1.7 'Earths' were needed to support humanity’s demand on Earth’s ecosystem (Grooten and Almond 2018). The current economic system also has severe social sustainability consequences. It is designed in such a way that it leads to extreme concentrations of wealth. The richest 1% of people in the world now own half of the world’s wealth (Shorrocks, Davis and Lluberas 2017). Furthermore, the current economic system largely considers growth as the solution to societal problems which perpetuates the problem (Raworth 2017).

Simon Kuznets (1934), the creator the GDP, warned of the metrics limitations and over application stating that “the welfare of a nation can scarcely be inferred from a measure of national income” and that it is quite possible for GDP to go in the opposite direction of welfare (Kohler and Chaves 2003, 336). Indeed, wealth and value creation should not be synonymous with a higher GDP, instead with increasing trust in society, greater equity, healthier lives, and richer ecosystems (Future-Fit 2019).

Decoupling of the economic growth from resource consumption is not new. Paul Hawken (1993) and Hawken, Lovins and Lovins (1999) suggested a transition to a “borrow-use-return” paradigm which embraces a radical increase in resource productivity and could lead to a dramatic reduction in humankind’s impact to the environment. The work of the Ellen
MacArthur Foundation has been exploring the potential of the circular economy as a solution that “provides multiple value creation mechanisms that are decoupled from the consumption of finite resources” (Ellen MacArthur Foundation 2015, 22). After all, should it not be the main objective of the economic system: how to tackle the current resource scarcity issue while ensuring value creation for society and the environment?

1.3 Business Value Creation

The private sector is often thought of as the driver of the economic engine. Within the current paradigm, it has a focus on creating shareholder value, often in the form of financial profits. This profit focused mentality is rooted in the neoclassical economics tradition exemplified by Milton Friedman and his view of the responsibility of the business “to make as much money as possible” (Friedman 1970, 1). Relentless focus on continuous growth, combined with the expansions of global markets and the support of innovation and technological progress, has led to the unprecedented scale of companies we see today. When comparing the revenue of corporations and governments across the globe, out of the top 100, 69 are corporations, while 31 are governments (Global Justice 2018). Marketing and political lobbying provides companies with incredible influence on public and civil society sectors. Business organisations have become some of the most powerful institutions globally. Given their size, economic power and influence, business organisations have the potential to have significant leverage power in the transition of our society towards sustainability (Willard 2012; Shrivastava and Hart 1995).

Porter and Kramer (2011) and Senge et al. (2008) highlight that businesses and their impact have increasingly been viewed as a major cause of problems in society, with the environment, and the economy. Therefore, there is great potential for sustainability gains if companies reinvent themselves as agents of social change by suspending externalizing their cost of ownership and instead creating ‘shared value’: pursuing financial success in a way that also yields societal benefits (Kramer and Pfitzer 2016). Treating societal challenges as business opportunities, Porter and Kramer suggest, is the most important new dimension of corporate strategy and the most powerful path to social progress (Porter and Kramer 2011). Furthermore, the shared value concept highlights the benefit of including social and environmental considerations in business strategies primarily to gain competitive advantage. Today’s companies operate in a complex world, impacting numerous interlinked systems. “A company embracing a CSV (creating shared value) approach might – in all good conscience – seek to solve one problem, only to create another” (Future-Fit 2019, 12). Value creation should be re-examined through a systems lens, creating a systems value as shown in Figure 1.2.
1.4 Sustainable Business

Most sustainability practitioners would agree that the concept of sustainable business or corporate sustainability has hit the mainstream (SustainAbility 2014; MIT Sloan 2017; McKinsey 2017). Yet, there is no consensus on what sustainability means for businesses and how it can be integrated. Does having incremental changes in the way businesses operate make a business sustainable? Where is the line between “cherry picking” the sustainable initiatives for competitive benefits and greenwashing? Do purely financial motives (cost reduction and profit generation practices) qualify as actions towards sustainability?

With the end goal in mind, it is easier to pinpoint some of the key attributes of sustainable business.1 As seen in Figure 1.2 above, an advanced understanding of sustainability requires companies to adopt a systems thinking lens, capable of appreciating the interconnectivity of economic, social and ecological issues (Williams et al. 2017).

Company strategy is the pinnacle of strategic planning within an organisation. A strategy states a business's focus and indicates the necessary steps the business will use to achieve it. However, sustainability practices are still often perceived as add-ons, rather than integrated into the business strategy (Bertels and Schulschenk 2015).

The overarching business strategy guides the business model and tactics (Wortel 2013). Osterwalder and Pigneur (2010) explain that business models describe the rationale of how an organisation creates, delivers, and captures value. They consist of four pillars and nine building blocks:

- Product: value proposition;
- Customer interface: customer segments, channels, relationship;
- Infrastructure management: essential resources, key activities and key partners;
- Financial aspects: revenue streams, cost structure.

---

1 This is not exhaustive list, rather it is an explorative inquiry in the topic.
The value creation aspect of business models makes them an essential element to drive significant progress towards sustainability (Porter and Kramer 2006; Schaltegger and Wagner 2017). Furthermore, Boons et al. (2012) believe that the concept of the sustainable business model can provide the link between the organisational level and the systems level.

The motivation for a sustainability change initiative can often be driven by external forces such as customers, investors, legislators, banks and insurance companies and, at times, the benefits may not appear to directly enhance value (Willard 2012). However, in many cases, it is driven by opportunistic motives and solely focus on financial gains (e.g. lower costs and improved brand image/ marketing). The issue with this approach is that the line between “greenwashing” and genuine change towards sustainability becomes obscure and hard to distinguish. In cases where the change is motivated internally, the consistency of sustainability efforts can lead to real impact in progressing companies towards sustainability. Company’s purpose becomes maximising stakeholder value, and “sustainability is seen as a goal in its own right rather than a set of enabling strategies” (Willard 2012, 28).

Independently, whether the case for change is driven intrinsically or extrinsically, it leads to business transformation. Adding social and ecological dimensions to economic objectives is a crucial success factor for a transformation towards sustainability. Sustainability business transformation requires an ongoing process and is not achieved by a single action. Organisational decision makers must have methodical means available to analyse the current state of an organisation (Müller and Pfleger 2014).

1.5 Tools to Support Business Transformation

There is a vast range of tools available to assist companies in their transition towards sustainability. Some focus on specific tasks such as reporting (GRI, IR), some function as metrics (LCAs or ecological footprinting), some are administrative vehicles (ISO14001, EMAS), some are certifications (B-Corps, Living Product, BREEAM) and some act as high-level aspirations (UN Sustainable Development Goals). Another tool to assist companies in their transition towards sustainability are sustainability maturity models (SMMs). SMMs can function as an overarching tool to guide the transition towards sustainability rather than focus on one specific aspect. Like all tools, SMMs need to be appropriately analysed and understood in order to be best applied and fully utilised to produce optimal outcomes. Sustainability maturity models and their potential for business transformation are of particular interest to the research team.

1.6 Sustainability Maturity Models

Maturity models were originally developed in the 1980s to address the poor performance of software projects delivered to the US Department of Defense (Sankaran, Rowe and Cady 2017) in order to help software providers improve their engineering processes from ad hoc to a more systematic state to deliver consistent outcomes. The design and application of a maturity model holds the assumption that the change and its evolution are predictable. Maturity models are theoretical concepts about how organisational capabilities evolve in a stage-by-stage manner along an anticipated, desired, or logical maturation path (Gottschalk 2009, Kazanjian and Drazin 1989).
Maturity is often assessed over various organisational aspects or dimensions of an organisation. Maturity models are often displayed in a tabulated format which will be referred to as the maturity grid in this research.

Several sustainability maturity models have been developed over the past three decades, with the purpose to support organisations to navigate the business transformation process (De Loura and Dickinson 2018). Within organisations SMMs have been utilised in various aspects such as sustainable supply chain management (Correia et al. 2017), sustainable knowledge management (Bochert, Schneider and Weßels 2016), innovation for sustainability (Adams et al. 2015) and sustainable product design (Pigosso, Rozenfeld and McAloune 2013; Hynds et al. 2014). Some SMMs focus on the whole organisation rather than one specific function within the company (Cagnin, Loveridge, and Butler 2005; Baumgartner and Ebner 2010; Bertels and Schulschenk 2015). As a research team, we are interested in company-wide transformation therefore the focus of this research is on SMMs that are applied to the whole organisation, not a specific function of an organisation.

The goal of an SMM is to support companies in review of the wide range of sustainability topics, using a structured approach, to define the internal agenda regarding these topics. They help to create a roadmap for sustainability integration (moving to higher levels of maturity), increase the company’s sustainability performance and transform business practices along the sustainability journey. In terms of the critical characteristics of SMMs, researchers define structure and process. Structure being the clear description of the specifics of each of the levels, in Figure 1.3 below it can be viewed as all horizontal steps. The process is represented in “the rise” (movement from one level to another).

![Figure 1.3. Maturity model steps and process.](Image)

1.7 Gap and Purpose

Sustainability management is becoming more widespread in the private sector however these activities are not reflected in studies monitoring the state of the planet (Dyllick and Muff 2015). Are SMMs helping to change this paradox? Do SMMs hold the potential to have a significant impact with regards to transforming businesses to reach sustainability or are they a tool with marginal benefits? Do SMMs alone move organisations towards sustainability? What else has to be considered, beyond the model itself? The research team considers that these questions are currently unanswered and may be resulting in the misuse or underutilisation of SMMs and therefore are worthy gaps in the field of research to address.

Therefore, the purpose of this research is to critically assess SMMs with regard to strategic sustainable development (SSD). In doing so we aim to provide insight into the potential value of SMMs. The analysis and critique of the models could also help the model designers to
improve their models. Ultimately this research aims to enable sustainability practitioners to be more informed with choosing tools supporting the evolution process of their companies towards sustainability and therefore resulting in better outcomes and a faster transition towards a sustainable future for the wider socio-ecological system.

1.8 Research Question

In order to help address this gap and fulfil the purpose of this research, the primary research question is:

*To what extent are sustainability maturity models designed to support organisations to move strategically towards sustainability?*

In order to answer the research question, the researchers will look closely into SMM’s structure – whether it has all relevant components to be strategic and the designed implementation process – whether and how the SMMs provide guidance for businesses on their sustainability journey. Finally, the research team will look into areas for improvement for SMMs to make them a robust support for organisations. The intended audience of this research is organisational decision makers, practitioners and academics who are working to progress the sustainability of the private sector along with the designers of SMMs.

It is beyond the scope of this thesis to investigate why certain SMMs are used more frequently than others and whether they really keep up their promise and move organisations indeed closer towards sustainability if applied. The intention is to look one step earlier into the composition of such models and evaluate whether they are designed to support companies to move strategically towards sustainable business practices.
2 Conceptual Framework

Organisations are complex systems, nested within and interconnected to other complex systems and sustainability is a complex challenge to tackle (Robért et al. 2002). Therefore, in order to answer the research question, we need a strategic and analytical approach that:
- Recognises the reality as complex, emergent and interdependent in nature;
- Can simplify a complex situation to facilitate a systematic analysis;
- Defines the full scope of social and ecological sustainability from a concrete, scientific perspective;
- Is generic and operationally applicable for any topic, project or organisation at any scale;
- Acknowledges the economy as a means to an end not an end in itself;
- Is designed to compare any method, concept or tool for sustainable development in relation to other methods, concepts or tools and utilises a principle-based, scientific definition of sustainability.

Many of the common conceptualisations of sustainability (e.g. Brundtland Sustainability Definition, Planetary Boundaries Framework, Triple Bottom Line, United Nations Global Compact) fall short of the specific requirements cited above. For example, the Planetary Boundaries Framework focuses in detail on ecological sustainability but lacks aspects of social sustainability and guidance for sustainable development, whereas the Brundtland Sustainability definition misses tangible, scientifically based metrics and steps (Goepel et al. 2015). The Triple Bottom Line approach is criticised by De Loura and Dickinson (2018) for being static and too broad. The Triple Bottom Line approach also lacks deeper and more complex requirements for organisations in the 21st century on their sustainability journey (De Loura and Dickinson 2018).

These different sustainability conceptualisation approaches have their strengths, weaknesses, and purpose for specific sustainability issues they are attempting to address (ecological or social). Furthermore, these constructs are narrow in their overall function and lack scientifically based metrics, thereby limiting their application for the research.

Therefore, with the above analytical requirements in mind, the research team decided to use the Strategic Sustainable Development (SSD) approach as the conceptual framework for the analysis and evaluation within this paper. The SSD approach is grounded in scientific laws and is based on systems thinking. It was developed in the early 1990s and is continuously updated by scientists and practitioners (Robért 2000; Broman and Robért, 2017). The development of the SSD approach is interdisciplinary in nature since methods and insights from different scientific disciplines and theories have been integrated (Broman and Robért 2017). The key elements of this approach are:
- Funnel metaphor;
- Backcasting approach;
- Principle-based definition of sustainability (eight sustainability principles);
- Operational planning procedure (ABCD);
- Five level framework (Framework for Strategic Sustainable Development (FSSD)).
2.1 Funnel Metaphor

The Funnel Metaphor, shown in Figure 2.1, is a depiction of the complex nature of the sustainability challenge society and the planet is facing. It is designed to create awareness about the need to eliminate society’s unsustainable and systemic errors (Broman and Robèrt 2017). The left side of the funnel represents the degradation of the socio-ecological systems due to unsustainable activities to sustain a growing civilization and the diminishing space for action to address the degradation (Robèrt et al. 2018). The right side represents society’s “sustainability journey”, the stabilization of the socio-ecological system, where the resources available, support the fulfilment of our civilization needs (Broman and Robèrt 2017). The challenge for humanity is to change the current unsustainable course towards a sustainable direction.

![Figure 2.1. Depiction of the Funnel Metaphor (adapted from Robèrt et al. 2018).](image)

2.2 Backcasting

It is essential to pick the right technique to enable a strategic planning process which supports the transition to a sustainable society. Forecasting is still the predominant method used to predict the future on past or current events or trends but bears the risk to lead to path dependencies (Robèrt 2000). It does not consider the complexity, interrelation and effects between the events/trends used to project the future and the future as a result itself (Broman and Robèrt 2017). Backcasting, however, starts the planning for success based on an envisioned future outcome (Robèrt et al. 2002), considering the gap to the current situation and taking actions to reach this vision (Robèrt et al. 2018). This technique is especially useful when the problem studied (e.g. sustainability challenge) is complex in nature affecting many levels within the society, a major change or paradigm shift is required, dominant trends are part of the problem or when the time horizon is long enough to allow considerable scope for deliberate choice (Drehborg 1996).

There are two types of backcasting methods; one is based on scenarios, the other based on principles. Robert et al. (2018) point out that a backcasting based on principles is the preferred approach to use when working on complex problems with diverse stakeholders. By agreeing on principles as boundary conditions for the vision of success, it is easier to reach consensus, to deal with uncertainty of the future and utilize technological progress and innovation to support the vision. Overall this approach offers more flexibility because the success of the vision can be achieved in multiple ways.
2.3 Definition of Sustainability

In order to actively and systematically contribute and support the elimination of unsustainable behaviour, how does one know what to do? To support governments, organisations or individual citizens to distinguish between actions that are unsustainable or sustainable, a clear definition of sustainability is needed. In order for this definition to be universal, its requirements have to be necessary, sufficient, general, concrete and non-overlapping (Broman and Robèrt 2017).

Utilising a scientific approach to determine the primary mechanisms causing systematic degradation of the socio-ecological system, upstream in the cause-effect chain, Broman and Robèrt (2017) followed the precautionary principle and defined eight principles serving as boundary condition to define sustainability and for creating a safe space for society, organisations or individuals to operate in. This scientifically grounded, principle-based definition of sustainability, framed by eight Sustainability Principles (SPs), establishes the necessary conditions for ecological and social systems to not be systematically degraded (Broman and Robèrt 2017). The current phrasing of the sustainability principles is shown in Table 2.1.

<table>
<thead>
<tr>
<th>Table 2.1. Current phrasing of the sustainability principles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In a sustainable society….</td>
</tr>
<tr>
<td>…..nature is not subject to systematically increasing….</td>
</tr>
<tr>
<td><strong>SP1</strong>…..concentrations of substances extracted from the Earth's crust.</td>
</tr>
<tr>
<td><strong>SP2</strong>…..concentrations of substances produced by society.</td>
</tr>
<tr>
<td><strong>SP3</strong>…..degradation by physical means.</td>
</tr>
<tr>
<td>….people are not subject to structural obstacles to….</td>
</tr>
<tr>
<td><strong>SP4</strong>…..health.</td>
</tr>
<tr>
<td><strong>SP5</strong>…..influence.</td>
</tr>
<tr>
<td><strong>SP6</strong>…..competence.</td>
</tr>
<tr>
<td><strong>SP7</strong>…..impartiality.</td>
</tr>
<tr>
<td><strong>SP8</strong>…..meaning-making.</td>
</tr>
</tbody>
</table>

2.4 ABCD Procedure

Once backcasting is introduced, sustainability is defined, the next step is to put this into an operational, hands-on, procedure that is flexible enough to be used by a variety of organisations. SSD comes with an application method for organisations for creative co-creation of strategic transitions, a process that supports planning and redesign for sustainability (Robèrt et al. 2018).

The ABCD procedure utilises a backcasting approach of a desired future or vision of success based on the SPs (Robèrt et al. 2018). Once this desirable future is defined, the path is then drawn to get there from the present moment. Step A is a shared mental model and vision of a success for an organisation within a sustainable society that complies with SPs. Step B is the baseline analysis of the current reality and mapping current activities through the lens of 8 SPs in order to identify alignments and misalignments, current challenges and strengths of any aspect of the organisation in that context. C and D steps are about bridging the gap between the desirable future and the current reality. Step C involves collecting or brainstorming possible actions to close the gap, and step D is focused on prioritisation of these actions into a strategic plan. Broman and Robèrt (2017) point out that this process is not an exclusive and rigid step by
step procedure, rather it is an iterative process or mindset, and one can move between the steps as necessary and that its open to be used with other tools and methodologies.

The ABCD is a strategic planning tool for sustainability. SMMs are also strategic planning tools for sustainability, therefore, the ABCD is an appropriate lens to analyse SMMs. The research team recognise the subtle difference between the ABCD process and the ABCD mindset. The ABCD process is required to be executed in an iterative way, which is outside of the scope of the research. Therefore it is the ABCD mindset that will be utilised as the analytical lens as this will support and inform the research by providing the key process steps a SMM should have, in order to support the transition towards business sustainability.

However, the ABCD is not designed to be an analytical tool and when used on its own, it will not provide sufficient insight into SMMs in order to answer the research question. Therefore the ABCD needs to be supported by a rigorous framework that is designed to provide a detailed analysis of any tool or concept.

2.5 Framework for Strategic Sustainable Development

In order to deepen the assessment of a SMM as a supporting tool for a strategic transition towards sustainability, the Framework for Strategic Sustainable Development is used to assist the ABCD mindset. The FSSD is an analytical tool, that guides strategic planning and redesign of any topic towards sustainability. The FSSD was developed as a strategic framework to help build a common language across disciplines around sustainability based on rigorous scientific research of the socio-ecological system (Broman and Robert 2017). The FSSD supports an understanding of how any concept or organisation behaves in relation to strategic sustainable development. It helps in identifying weaknesses and strengths from this perspective and it helps in developing support for strategic improvement by organising the way of thinking (Robert et al. 2018).

It is based upon a five-level model (5LM), which is a conceptual mental model, developed to assist planning in complex systems by structuring any type of information according to their function and characteristics, into different ‘levels’ (Robert et al. 2018). It outlines how the distinct five levels systems, success, strategic guidelines, actions and tools relate to one another. Appendix A details the FSSD in general and also tailored specifically to an organisational context.

Analysing SMMs through the lens of the FSSD levels will assist greatly when answering the research question. However, on its own, the FSSD lens will not provide the level of understanding the research team is seeking. Therefore, the research team decided to analyse SMMs through the transformative process lens of the ABCD mindset with the added rigour of the detailed, analytical lens of the FSSD. The methodological process, used to combine the ABCD mindset and FSSD to form one analytical tool for the purpose of this specific research, is explained in full detail in the Methods Section.
3 Research Methodology

3.1 Research Approach

Considering that the focus of this research is examining abstract concepts (SMMs), rather than more concrete phenomena or outcomes (volume of emissions, or profitability), conducting qualitative research was selected as the most appropriate way to design and conduct the research. Qualitative research is defined as social research that is aimed at investigating how people make sense of their ideas and experiences (Savin-Baden and Major 2010). It was imperative for the researchers, by using qualitative research methods to investigate the underlying effectiveness of SMMs, not only through literature research but also through interviews with model designers and sustainability practitioners. Maxwell’s Qualitative Research Design approach was chosen to support the analysis and to answer the research question. With this approach, any element of the design is open for adjustments in response to new insights gained while executing the research project (Maxwell 2013). Research design, exploration of practice and knowledge creation happen simultaneously and impact each other. As a research team, we valued this approach since it supported the flexible nature of research activities and the nonlinear and interdependent connections of its individual elements very much like in any complex system.

3.2 Research Design

This study has followed a multi-phase research design, illustrated in Figure 3.1 and explained in detail in the following sections.

![Figure 3.1. Research Design.](image)
3.2 Analytical Tool Development

This section will detail how the ABCD mindset and the FSSD were applied to SMMs and how the two concepts were integrated to form one comprehensive analytical tool for the purpose of this specific research.

3.2.1 ABCD Mindset Applied to SMM

By understanding the importance of the ABCD mindset and its key process steps as a planning tool to support the strategic transformation towards sustainability within organisations, the research team felt that these steps should be reflected and adjusted to a SMMs specific context. By defining benchmark criteria it was possible to judge whether a SMM fulfills the process requirements or yield any gaps, which in return will help to answer the RQ.

Figure 3.2 depicts the ABCD mindset applied to SMM. Step A, defines the success and represents the highest maturity level of a SMM, although criteria for interim levels of success are also reflected. The SPs should be incorporated within this step as guidelines for backcasting. The B step should provide guidance and methods to assess the current business practices of an organisation relative to the SPs. In the C step a SMM should help to create the actions/programs/initiatives to achieve progressive maturity levels and eventually the highest level. The D step should provide guidance on which actions/programs/initiatives should be taken, utilizing different prioritisation criteria, in order to achieve the intermediate levels and eventually the highest level of maturity. Each intermediate level within the SMM can be considered as partial success and a stepping stone in the right direction.

![Figure 3.2. ABCD mindset adapted to a SMM.](image-url)
3.2.2 FSSD Level Specific Criteria for a SMM

The FSSD was used to support the ABCD mindset and guide the structural analysis to create a nuanced understanding of SMMs. To fully utilise the analytical power of the FSSD, the essence of the various levels of the FSSD were assessed in great detail and how they would specifically apply to a SMM. Insights from the previous six months of study, supported by a review of the literature on SSD, mainly Robèrt et al. (2018, 2002), were added to each level. This process produced several criteria that were broken down into further detail as sub-criteria for each level of the FSSD that was specific to SMMs and served as the basis to analyse SMMs. This is summarised in Appendix B.

3.2.3 Merging the ABCD Mindset and FSSD

After applying the ABCD mindset and FSSD to the context of SMMs, the next stage was to merge the two to form one comprehensive tool to perform the analysis of SMMs. Analysing SMMs against both concepts individually would have produced several duplicates. The two concepts would have been compartmentalised and therefore it would not have provided the elegant analysis that produced a holistic, yet detailed understanding of SMMs. That was only achievable by combining the two concepts into one analysis.

To merge the ABCD mindset and FSSD we created the matrix shown in Figure 3.3. The team used the guiding lens of the ABCD mindset and mapped the detailed breakdown of the FSSD against it. The checkboxes indicate a first-degree relevance between ABCD and FSSD when applied to a SMM. The exclamation marks represent a second-degree of relevance and/or that the level was already adequately addressed in the previous step. Only sections that had a first degree of relevance were assessed. The research team notes that the degrees of relevance could be debated. Judgement was made by the research team after detailed discussions based on direct relevance to this specific research. Further research could be done into the finer nuances of mapping the two concepts against one another.

Merging the ABCD mindset and FSSD showed that there were several overlaps and that indeed the majority of the ABCD was captured within the FSSD. However, it highlighted two critical aspects that would have been missing if the FSSD was the only lens used for the analysis. One aspect was that performing a baseline analysis was not captured within the FSSD. The other critical aspect was that the importance of tools was not fully understood when only looking at the FSSD. Indeed tools are one of the five levels in the FSSD however, without contextualising the FSSD within the ABCD process, it is not obvious what type tools are needed.
The final analytical tool used to assess SMMs in order to answer the research question is presented in Appendix C. To meet the full extent of strategically supporting companies towards sustainability all criteria outlined in the research instrument must be present within the SMM. The process of analysing SMMs against this tool is explained in full detail in the data analysis section.

3.3 Data Collection

3.3.1 Literature Search

The research team carried out the following steps in order to identify relevant literature to answer the research question. This was a narrative literature review, although the process was based on a systematic literature review (Pickering and Byrne 2013). The process is also shown in Phase 2 of Figure 3.1.

Step 1: Identify search terms
Keywords for the literature search were identified as sustainability, organisations and maturity models. Multiple synonyms for each keyword was generated based on 30 articles that were found from a high-level preliminary literature search for SMMs. The keywords and their synonyms were constructed into search terms utilising boolean operators. However, these search terms with multiple synonyms returned thousands of hits, therefore, it was decided to remove the synonyms and have two search terms:

- sustainab* AND organi?ation* AND "maturity model*"
- sustainab* AND "maturity model*

Prominent sustainability consultancies (Accenture, SustainAbility, Forum for the Future) were added into the search terms for the search for practitioner models.
Step 2: Identify databases
Given the research topic is interdisciplinary, researchers used multiple academic literature databases. The databases used for the academic literature search were Summon, Scopus, Web of Science and Google Scholar. Google was used to search for maturity models created by practitioners. Researchers noticed, that screening for images in Google, provided relevant search results, therefore, this database was also used as a led to find practitioner models.

Step 3: Create inclusion and exclusion criteria
In order to keep within the scope of the research, the following inclusion and exclusion criteria were applied to all literature.
Inclusion criteria:
- The paper makes reference to organisational sustainability and a form of maturity model;
- The maturity model is focused on the whole organisation and not one specific part of the organisation such as sustainable supply chain or sustainable project management;
- The article was accessible through the University Library websites (see above);
- The model has specific levels (usually 1-5), dimensions (aspects of a company) and descriptions for each possible state shown in a detailed maturity grid.

Exclusion criteria:
- Sustainability is only referred to in relation to the finance or competitive advantage;
- The model is designed to only address environmental or social sustainability, not both;
- Limited access to documentation. This was mainly applicable to practitioner models due to intellectual property rights and consultancies no longer being in operation.
- The model is a top line description of different levels of maturity such as Willard’s Five Stage Sustainability Journey (Willard 2012) and does not include a detailed maturity grid.

Step 4: Literature search and review
The search terms were entered into the databases. All resulting literature from the academic databases was then assessed against the inclusion and exclusion criteria. Google Scholar, Google and Google Images returned thousands of hits. These hits were reviewed in the order they appeared. The search ceased after 20 hits in a row were deemed to be irrelevant to the research. All hits before this point were assessed against the inclusion and exclusion criteria. Decisions relating to inclusion and exclusion can be subjective therefore, this stage was done by multiple members of the research team and cross-referenced (Tranfield, Denyer and Smart 2003).

Step 5: Reference list review
Literature found in the reference list of any literature that progressed through stage 4 was also reviewed and assessed against the inclusion and exclusion criteria.

Step 6: Contact SMM designers
Analysing SMMs based solely on literature would not provide sufficient data for a detailed analysis of the model and would dramatically increase the likelihood of miss representation. Therefore if the designer of a model could not be contacted, that model was excluded from this research.

Literature that contained a SMM and met the inclusion and exclusion criteria was then selected for analysis as primary literature. The research team wanted as much information as possible
on each model, therefore, supporting literature for each model (e.g. case study that used the model in a real-world example) was also searched for. This was done via the same databases shown in step 2 using the literature title, model name and authors as keywords. Supporting literature was also identified during interviews with model designers. The final list of primary and supporting literature used for the analysis is shown in Appendix D.

3.3.2 Interviews

Despite conducting a thorough literature review to gain an understanding of the field in general, the research team acknowledge that regardless of how much reading is done, discussions with experts in the field will still add significant value. Similarly to gaining an understanding of the field in general, discussions with model designers were seen as a way to strengthen the research. Interviews were also a valuable method to add a human element to the research and is consistent with the qualitative approach to the research overall.

Semi-structured interviews were chosen as the most appropriate interview approach for both types of interviews. This approach allowed to collect deeper, richer data and support the research process by allowing real-time feedback between researcher and participant (Bryman 2012, chap. 20). Semi-structured interviews were also more appropriate vs structured, as the level of details needed to feed-in the data analysis varied from one SMM to another, however, a certain amount structure was still needed to ensure consistency and comparability of the data collected.

Step 1: Exploratory Interviews

As the researchers were reading through the initial literature, four exploratory interviews were conducted with practitioners in the field (designers of the SMMs, which were out of scope for this analysis). The main objective was to explore and build upon learnings obtained during the initial data collection phase, identify strengths and limitations of SMMs in general and get leads to other SMMs. At least two researchers were present for all of these interviews. Insights from exploratory interviews were not used to inform the analysis of models. A list of exploratory interviewees can be found in Appendix F.

Step 2: Designer Interviews

After reviewing the primary and supporting literature for each model, key aspects remained in need of clarification. Interview questions reflected these key missing aspects for each model and therefore were different for each model. The purpose of conducting interviews with model designers was also to gain in-depth knowledge about the background and conditions for creating the models, to understand the specifics, details, application conditions. These questions were more standardized across models. A sample list of interview questions is shown in Appendix E. Requests for supporting literature was also made during the interview. At least two researchers were present for all interviews. The list of interviews is shown Appendix G.

Due to the number of interviews and time constraints, all interviews with model designers were transcribed with the assistance of Temi, an online speech to text transcription tool. Temi was identified as an acceptable transcription service approved through the University data security department provided that the researchers complied with GDPR regulatory requirements along with transparent documentation procedures. Transcripts produced by Temi were not perfect, particularly when interviewees had a strong accent or spoke fast, therefore, all transcripts were manually checked and corrected to ensure quality control. Key questions and content shared during the interview were highlighted to assist the coding process.
Overall, the research team was confident that the triangulation of data collection from primary literature, supporting literature and interviews with model designers produced sufficient data to accurately represent each model and provide a robust analysis.

3.4 Data Analysis

3.4.1 Coding

The first stage of data analysis was to thoroughly read the primary literature and tease out any information that related to the criteria and sub-criteria from the custom-built analytical tool shown in Appendix C. When the analytical tool is applied to a model and populated with data from that model it is then referred to as a coding table. Coding tables included 14 criteria and 70 sub-criteria (see Appendix C). All 70 sub-criteria had guiding statements to promote internal consistency. Supporting literature was then reviewed to and relevant information placed in the coding table. Reviewing the supporting literature also helped to gain a broader understanding of the model. The high-level coding exercise was done for four models as a group to promote internal consistency. Review of literature and input into the coding table was done by one member of the research team for each model. This input was then checked by a second member.

The final stage of the data analysis was to review the model designer interview transcripts. This was to fill in any gaps that may have been missing in the analysis after reviewing the primary and supporting literature. The transcripts were coded according to the criteria and sub-criteria in the analytical tool. Statements made by the interviewee that were added to the coding table were checked by another member of the research team to validate the interpretation of the interviewee. These interviews also served as a way to gain valuable insights into the historical context, purpose, general background of the models and additional supporting information. After primary literature, supporting literature and interview transcripts were reviewed, if no information was found on a criteria or sub-criteria, it was then assumed that the model did not address that criteria.

3.4.2 Data Visualisation

After the coding table was complete, the research team had a dilemma on how to synthesise and present the results of the analysis. Each of the SMMs consisted of 14 criteria that were further broken down to and 70 sub-criteria based on the analytical tool developed for this research. The 70 sub-criteria codes were listed as alignments or misalignments for each model. To see a higher systems view and not being lost in details, the team has created a chart below, based on the inputs of the analytical tool, showing how many codes were used for each of the key elements.

This data visualisation structure was then used for the quantitative analysis of the results. Using the inputs of the coding table (analysis of the SMMs based on alignment and misalignment with the specific code), the percentage of alignment was generated first for each of the 14 criteria, then synthesised per specific box in Figure 3.4. The quantitative results were then visualised in a series of charts/ graphs (see Results Chapter) for each SMM.
The research team did not assess the relative importance of each code and therefore, did not assign weights to any of the key elements, nor codes. Calculations made for the qualitative analysis are based on an alignment/misalignment basis. In several instances, this binary decision was not clear and could have gone either way. Measures were taken to promote internal consistency during the data analysis, however, the analysis was still subjective. Therefore the purpose of this quantitative interpretation of the results was simply to serve as an indicator for the research team to recognize patterns or trends rather than a method to produce concrete statistical figures.

### 3.5 Ethical Considerations

There was no formal ethics board approval required for the research, due to the low risk of the research topic. For the interviews, there was an informed consent obtained by the research team from the interviewees to record the interview. Interviewees were treated with respect and honesty. The purpose of the research and use of interview data was shared to promote transparency. All efforts were made to protect the personal data of the individuals and the proprietary information which were part of this research according to General Data Protection Regulation (GDPR, European Union 2016). The interviews were recorded and stored on secured servers of BTH.
4 Results

The following section presents the findings as they relate to the research question “To what extent are sustainability maturity models designed to support organisations to move strategically towards sustainability?” For each model, an overview, outstanding features, a summary figure, followed by highlights of the analysis is presented and then finalised with additional insights from the interview with the designer(s).

Each SMM description is supplemented by a graphical representation of the analysis. These figures are based on the analytical tool developed for this research which was the research teams interpretation of merging the ABCD mindset and FSSD. The pie chart like symbols represents the alignment/misalignment with the various criteria within the analytical tool. As stated in the Methods Chapter above, the purpose of this interpretation of the results was to serve as an indicator to recognise and communicate patterns or trends.

4.1 Common Features Across all SMMs

The common features below are present in every model, unless otherwise noted. In the model specific summaries, only deviations from and additions to these statements will be mentioned.

4.1.1 Step A: Future Vision of Success

System
The sustainability challenge: Most SMMs do not directly refer to the decreasing potential of the fulfilment of human needs or systematic decline of ecological and social systems.

Success
A principled definition of sustainability: Every SMM has a definition of sustainability present, however, the definition of sustainability is not based on sustainability principles. The limited information in the models does not allow an analysis through the lens of the sustainability principles.

A principled vision of success: With the different levels of maturity every SMM defines the success, but it is not based on sustainability principles.

Strategic guidelines
Backcasting: Backcasting is implicitly present in every SMM and represented through the highest maturity level, however, it is not based on principles, rather on criteria defined on each level using the model's sustainability definition.

4.1.2 Step B: Current Reality

System
Assess Baseline organisational maturity level: Most SMMs do not provide a baseline assessment of the company’s current state, other than the maturity grid itself, which could be viewed as a high-level assessment.
4.1.3 Step C: Organisational Initiatives

*Actions*
Strategic Action Plan: SMMs are designed to be used by organisations from various industries, geographies etc. The context of the conditions the organisations operate in is crucial to identify specific sustainability-related actions, thus most of the analysed SMMs do not have specific actions listed to reach higher maturity levels. By specifying what the different levels of sustainability maturity look like, SMMs provides high-level guidance for actions, but they do not prescribe any concrete actions.

4.1.4 Step D: Strategic prioritisation

*Strategic Guidelines*
Strategic guidelines for prioritisation: SMMs overall do not have explicitly defined strategic guidelines to prioritise organisational initiatives. Intermediate levels of SMMs are stepping stones in the right direction towards the end goal, as they highlight what criteria have to be achieved, but not the actions themselves and the how to reach the next level.

*Tools*
SMMs overall do not have specific tools available to support different steps of the implementation process (tools supporting ABCD process).

4.2 Business Sustainability Typology (BST)

4.2.1 Model Overview

The Business Sustainability Typology Model is an academic model designed in 2014 by Professor Thomas Dyllick from the University St. Gallen and Dr. Katrin Muff from the Business School Lausanne (BSL).

The Business Sustainability Typology (BST) was created to provide clarity and an academic perspective to sustainability efforts of individual organisations towards global sustainable development and help to differentiate organisations who want to have truly sustainable impact vs. the ones who are involved in ‘greenwashing’. The model was tested within BSLs doctoral program on business organisations with 15 case studies. Several academic articles have - built on this model to help define or expand on business sustainability (Landrum 2017; Landrum 2018; Sambhanthan 2019).

The SMM has four levels: (1) Business as Usual - current economic paradigm, (2) Business Sustainability 1.0 - refined shareholder value; (3) Business Sustainability 2.0 - managing the triple bottom line and (4) Business Sustainability 3.0 or true business sustainability. “3.0 company is a more service-oriented company; a collaborative enterprise with more than one organisation involved to provide a complete service” (Muff 2019).

The authors claim that in order to change the organisational perspective, the organisation has to broaden its business concerns beyond economic goals and create value for the common good. “Inside-out means doing better in what companies are currently doing” (Muff 2019). Outside-in means extending the purpose and concerns of the organisation beyond their own four walls (Dyllick and Muff 2015). By extending the organisation’s purpose beyond their own four walls,
“the outside-in perspective added to the SMM recognises how a business ultimately contributes to solving societal issues” (Muff 2019). The author stated that in order to impact sustainability in an accelerated way, it is imperative that new companies aim for the top level, rather than incrementally work their way up. This process is facilitated based on the Sustainable Development Goals (SDGx), through their consultancy group SDGXCHANGE (Muff 2019).

### 4.2.2 Unique Features

The Business Sustainability Typology attempts to close the disconnect between global sustainable development and organisational sustainability initiatives by defining the conditions of how truly sustainable business practices look like. It considers the leadership style as a major enabler for a successful transformation and assesses the change readiness of an organisation. Additionally, the participatory, co-creative process model (SDGX) launched in 2017 supports organisations to jump directly to the highest maturity level.

### 4.2.3 Results Summary

![Diagram of ABCL model](image.png)

**Figure 4.1. Summary of the results for the BST.**

**Step A: Future Vision of Success**

**SYSTEM**
The sustainability challenge: The model states clear examples of current sustainability challenges/ issues caused by a growing population and the unsustainable behaviour of society.

Taking a broad systems perspective: The complexity of ecological or social challenges are acknowledged as well as the interconnection of the organisation to other systems (e.g. considers the complete value chain of the company’s products and services). The model does not mention any system specific properties (e.g. non-linearity between cause and effect, unknown negative impacts or unintended consequences, complex-adaptive properties of a system). In order to be
truly 'business sustainable,' the organisation should dedicate its resources and competencies at its disposal to contribute with its business practices and initiatives to global sustainable development.

Organisation as a system: Within the model, organisational culture includes leadership dimension, participatory decision making, and proactive and interactive collaboration. It clearly mentions the importance of integrating the purpose into the processes of the organisation. Core organisational processes (supply chain, customer, community, other key stakeholder relationships) fall within its scope. The model does not explicitly suggest the organisation to built up in-house intellectual and practitioners capacity, nor to embed through training, performance management, incentives/rewards and employee empowerment the sustainability transformation into its culture. Neither does the model account for organisational structures or hierarchies, division of power or the importance of network building amongst employees.

SUCCESS
A principled definition of sustainability: The model refers to the triple bottom line. It clearly states a long term perspective of the envisioned future by changing the way business is done today to a new way where economic growth and resource consumption are decoupled and markets aim for true value pricing and long term value creation.
A principled vision of success: At the highest BST maturity level success is defined that an organisation should create value for the common good and solve sustainability challenges.

Organisational Aspects: The model clearly champions open dialogue and collaboration between different internal and external organisational stakeholder and their inclusion in the decision-making process. The importance of clarity and communication about the economic and societal purpose of the organisation is evident in the model. It also considers the different types and capabilities of leaders as a key enablers for success. According to Muff, currently, leaders do not use their organisations as an engine for positive change in society. In order to change leaders and their awareness, it is essential to show them where their organisations are at and where they want to go (future vision). Once leaders are on a sustainability journey, it becomes a transformative one.

TOOLS
The model refers to tools like GRI, SABS (Sustainability Accounting Standard Board) or ISO 26000 to measure the overall progress on an organisation.

*Step B: Current Reality SYSTEM*
Assess/ Baseline organisations maturity level: An initial free business sustainability change readiness assessment is offered online referred to by the acronym, GRIPS (Get Started, Reframe, Ideate, Prototype, Share), and was developed and prototyped in 2017. However, to understand current business practices in more detail, there is no clear risk/opportunities analysis of external factors, no clear methods visible which assess the current end-to-end operations footprint. The utilisation of the GRIPS process is proprietary information and not freely accessible.

TOOLS
The model mentions Competing Values Framework (Cameron and Quinn 2011) to understand the companies culture in for change readiness towards sustainability.
Step C: organisational Initiatives

ACTIONS

Strategic Action Plan: Missing. “Models or typology frameworks are not predictive; many possibilities exist to get to an end goal and can vary widely across cultures and geographic regions” (Muff 2019).

Step D: Strategic Prioritisation

STRATEGIC GUIDELINES

Strategic guidelines for prioritisation: The model mentions the importance to give long terms aspects and short term aspects equal weight when making decisions.

4.2.4 Additional Insights from Interviews with Designers

Katrin Muff, one of the designers, shared in the interview that there is a state of urgency and considering the challenges we are facing, we are running out of time, (in regards to) moving companies from business as usual to 3.0 true business sustainability level, as this might take “five years or ten years going through all the steps” (Muff 2019). These were the convictions that led to creating the GRIPS sustainability integration process.

4.3 Business Sustainability Maturity Model

4.3.1 Model Overview

The Business Sustainability Maturity Model is an academic model designed by Cristiano Cagnin, Denis Loveridge and Jeff Butler, all from the Policy Research in Engineering, Science and Technology (PREST) Institute of the University of Manchester in the UK. The model was presented at a CRR conference in 2005.

The model was developed as a result of fieldwork with multiple companies done by Cagnin during his PhD thesis research. Loveridge was Cagnin’s advisor. At the time of development, the model designers viewed popular sustainability certifications more as marketing tools rather than tools that promoted genuine behaviour change that had a real impact in progressing companies towards sustainability. Therefore, the purpose of this model was to fill that gap by providing a tool that could change behaviour and have an impact across the whole innovation chain. Value was seen in maturity models as they are able to break down ambitious, long term goals by describing what steady advancement towards that goal can look like, incorporating key milestones along the way.

The SMM has five maturity levels: (1) Ad-hoc - driven by compliance with regulation; (2) Planned in Isolation with the main goal to gain overall operations efficiency; (3) Managed with no Integration - main objective is to enhance the firm’s image; (4) Excellence at Corporate level - customers as driver, target is on costs reduction; (5) High Performance Sustainability Net - sustainability-driven firm.

The model is designed to be used in any industry. The designers acknowledge that if the model is used correctly, it can take a significant amount of time. Therefore, the model will most likely be used by larger companies. Smaller companies might use the same notions of the maturity model but not implement it fully. Cagnin and Loveridge have not applied the model in any organisations and they are unaware of anyone else who has used the model in practice.
4.3.2 Unique Features

The definition of business sustainability used in the model goes beyond the triple bottom line, adding the five capitals (natural, human/intellectual, manufactured, social and financial) and incorporates three additional dimensions - spatial, institutional-political, cultural. The model acknowledges that companies are embedded in a global system which is conceptualised through the “sustainability net”.

4.3.3 Results Summary

![Diagram of Business Sustainability Maturity Model](image)

*Figure 4.2. Summary of the results for the BSMM.*

**Step A: Future Vision of Success**

**SYSTEM**

Taking a broad systems perspective: The model recognises that companies are embedded in a global system. This is communicated through the concept of the sustainability net, going beyond the concept of supply chain and value chain, incorporating all that connects a company to not only to suppliers, customers and stakeholders, but also nature and society. The sustainability net is based on complexity science and the notion of the circular economy (human-made products kept in tight technical loops and only returning back to the biosphere compostable material, all powered by renewable energy). However, the concept of nested systems is not fully translated via the sustainability net.

Organisation as a system: The model recognises that organisations are complex systems and addresses key components such as communication between people within the organisation, organisation structure, leadership and communication styles, and distribution of power. The model, however, does not explicitly mention the impact of the current business model.
SUCCESS
A principled definition of sustainability: It is stated that the triple bottom line does not translate the full responsibility of a firm and ability to transform the world in which we live, therefore, the definition of business sustainability goes beyond, incorporating three additional dimensions - spatial, institutional-political, cultural. Regarding ongoing business transformation, the author states that the "path to business sustainability is never-ending and is continuously evolving". (Cagnin et al. 2005, 13). Therefore suggesting that there is no definition of the actual state of sustainability rather that the definition of business sustainability is more so a description of the process itself.

A principled vision of success: The highest level of maturity in the SMM includes success across the whole sustainability net, going beyond the individual company and suggesting that the model is striving for global sustainability, not just sustainability of the company itself. The model recognises the importance of creating a shared vision to strive towards and recognises the importance of co-creating this vision and sharing it throughout the sustainability net, helping to create a shared sense of ownership. The model states that the shared vision should be rooted in universal principles, laws and principles ruled by nature (Covey 1997). The maturity grid largely captures the notion of all of the social SPs and makes consistent reference to fostering trust within the organisation and across the sustainability net. The maturity grid has little detail on concrete ecological requirements that need to be met in order to progress maturity.

Organisational aspects: The model clearly advocates for collaboration within the company and across the sustainability net. The highest maturity level has a strong focus on learning and it states that sustainability is the driver of the firm. Transparency and shared information is a foundation of the model. Leadership's commitment to sustainability is addressed at the highest maturity level and support to employees is given through competence building and motivation. Company processes are a key focus of the model.

Step B: Current Reality
SYSTEM
Assess/ Baseline organisations maturity level: Missing. During the interview, the designers shared that the organisation needs to do their own self-assessment (Cagnin and Loveridge 2019).

Step C: Organisational Initiatives
ACTIONS
Strategic Action Plan: Missing. The model provides guidance on what to do to progress towards sustainability. It does not tell the user exactly what to do, therefore, the impact of the model is entirely dependent on the users of the model (Loveridge 2019).

Step D: Strategic Prioritisation
STRATEGIC GUIDELINES
Strategic guidelines for prioritisation: The model does not give any strategic guidelines. This is by design and it was stated by the designers that decision making, and methods to support that, is the responsibility of the managers using the model. “It’s different for different companies as it’s different for different cities, depending on the maturity, on the way the city works and the ways people engage and get together. There’s not the one thing fits all; it has to be context dependent” (Cagnin and Loveridge 2019).

TOOLS
The designers stated that this is up to the users of the model to decide what tools to use. 

**4.3.4 Additional Insights from Interviews with Designers**

During the interview, designers mentioned that a model is often thought of as something that describes the world in a very particular and precise way. However, “a model is a representation of what a person or group of people think and therefore, as a result, represents their values and their biases” (Cagnin and Loveridge 2019), highlighting the importance of leaders mindset and their set of values.

**4.4 Corporate Sustainability Strategies: Sustainability Profiles and Maturity Levels (CSS)**

**4.4.1 Model Overview**

The article “Corporate Sustainability Strategies: Sustainability Profiles and Maturity Levels” that presents a SMM, an academic model designed by Rupert Baumgartner (Abo Akademi University, Finland and the University of Leoben, Austria) and Daniela Ebner (University of Leoben). The article was published in the Journal Sustainable Development in 2010, as part of a larger body of work to develop a framework for corporate sustainability management. According to the author, an organisation has to have a structured process to identify which sustainability topics are relevant and which are not. “Identifying what are relevant topics can be based on the internal motivation towards sustainability or it can be based on opportunistic consideration” (Baumgartner 2019).

The specific purpose of the paper was to describe different maturity levels across distinct aspects concerning economic, ecological and social dimensions of corporate sustainability and then relate them to specific sustainability strategies, in order to help companies to verify whether they are consistent in the implementation of a distinct sustainability strategy. The value of SMM is seen in its ability to provide a clear structure for companies to assess what they are doing in regards to sustainability and also support companies in identifying the way to become more sustainable.

The model has four levels of maturity: (1) Rudimentary - maybe beginning consideration of sustainability, only mandatory rules and laws are respected; (2) Elementary - goes slightly beyond compliance with sustainability-related laws; (3) Satisfying - consideration of sustainability often above the industry average; (4) Sophisticated - outstanding effort towards sustainability. The different sustainability strategies are: Introverted - risk mitigation; Extroverted - legitimization (conventional and transformational); Conservative - efficiency; Visionary - holistic (conventional and systemic).

The model was designed with input from case studies done with industrial manufacturing companies. However, Baumgartner stated that it is “applicable to more or less all sectors” (Baumgartner 2019). He is not aware of any companies directly implementing the work presented in this paper.
4.4.2 Unique Features

The model differentiates between the destination of sustainability and the progress towards that destination - sustainable development. It maps various sustainability strategies against the maturity grid.

4.4.3 Results Summary

![Diagram showing the relationship between CSS, System, Success, Strategic Guidelines, Actions, and Tools.]

Figure 4.3. Summary of the results for CSS.

**Step A: Future Vision of Success**

**SYSTEM**

Taking a broad systems perspective: The model connects macro-level sustainable development to micro-level corporate sustainability, identifying six external influences that affect a company’s orientation towards sustainability (legal, technological, market, societal, cultural, environmental) and states that corporate sustainability has positive effects on society in the long term. Although society and the environment are identified as factors that can affect the organisation, they are not referred to as systems.

Organisation as a system: The model does not explicitly mention a change in business model, however, the most sophisticated sustainability strategy requires an outside-in perspective, suggesting a change in business model at the highest maturity level.

**SUCCESS**

A principled definition of sustainability: When the model is discussing its underlying concept of corporate sustainability it provides an interesting insight into the difference between the state of sustainability and the process to get to that state. The model is focused on sustainable development and the TBL is the central sustainability concept used. Within the TBL, social is broken down into internal and external.
A principled vision of success: The most sophisticated sustainability strategy requires reaching global sustainability, not just sustainability of the individual company. The highest maturity level of the ecological dimensions states that long-term resource management strategy is aligned with the SPs. Although SPs are mentioned as requirements at the highest level of the model, they are not fully described and therefore, they are not adequately operationalised. The model does not explicitly mention the need for a company to have a vision.

Organisational aspects: The model includes key organisational requirements such as human capacity building, transparency within the organisation and across stakeholders, requirements of the leadership team, and a focus on core processes.

Step B: Current Reality
SYSTEM
Assess/ Baseline organisations maturity level: The model acknowledges that there are external factors that affect the company (legal, technological, market, societal, cultural and environmental) however it does not state how to assess these factors and how they can influence the company.

4.4.4 Additional Insights from Interviews with Designers

In the interview with the research team, Baumgartner (2019) shared that sustainability can be a very confusing topic. “Where should a company start and what should they do? SMMs provide structure to start making sense and break down the complexity of integrating sustainability". Most of SMMs, however, do not have the purpose of supporting prioritisation and implementation processes.

Another point discussed was way the scientific output is produced and the lack of integrating the existing knowledge. “One weakness is that many people develop a model, especially in recent years, without really carefully looking at what is already available” (Baumgartner 2019).

4.5 Sustainability Management Maturity Model (SM3)

4.5.1 Model Overview

Designed in 2008 by a team of former management consultants headed by Scott Johnson, the Sustainability Management Maturity Model (SM3) was used as a consultancy tool by the FairRidge Group, “a Bay Area sustainability consulting services firm that offers consulting and subscription solutions for business sustainability” (FairRidge group 2009).

Fairridge’s vision “Enhancing Business Performance through Sustainability Services” (Scott Johnson, email message from designer, April 30, 2019) is reflected in the economic character of the model. It’s aim was to help companies to be more strategic about their sustainability initiatives by adopting sustainable business practices in order to increase their competitive advantage. The design of the model was spurred by the idea to create a model which differentiates organisations from the many eco-initiatives used as greenwashing. FairRidge merged in 2010 with Global Business Sustainability Network (GBSN). The model was further developed and applied in over 30 business organisations within the network.
The SMM has five levels: (1) recognise: Company recognises the need to address sustainability, but is not currently doing anything; (2) Initiate: Company has a sustainability sponsor, has assessed industry trends, is building awareness and base-lined current operational footprint; (3) Pilot: Company has created a sustainability function, developed a sustainability strategy and is piloting some eco-efficiency initiatives; (4) operationalise: Company has engaged the business units who have integrated sustainability into their business strategy, processes and performance measurement to continuously improve it; (5) Transform: Company has fully embraced sustainability as a way of doing business, sustainability initiatives drive innovation that in turn drives the overall business strategy, the business model transforms into a zero impact market leader.

It was also piloted with SMEs, but the designers believe it is more adequate to be used for large companies since they have the organisational setup, power and budgets to make an impact. The designer confirmed that the highest maturity level (integrate sustainability into the organisations DNA) takes an outside-in perspective and requires a robust change management approach since the organisations operating/business model will transform.

4.5.2 Unique Features

The SM3 model has very robust management and application process with tools for each step to support an organisation on the sustainability journey. However, the tools and detailed documentation was not shared with the research team due to intellectual property restrictions.

4.5.3 Results Summary

![Diagram: Summary of the results for the SM3 model]

*Figure 4.4. Summary of the results for the SM3.*
A Step: Future Vision of Success

SYSTEM
The sustainability challenge: The business case related to sustainability focuses only on solely economic aspects (increase competitive advantage).

Taking a broad systems perspective: The SMM considers the connection to the broader system implicitly through mentioning global stewardship. The SM3 encourages cross functional and cross sectoral collaboration along the value chain with knowledge sharing and proper metrics established.

Organisation as a system: The model focuses on organisational structure and functional sustainability related roles and responsibilities.

SUCCESS
A principled definition of sustainability: The SM3 considers ecological and social aspects at a high level and assumes triple bottom line. There is no explicit reference of a sustainability definition and the maturity grid requirements only focus on ecological and neglect social aspect of sustainability. However Johnson (2019) stated that the approach was more about how to embed sustainability thinking into the business versus identifying the specific ecological or social programs.

A principled vision of success: The sustainability strategy dimension within the model drives corporate vision and transformative innovation, aspiring to have zero impact. The model’s proactive approach is built into the maturity highest level goals: "Aspires to have zero impact, even restorative" and "global stewardship" amongst the industry (Johnson 2019).

Organisational aspects: Common understanding and dialogue between different stakeholders as well as a shared sense of importance are reflected in the governance structure. A “Strategy” dimension within the model, addresses the importance of the vision. The model supports group creativity, dialogue and co-learning specifically via employee engagement, competency building and rewards and recognition programs. It promotes the creation of internal intellectual and practitioner capacities to support the sustainability transformation through dedicated organisational competency building.

However, there is no explicit mention in the model about a long-term perspective, core values and ambitious goals, nor mention a core purpose or the pursuit of societal services to satisfy human needs. Leadership commitment towards sustainability is covered under the "organisation" track, and is focused on gaining sponsorship and executing the strategy. The models fosters an organisational culture to support the sustainability journey through training, performance management, incentives/rewards and empowerment. Core organisational processes (supply chain, customer, community, other key stakeholder relationships) support the vision and are covered within different tracks of the SMM’s maturity grid. It does not indicate any change management model or method supporting the maturing process from one maturity level to the next.

TOOLS
Tools to support the overall system are Registries (Carbon Disclosure Project, The Climate Registry, GRI), Investment Ratings (S&P Carbon Efficient Index, Dow Jones Sustainability Index, FTSE4Good, NASDAQ Global Sustainability 50 Index), NGO Ratings and ICT Sector Ratings. Beyond these tools, the model does not reference any specific tools needed to support developing the future vision of success in its full scope.
Step B: Current Reality
SYSTEM
Assess/ Baseline organisations maturity level: SM3 created their own assessment set, where it benchmarks industry eco-programs, procurement and supply chain assurance, CSR, risk management and best practices. It also has a initial comprehensive assessment to evaluate where a corporation is at in their different areas of operation. The detailed analysis tools were not available to be assessed due to intellectual property restrictions and are part of their consulting services. SM3 has level specific assessments to check progress maturing from one level to the next one.

Step D: Strategic prioritisation
STRATEGIC GUIDELINES
Strategic guidelines for prioritisation: SM3 does prioritisation purely based on economic factors in order to get buy in from organisational sponsors to start their programs. Further guidance around prioritisation is provided directly by the consultants.

4.5.4 Additional Insights from Interviews with Designers

Johnson (2019) shared in hindsight that “decision makers with huge budgets are key, you have to talk to the right people, (e.g. logistics directors or VP of operations) in order to work sustainability into an organisation”. They had the experience of talking to the sustainability directors, that they would not get the budget allocation or attention needed.

Johnson (2019) mentioned the importance of continuous evaluation and improvement of the maturity model based on the experience and new learning.

During the interview, Johnson (2019) mentioned that there was a “plateau effect” with many companies stalled between level three and level four, very few were able to operationalise beyond. He emphasised that in order to operationalise the highest level, organisations need to have a different, if not radical change management approach, investment and commitment. The exception are companies where sustainability is part of their DNA, like Patagonia. In addition to that, not every company can get to level five because of the nature of their businesses. It is not realistic the companies not producing environmentally friendly products to shut down, so “all you could do is operationalise getting them into level four”.

Johnson also talked about the importance of building the transformation into the processes of the companies; embed sustainability in the structure and culture of an organisation. “You’ve got to ensure people understand the new ways of working, the strategies, etc; there’s a people element and there’s business transformation process”.

Companies should be more strategic in applying a framework for bridging the gap between current reality and the envisioned future. However, the reality is that most of the models are very academic, “business guys don’t want to get weighed down by this kind of discussion; that’s where we struggled to get traction”. Johnson stated that “Our theory was if you incorporated sustainable business practices internally if you drove it through, it was good for business; save money in your operations and companies. Current large companies will spend $100 million on projects to tune their supply chains because there is so much money in their supply chain”. Being operationally efficient has a huge environmental impact.
4.6 CollaborateUp Sustainability Maturity Model (CUSMM)

4.6.1 Model Overview

The CollaborateUp Sustainability Maturity Model is a practitioners model designed by the CEO of CollaborateUp, Richard Crespin, in 2013. The model is based on research that studied the barriers to greater sustainability in publicly traded companies, which helped to identify what is needed to advance corporate sustainability. This research was then used to create the CollaborateUp Sustainability Maturity model with additional input from qualitative research carried out with corporate sustainability officers of approximately 24 companies, most of which were US headquartered publicly traded companies.

The purpose of creating the model was to provide a tool and strategic planning framework to advance corporate sustainability that was more relevant to a company's specific context than popular existing sustainability tools such as ranking indices.

The model describes maturity along a spectrum more so than distinct levels. The spectrum progresses from: (1) Transparency - informing customers so they can make more informed choices, to; (2) Risk - doing less bad, to; (3) value - doing more good.

The model is designed to be used by any industry although the designer acknowledges that the model would ideally be tweaked when applied to service-based companies as opposed to product based companies. The model has been actively used in industry.

4.6.2 Unique Features

The model is based on society’s expectations of the company as a whole and also on the different units and functions within the company. It is these societal expectations which determine what level of maturity to aim towards and the model recognises that different functions or units may be striving for different maturity levels, which is perfectly acceptable.
4.6.3 Results Summary

**Figure 4.5. Summary of the results for CUSMM.**

**Step A: Future Vision of Success**

**SYSTEM**
Taking a broad systems perspective: The model inherently recognises that companies are nested within society as the target level of maturity is based on society's expectations, however, it does not state this explicitly nor give any further insights into the systems which the organisation relies on and how they interact. The highest level of the model includes community-wide integrated planning and collaboration between organisations on sustainability-related strategy and operations, suggesting it is taking a full value chain perspective.

Organisation as a system: The model recognises some key aspects of viewing the organisation as a system such as culture and structure however, it omits some such as communication within the organisation and purpose.

**SUCCESS**
A principled definition of sustainability: The model does not provide a definition of the core concept of sustainability. It is built on the notion that business sustainability is relative and that not all companies need to be striving towards the same level of sustainability.

A principled vision of success: The highest level requires community-wide integrated planning and collaboration across departments and organisations on sustainability-related strategy and operations, however, it does not elevate this to the level of reaching global sustainability. The model does not mention the importance of creating a shared vision explicitly, it can be implied that determining the level of maturity to aim for is based on society’s/ key stakeholders’ expectations is a vision. The model does not include specific requirements for ecological sustainability. Other than employee training, there is no mention of specific social sustainability requirements.
Organisational aspects: The model includes several key organisational aspects including continuous staff training, transparency, a focus on process and leadership is acknowledged as playing an essential part in the transition towards sustainability. “Leadership matters and where the model has struggled is when there is leadership turnover and support is retracted with new leadership” (Crespin 2019). Institutionalisation of sustainability into organisation’s business processes is a way to overcome the leadership change.

STRATEGIC GUIDELINES
Backcasting: The first step is to determine where the key stakeholders expect an organisation to be in regards to sustainability. This is essentially where the organisation backcast from.

TOOLS
The model is designed to be used with the CollaborateUp Formula (an add on consultancy service) for co-creating with internal and external stakeholders to determine society’s expectations and thus the level of maturity to aim for.

Step B: Current Reality SYSTEM
Assess/ Baseline organisations maturity level: CollaborateUp engages with companies through its consultancy services, to perform a baseline assessment to determine both where they are at and also where their key stakeholders expect them to be. This is done via workshops with key stakeholders, research on the industry and regulations and then discussed with the company. The author mentioned, “A caveat of self-ranking or self-scoring methodology is that a company can under or estimate their performance; our sustainability maturity model, puts an emphasis on the process over outcome” (Crespin 2019).

Step C: Organisational Initiatives ACTIONS
Strategic Action Plan: No specific actions are given within the model, however according to Crespin (2019), CollaborateUp can provide guidance as a consultancy service to generate concrete actions to progress sustainability through a series of workshops. Crespin (2019) highlighted, the value of a maturity model is the ability to bridge the gap, thus the need to have a relative flexibility to set standards appropriate to the company and its industry based on specific context: “If done right, it gives clear steps that can be achieved, the model itself does not tell you what to do or how to do it”.

4.6.4 Additional Insights from Interviews with Designers

The MM was created after talking to many corporate sustainability officers, and the expectation that everybody needed to be aiming to the same standards on all things such as in rating systems. However, Crespin (2019) asks the question if business need to aim towards the same level of maturity?

4.7 The Embedding Project Framework (EPF)

4.7.1 Model Overview

The Embedding Project Framework is a collaboration between leading sustainability researchers and practitioners pioneering work on embedding sustainability globally (Bertels,
and Schulschenk 2015), anchoring a prior systematic review conducted in 2010 for the Network for Business Sustainability. The review included learnings from more than 179 sources, divided into three groups (academic, practitioner, and analogous interventions), from an initial search result set of 13,756 articles (Bertels et al. 2010).

The initial research and first generation of the model was focused on organisational culture (Bertels 2019) and has since evolved into a more rigorous representation referred to as “the wheel” incorporating learnings from testing the model with 16 partner organisations from across North America, Europe and Africa. The Embedding Project Framework consists of 60 distinct practices, organised into a set of 13 pathways, all oriented around two main axes (see Appendix H).

The framework functions as a diagnostic tool to assess a company’s maturity, which includes a set of guidebooks and tools that help chart a company’s business path towards sustainability. The model’s strong academic foundation, integrates recent developments in sustainability science, including Planetary Boundaries (Steffen et al. 2015), Doughnut Economics (Raworth 2017) and The Natural Step (Robèrt et al. 2002), in combination with work with collaborative academic partners (University of Cambridge, MIT, University of Capetown) and practitioner members, including AngloGold Ashanti (mining), Biogen (neuroscience), ConocoPhillips and Cenovus (oil and gas), Etsy (retail), Nedbank Group and Old Mutual Limited (financial services), Port of Vancouver (transportation), and WWF; makes it a unique model leveraging the best of both worlds. It is designed as a generic model, which can be applied in all industries, various geographic locations and sizes of organisations.

4.7.2 Unique Features

Embedding sustainability is about integrating sustainability across the business, to the point that it is no longer considered an ‘add-on’ but simply ‘the way we do business’ (Bertels and Schulschenk 2015). The extensive list of supporting tools (for each of 60 practices) makes implementation of the model practical.
4.7.3 Results Summary

Step A: Future Vision of Success
SYSTEM
Taking a broad systems perspective: The system in the model goes beyond the organisation's boundaries, includes the value chain and industry, advocating collaboration with other organisations to achieve broader sustainability goals that benefit the environment and society.

Organisation as a system: The model considers the broad perspective of the organisation, looking into various aspects (structure, culture, collaboration within and outside of the organisation boundaries). Practices in the model instil capacity for change and involve the creation of structures or processes for innovation towards sustainability.

SUCCESS
A principled definition of sustainability: The definition of business sustainability used in the model recognises that all business takes place within the context of a set of planetary boundaries and social thresholds. Businesses operate as part of a nested system bound by the social and environmental systems that surround them (Bertels, and Schulschenk 2015).

A principled vision of success: The model captures a shared vision and provides a system perspective to inform the vision. A principled definition of success is reflected in the highest maturity level, ensuring that sustainability becomes a daily and enduring part of the organisation. The highest level supports ecological and societal aspects of community building and participation. SP's are implicitly mentioned within socio-ecological thresholds. However, the core purpose of an organisation is not explicitly mentioned, though implicitly reflected in the definition of success.

Organisational aspects: The model cites sustainability goals and the need to develop organisational and business unit goals targeting that would enable operating in a way that
adherence to environmental limits and enhance social foundations. Specific goals include an emphasis on learning culture, human capital, transparency, proactive leadership, organisational culture support, core organisational processes and collaborative approach. The model does not explicitly suggest to take on a proactive purpose, however, it discusses that the organisations' prioritisation process should focus on the impact the company has on the thresholds not the other way around (approach commonly used in "classic" materiality process in sustainability reporting).

According to Bertels (2019), inspiration for designing the model came from sustainability leaders in Canada with the question, “how to shift the culture of the organisation towards sustainability in a way that endures a change in leadership?” Further, “How do you engage in that fundamental embedding work to make these things a lived part of this decision making and governance of an organisation?” Beyond standard grid type models where the assumption to move all aspects at the same time, the reality is that prioritisation is imperative to reinforce or constrain other practices.

When a company has a charismatic CEO who takes the company in a direction and then leaves, the new CEO views the former directives as the former CEOs pet project so does not pick it up”. The research came out of an interest in understanding how to overcome that attachment of sustainability to a particular executive.

STRATEGIC GUIDELINES
Backcasting: As part of the envisioning practice, the model suggests future scenario engagement to envision a sustainable future in where the organisation operates by adhering to environmental limits and enhances social foundations. Backcasting is explicitly mentioned as a supporting tool.

TOOLS
The model provides a comprehensive list of supporting resources and tools for each of the 60 practices. However, it does not provide specific tools that help support the execution of the A step (e.g. feedback loops, system maps, etc.).

Step B: Current Reality
SYSTEM
Assess/ Baseline organisations maturity level: The Model includes a comprehensive internal analysis as part of the self-assessment, focusing on various practices within and outside of an organisation (value chain, lifecycle impact of products and services). The model examines how decisions influence eco-and social systems in which the organisation operates. The model does not explicitly conduct a risk assessment, as it focuses primarily on incorporating sustainability into the organisation’s risk processes.

According to Bertels (2019), self-assessment and calibration is helping organisations analyse and understand the narrative within their organisation. Part of that is about developing new stories, new narratives, but it is also about actively engaging and forgetting. Calibration is a participatory process whereby best practices are gathered from people actually doing the work to learn where adaption was needed and where organisations falter.

Bertels also mentioned that “It is said, what gets measured, gets managed; in my experience, what gets measured, gets manipulated”, so there are unintended consequences if the supporting structures are not in place.
TOOLS
The model emphasises the need for organisational self-assessment, and the discernment about an appropriate course by collecting, analysing, reporting and verifying sustainability data. However, the model does not explicitly mention tools (e.g. SWOT, PESTLE, SIPOC, etc.) that help to support the execution of the B step.

Step C: Organisational Initiatives

ACTIONS
Strategic Action Plan: After completing the assessment, the model implies creating a strategic plan based on the gap between the envisioned future and current reality. The model utilises participatory, techniques integrating employee ideas to solve sustainability issues, and to foster an inclusive organisational culture to generate supportive measures/actions to move the organisation along the maturity curve.

TOOLS
The model explicitly mentions an internal capacity to evaluate past sustainability efforts, tools to focus on the skills and experience needed for board members to provide thoughtful and effective to support the analysis of risks and opportunities for employee capacity building. It provides support to monitor and measure progress, including benchmarking tools (FutureFit) with indicators to determine the gap between their current and future performance in relation to key thresholds.

Step D: Strategic Prioritisation

STRATEGIC GUIDELINES
Strategic guidelines for prioritisation: The model explicitly talks about the importance of prioritisation as a separate practice, including challenges and blind spots. The free online assessment is very top line (e.g. creates an awareness of impacts and how to influence key socio-ecological thresholds). Bertels (2019) mentioned that when they collaborate with companies, the process goes through assessment, calibration, and benchmarking. “We report our findings and then engage in action planning and prioritisation. Also engage in further implementation support including workshops, presentations, retreats. Leadership teams feel this is very trustworthy and presents a lot of insights”. The model does not provide explicit mentioning of ROI, technical feasibility, economic feasibility, uncertainty.

4.7.4 Additional Insights from Interviews with Designers

An aspect is the company's willingness to adopt sustainability and where do they prioritise their funding. “How do you engage in that fundamental embedding work to make these things a lived part of this decision making and governance of an organisation?” (Bertels 2019).

Bertels spoke about the limitations of the SMMs in general, stating that some of the grid type maturity models imply that everything has to move at the same time. “What we have seen is in fact, there is some really important sequencing to that work. So just because you score high on a particular practice on the practice assessment, it does not make that better or worse. What we tried to do is understand, what's the relationship between practices and how did those reinforce or constrain other practices". This is why prioritisation becomes essential, as it is impossible to focus on everything equally, all at the same time, “if you never focus on the legs, then you have a lopsided body. It has to be a holistic view".
5 Discussion

This Chapter presents a discussion of the results as they relate to the research question - To what extent are sustainability maturity models designed to support organisations to move strategically towards sustainability? Firstly it presents the contributions of the research to the field of sustainability and business transformation. It then discusses the synthesised analysis of the models relative to the analytical tool that was developed, providing insights into how SMMs contribute to SSD and how they could potentially be improved. The research team recognises that the analytical tool was not able to structure all of the insights gleaned from the interviews but still pertinent to the research question, therefore, additional insights from interviews follow. The Chapter then critically reflects on the research process and findings and concludes with potential areas of future research.

5.1 Research Contributions

This research intended to contribute to the transformation of businesses, the economy and thus promote a faster transition towards a sustainable future for the wider socio-ecological system. Businesses need a clear path forward towards sustainability. Sustainability Maturity Models (SMMs) are a tool that may have the potential to do so and are currently being used by businesses for that very purpose. The research team has critically analysed SMMs using Strategic Sustainable Development (SSD) lens, therefore, allowing practitioners and academics alike working in the field of business transformation to make informed decisions when selecting tools to assist their cause. If a SMM is selected as an appropriate tool, we have outlined several areas of improvement that may need to be supplemented. The optimal choice and use of tools will, in turn, lead to better outcomes.

Furthermore, all designers of the analysed models expressed interest in the research and requested to see the final thesis, which was obliged. The findings will offer potential areas of improvement from the research teams understanding of the model and interpretation of SSD. Where appropriate, findings from the six models have been synergised and could act as guidelines for SMMs development and refinement in general.

In addition to the intended contribution of the research, a potential impact was simply a result of contacting designers. Modern technology enabled the research team to conduct interviews through virtual platforms with designers from all around the world. By requesting an interview and expressing interest in work completed on maturity models, many designers expressed that this action reignited interest in their former work. Some are now reviewing their sustainability research or consultancy work with a fresh perspective discussing how they would improve their work. Observations shared from a hindsight perspective served as an inspiration to re-engage in sustainability efforts in a potentially new and strategic way.
5.2 Discussion of Results based on Analytical Tool

5.2.1 Step A: Future Vision of Success

Self-benefit/Business Case
Understanding the self-benefit of transitioning towards sustainability for companies is an important element of strategic action and vision creation. Previous research outlines the benefits of sustainability integration that positively influence business profitability along with environmental and social performance (Willard 2012; Schaltegger and Wagner 2017).

Johnson, the designer of SM3, highlighted an example in the interview “our theory was if you incorporated sustainable business practices internally if you drove it through, it was good for business; save money in your operations and companies” (Johnson 2019).

However, none of the models presents a compelling business argument for why a company should utilise a sustainability maturity model in the first place, nor why they should aim to progress towards higher levels of maturity. The research team believes that is a gap and has to be taken into consideration. Overcoming the sustainability challenge will require all businesses to take action. Focusing efforts only on those who are already engaged with sustainability will not be sufficient. Providing a self-benefit business case will assist with engaging businesses.

The researchers consider that integrating a compelling business case into SMMs is appropriate as multiple SMM designers (Loveridge 2019; Muff 2019) explicitly stated that SMMs can help facilitate a conversation with executive leadership around sustainable business. SMMs can create awareness with decision makers around purpose-driven organisations and also point out the organisational implications (Muff 2019). Therefore, including the business case will only strengthen SMMs as conversation starters.

Sustainability Challenge
None of the SMMs analysed point out the sustainability challenge nor profile current trends such as the systematic decline of the natural resources or the decreasing potential to fulfil the needs of the steadily growing population. The research team sees this as a gap in SMMs. Contextualising companies within the sustainability challenge will help to translate a sense of urgency and need to act. This was highlighted by Muff (2019) stating that “I’m not interested in them spending five years or 10 years going through all the steps. We don’t have the time. We’re in 2019 for God sakes!”

Although somewhat abstract and non-tangible, the sustainability challenge also presents a business case justification - if we don’t overcome the challenge then society as we know it, including businesses, will collapse. Therefore, the research team considers that incorporating the sustainability challenge into SMMs can be dovetailed into the business case self-benefit argumentation. The business case provides a reason to act at an individual organisational level, perhaps more so aimed at businesses at earlier stages of maturity, and the sustainability challenge provides a reason to act at a societal level, perhaps best aimed at businesses at higher stages of maturity, encouraging them to do more and be purpose driven.

Systems Perspective
Despite not contextualising business in the sustainability challenge, most SMMs (BST, CSS, BSMM, SM3 and EPF) support organisations to a great extent, in a practical manner, to understand the complexity and interconnections to other subsystems and the mutual
implications of actions within these systems. Some also show that the organisations consider
the complete value chain, from extraction to end of life, as part of the system and ensure that
organisations understand the interlinkage of organisational sustainability efforts to global
sustainable development. For example, BSMM provides the concept of the sustainability net,
which recognises the interconnectedness of all organisations and how they are embedded in the
global system including nature and society. Williams et al. (2017) argue that taking a systems
thinking perspective, is a key attribute to help to get an understanding of the interconnectivity
of economic, social and ecological issues of the system the company is nested in. The research
team advocates that by adopting a systems perspective, reductionist thinking, unintended
consequences and decision-making leading into path dependencies can be avoided.

Acknowledging the interrelationships of organisations via a systems perspective also helps to
promote collaboration among other organisations and sectors, which fosters business
transformation. Bertels (2019) noted that often fierce business competitors are not willing to
share operational process information, however, ironically, heads of sustainability of these
same companies were often willing to collaborate to improve processes and find solutions.
Organisation as a system

In addition to situating business in a larger system, SMMs also examine the organisation itself
as a system. Within the different dimensions of SMMs, in general, there is a focus on
organisational structure, culture, purpose and collaboration/networking amongst employees,
ensuring that these topics become part of the transformational success agenda. The research
team view this as a key aspect of being strategic as it helps to reduce compartmentalisation and
silod business units. Viewing an organisation as a system also helps to understand the
complexity of the situation, leading to better decisions and increased systematic resilience
(Hutchins 2012).

Sustainability Principles
The analysis shows that nearly every model (all except CUSMM) is based on a definition or
concept of sustainability. Some of the models (BST, CSS) refer to concepts of sustainability,
such as the triple bottom line, however, they do not discuss how to operationalise it. One model
(CSS) defines sustainability using the SPs. It is apparent that there is no consensus between
authors of different SMMs on what sustainability is. A phenomenon not only restricted to
SMMs, but rather to the sustainable development field (Vos 2007). Without a shared definition
of sustainability, it is hard to argue what and how sustainable development should look like for
organisations.

The vision of success is not based on principles, rather on criteria the designer defined. The
vision is incorporated into each of the maturity levels breaking it down into stepping stones,
which serve as intermediate success goals for the overall vision.

The absence of a functional sustainability definition can lead to a misunderstanding of a
common vision of success and trigger diffuse actions when organisations try to reach
sustainability. This is not strategic and will potentially only lead to incremental change, rather
than to an organisational and sector-wide transformation towards sustainability. A definition of
sustainability based on principles will not only provide distinct boundary conditions for a
company to operate in, but also help to operationalise an abstract concept into guiding day to
day actions. Additionally, it will support collaborative efforts and create mutual understanding
within and across organisations, both urgently needed, to help to make a change. On a larger
scale, having a shared understanding and focusing efforts in a unified direction would accelerate
the transition of the economic system towards sustainability.
Organisational Aspects
The research team identified several organisational aspects, based on our interpretation of the SSD, that are an important part of business transformation. Leadership was one of these aspects and was a recurring theme in the majority of interviews. Designers shared that leadership in support of sustainability transformation is imperative to successful application/implementation of SMMs. Muff (2019) emphasises that leaders (CEOs) are key to use their organisations as an engine for positive change in society. The research team learnt that getting access to key decision makers is pivotal to incorporating change.

Leadership turnover proved to be detrimental as leadership change often translated into cutting key projects associated with the former leader (Bertels 2019, Crespin 2019, Willard 2019, Johnson 2019). When asked if there was a way to build in strategies in anticipation of potential leadership change to support continuity, Bertels (2019) countered that leadership change cannot be incorporated into planning. Crespin (2019) stated that if the model focuses on process over outcomes, leadership would not matter quite as much as sustainable practices would be embedded and institutionalised within the company, which opens up a discussion on what can be done to protect sustainability efforts from a change in leadership. The research team collected various responses, starting from embedding sustainability into the business strategy to utilising legal structures via Benefit Corporations.

Another important organisational aspect is that a business should have a proactive purpose, meaning that it should not only be aiming to minimise and eliminate the negative impacts it may generate, but also proactively strive to contribute to the common good in society. All models capture this notion in the highest maturity level. However, Muff (2019) and Johnson (2019) pointed out in the interviews that some companies will never be able to reach the highest level of maturity a SMMs defines, because of the nature of their business and purpose (e.g. oil and gas corporations).

Backcasting
Backcasting is an important element of strategic planning and is implicitly present in every model, represented through the highest maturity level. EPF explicitly references a backcasting approach to planning as a supporting tool to the envision practice. Within the models, backcasting is neither based on principles nor scenarios, but rather on model-specific success characteristics defined by the designers and featured in the maturity grid. The risk of doing backcasting this way could lead organisations to define their vision of success not ambitious enough to support the transition to a more sustainable society.

5.2.2 Step B: Current Reality

Conducting step B and determining the current reality of an organisation is critical in the business transformation process as it is not possible to reach a desired destination without first knowing the starting point as it will inevitably result in sub-optimal actions and slow progress towards sustainability. Johnson (2019) pointed out that in order to create awareness it is important to show businesses where they are at and where they could be. This step is the time to operationalise strategic thinking by analysing the business across the entire ‘sustainability net’ (Cagnin, Loveridge, and Butler 2005) to ensure all impacts and opportunities are considered. As mentioned in a previous subsection, SMMs are generally good at promoting a systems perspective. However, the research team considers that the SMMs should improve their ability to operationalise the very systems perspective they promote.
All models provide some form of baseline assessment via their respective maturity grids. The statements describing each the levels of maturity across the various dimensions are high level and do not provide adequate guidance for concrete actions in consecutive steps. Three models (BST, SM3, EPF) provide simple self-ranking assessments beyond the maturity grid, however, these too may not provide an adequate level of details for the subsequent steps. Additionally, Crespin (2019) shared a caveat of the self-ranking or self-scoring methodology of a SMM, stating “there is a risk that a company can under or overestimate their performance”. Practitioner models (EPF, CUSMM, SM3) offer consultancy services designed to facilitate the baseline assessment to the level of detail sufficient to create concrete actions. However, it comes with an additional cost to businesses implementing SMMs.

5.2.3 Step C: Organisational Initiatives

Without proactive actions, business transformation is not possible. Every model states what the users need to achieve in order to reach the different levels of maturity, however, no model suggests actions on how to reach them. The research team understands that every organisation is embedded in a different system and context, hence will have different measures in place or organisational initiatives it wants to implement and therefore does not consider the absence of concrete actions within SMMs to be a weakness. Model designers (Crespin 2019; Cagnin 2019; Bartels 2019) all pointed out that SMMs are not designed to provide this level of detail to describe the actions to be taken. However, according to the researchers, it is of vital importance to provide guidance to organisations on ways to generate such actions.

5.2.4 Step D: Strategic Guidelines

Not all actions can be undertaken and some will inevitably be more relevant than others, therefore, strategic guidelines for the prioritisation process are an important part of the business transformation journey. Half of the models (BSMM, BST, CSS) have some form of strategic guidelines or prioritisation guidance within the model. Strategic guidelines were intentionally left out of some models as they were not designed to provide specifics on how to operationalise or prioritise actions. Baumgartner (2019) emphasised that maturity models do not say a lot about how to prioritise and decision making, nothing about that and how to implement actions or how to organise. He continues, “To my knowledge, most models do not have the purpose of supporting the implementation process”. Similarly to actions, suitable strategic guidelines can be context dependent. However, consistent with SSD, the research team considers some strategic guidelines to apply to all situations and therefore see a complete lack of strategic guidelines in the model as a gap. Such guidelines should not only account for financial feasibility and return but should also consider externalities by including social or ecological aspects in the decision-making process. The community capitals model is a prime example of decision making beyond economic aspects.

EPF has an interesting perspective on strategic guidelines. Bertles (2019) stated that companies typically view materiality assessments from a risk perspective and thus prioritise according to that with the primary aim to mitigate risks. However, EPF makes prioritisation decisions based on the areas of the most significant opportunities for positive impact of the business on the sustainability challenge. Bertels (2019) also points out that a limitation with grid-type maturity models is that it implies that everything has to move at the same time. What the Embedding Project team found is that it is essential to first do sequencing that works. Understanding what
the relationship is between practices and how these reinforce or constrain other practices is important for the overall success of the sustainability initiatives. The research team believes this learning can be used to develop strategic guidelines for SSMs.

An important consideration related to strategic guidelines is that some SMMs serve as the basis for consultancy projects that include prioritisation of the actions, the formation of a strategic action plan, and implementation of the plan.

5.2.5 Tools

Tools were assessed at each step of the analysis. They proved to be an engaging point of discussion, therefore, they are presented as a separate section. Tools are needed for every stage of the transformation journey. High-level strategy and planning are critical in deciding what actions to take, however, tools are the vehicle for which strategy manifests into reality. It was apparent that with the exception of EPF, all models when not accompanied by supporting tools lacked rigour and practical ways to make the necessary changes happen. When combined with consultancy services, however, SMMs act as the basis to guide the selection of appropriate tools based on the practitioner's experience.

5.3 Additional Insights

Baumgartner (2019) stated that “Most companies have an opportunistic behaviour, so they do something for sustainability as long as they can benefit in economic terms". Setting targets based on externally motivated reasons may not result in actual change but rather ‘rigging’ the system. Bertles (2019) summed this concept up by saying “what gets managed gets manipulated". The majority of the analysed sustainability maturity models, however, were created with the incentive to promote genuine change and build consistency in the implementation of sustainability within organisations. This makes SMMs an important tool, assuring the changes are not only nominal but rather truly transformational.

Johnson (2019) shared his experience where he saw many organisations hit a plateau after a certain level. In order to reach the highest level of the SMM, a different radical implementation approach and strong organisational commitment are needed (Johnson 2019). This emphasises the importance of change management being a fundamental component when utilising SMMs and is a key gap identified during the analysis as it was not present in any model. The researchers believe that aiming to achieve the highest maturity level and introducing sustainability into the DNA of an organisation will not only require a change in the organisation's governance, business models and operations models, it will also require a solid well thought through change management approach. This finding was confirmed by some of the model designers (Muff 2019; Johnson 2019).

In relation to change management and reaching the highest level of maturity, Bertles (2019) sees storytelling as a key supporting tool “Part of that is about developing new stories, new narratives, but it is also about actively engaging and forgetting. We are doing a lot of work on storytelling; helping organisations analyse and understand narrative within their organisation and what it is that needs to be done to evaluate narrative infrastructure".
Practitioners should be aware of the human component when working with any model. Every model is a simplification of reality, designed with the values and biases of the designer, and not treated as the only representation of reality (Cagnin 2019, Muff 2019). Loveridge (2019) remarked that the user of the model needs to consider its historical background and the knowledge and technology available at that time. The utilisation of the model completely depends on the people using it (Muff 2019).

Muff (2019) outlined the need for organisations to transition directly to the highest maturity level without going through all the levels step by step, commenting that it can take years for an organisation to mature in a stepwise manner. Progressing in a stepwise manner is a key designer feature of all SMMs. Muff (2019) continued to mention that in her experience, large organisations mature very slowly and that it is easier, even for a big corporation to start their transformation by trying to generate a new revenue stream with a product/service. She suggested that to set up a completely new business unit and legal entity instead of integration into the current business of an organisation, might be beneficial. The research team sees the advantage of starting off such an important journey in a controlled way, however also acknowledges the associated risk if an organisation is operating in two different paradigms, the resources needed, the communication required and the administration efforts. Such an approach might also not support what Muff (2019) criticised earlier, that there is not much time left thereby requiring immediate advancement to the highest maturity level.

Several model designer mentioned that SMMs might not be suited for all company sizes (Muff 2019; Johnson 2019; Baumgartner 2019; Loveridge 2019). Johnson (2019) brought up the example of trying to apply SM3 with a Deli shop and it turned out not to work the way they had expected it. The reason for that was, that there were no financial or human resources available to do the required work with the consultants. Johnson (2019) thinks that SMMs are better suited for larger corporations which have different financial backing as compared to smaller SMEs.

The true value of the SMM is only unlocked when it is applied in conjunction with paid consultancy services, therefore, limiting their potential impact.

5.4 Validity, Reliability and Limitations

The dimensions of a maturity model grid is a central design feature of SMMs. This aspect of the models was noted when analysing the models however it was not assessed as the different organisation components are not part of the overarching conceptual framework, SSD, and the research team did not identify a suitable CF for the analysis of this aspect of SMMs. Another aspect of SMMs that was not analysed directly was the financial impact of sustainability. Economic sustainability was referenced in several of the models, through the triple bottom line and other sustainability concepts.

The analytical tool developed to analyse SMMs was central to this research. A different tool would likely result in different analysis, results, discussion and conclusion. Although the research team is confident in the decisions made when developing the tool and consider it to be an accurate reflection of the SSD, it is recognised that the tool is ultimately based on the research team’s interpretation of SSD. The tool was developed and then applied in a relatively short time frame. Minor adjustments to the tool were made during the analysis, however, it was not subject to a formal testing and refinement process.
The search term used in the data collection phase was fairly narrow. Using broader, more complicated search terms would expand the literature search. This was explored, however, due to time constraints it was not considered feasible to filter the increased amount of literature that the expanded search terms were producing. One of the exclusion criteria was access to model designers in order to conduct interviews. Although we managed to secure interviews for models that we identified during the literature search, some models were excluded from analysis because the designers could not be contacted. In some cases, particularly with the practitioner models, there was limited access to model documents due to confidentiality reasons. Conducting interviews with designers helped to mitigate this, however, this still meant that the analysis was potentially not as robust as it could have been with full access. Some of the models analysed were designed over fifteen years ago, therefore, some of the data was significantly outdated. The research team was pleased that the final list of models analysed consisted of academic models, practitioner models and one model that is best described as a hybrid between the two.

Part of the analysis was based on insights from the interviews. This resulted in a more thorough analysis, however, it essentially added data to the model that was not present in the literature and therefore not necessarily publicly available. It is noted however that if these models are used by a company it is usually with guidance/engagement from the model designers, therefore the insights gained from the interviews with the designers would also be available to the companies using the models. Multiple processes (see data analysis section) were put in place to avoid research bias and inconsistency when conducting the model analysis, however, due to time constraints, the number of models analysed and depth of analysis, the full review of data and coding for each model was done by a single researcher for each model.

All research is subject to the inherent biases of the researcher(s). Being a group of four with different professional backgrounds and cultures and engaging in constant group discussion and reflection helped to limit biases, however, it is still a significant aspect of the research to consider. Data reliability could have been influenced by having inadequate analysis criteria or inaccurate interview questions. Extensive due diligence during the preparatory work limited this threat. Each phase of the research was designed systematically; each analytical criteria and question in the interviews was justified against the research question, ensuring to obtain relevant data.

### 5.5 Future Research Opportunities

In order to further strengthen the contribution of SMMs towards SSD and to help practitioners, academia or decision makers when working on a transition to a more sustainable society, the research team suggests the exploration of further possible areas of research.

The analytical tool developed in this thesis used to assess SMMs and applied to organisations serves as a good example of the flexibility of the SSD elements. The research team suggests testing, application and improving the analytical tool to other similar application areas, which combine structure and process. Furthermore, adding to this, a SMM could be designed considering all gaps the analytical tool highlights.

Even though the research team had a proper method to assess SMMs around their effectiveness in regards to SSD, the dimensions constructed by the designer underlying each model, defining
its organisational scope, could be assessed in greater detail against another framework(s), since SSD does not have such a granular organisational nor economic focus.

The research concluded that in order for SMMs to be strategic, it is necessary to have certain tools or methods available, which support the different phases of an organisational transformation journey. A further research possibility is around defining the best suited and effective tools to support each step of the ABCD process to supplement SMMs, to ensure that a real impact towards sustainable development is achieved.

The research team evaluated the design of SMMs and how they are currently set up to support organisations. However, it was outside of the scope of this work to evaluate how well certain SMMs are performing when implemented within an organisation. A future research topic could centre on how effective are SSMs in practice and how can their impact be measured within organisations and at a global level. This work could be one or multiple case studies about SMMs applied within a corporation.

Future Fit Business Benchmark (FFBB) is a tool grounded to a large degree in many foundational ideas from SSD. It could be an area of interest to understand how FFBB could support SMMs as a tool to help to identify the progress an organisation is making along their way to higher levels of maturity.
6 Conclusion

Society is facing complex sustainability issues which have yet to be solved. Businesses are a major contributor to the challenge, however, they could play an active part in generating the solutions. SMMs have the potential to contribute to a paradigm shift in the organisational thinking to more sustainable business practices. Within the analysis of maturity models through the lens of SSD, the research team was able to reveal the contributions, limitations, improvements and considerations of SSMs for decision-makers, practitioners and designers.

SMMs can act as a conversation starter around the topic of business transformation. By describing a clear path forward, they can help decision makers break down the seemingly complex goal of becoming a sustainable business. The attribute of initiating conversations could also be enhanced by including a compelling reason for businesses to act. This should be done on multiple levels by incorporating the self-benefits to the company and also high-level societal reasoning by describing the sustainability challenge.

It is clear that there is a lack of consensus around the concept or definition of sustainability among the various SMMs analysed. A common understanding of sustainability among SMMs would help to promote collaboration and synergy between business and sector-wide transformation. It is recognised, however, that a lack of common understanding of sustainability is not isolated to SMMs, but rather it is a discipline-wide concern. Ideally, the common definition of sustainability would be science-based, framed as boundary conditions to foster innovation and specific enough to guide day-to-day operations. The researchers consider the SPs to be a suitable option.

SMMs do an adequate job of describing what needs to be done to progress to higher levels of maturity, however, they are not at the level of detail that describes how to progress to higher levels of maturity. This is particularly present when determining the current reality of a business and when making decisions on how to prioritise between competing actions. It was also apparent in the research that tools to support each step are not suggested in the models. Level of detail describing how to progress and the tools to do so is provided via consultancy services offered alongside the practitioner models and thus not accessible to all the users.

In general, SMMs are designed to provide real business transformation rather than incremental change and they are driven by internal motivations/ not concerned with external promotion. Therefore they can act as an indicator to help distinguish between businesses wanting to make genuine change with real impact versus those who may be more concerned with incremental change to reach a certain standard in order to receive positive PR.

A key finding from the interview process was the importance of change management. SMMs are designed to provide business transformation and offer guidance on what to do in order to reach higher levels of maturity. However, unless change itself is addressed and managed through a comprehensive change management approach, it is unlikely that a business will progress beyond incremental change and reach the highest level of maturity as this requires a significant mindset shift throughout the whole business. Neglecting change management could also result in wasted resources and, at worst, could potentially jeopardise the entire business. This insight was not discovered via the analytical tool as change management is not directly present in SSD.
Maturity models consist of different maturity levels and for an organisation to reach the highest maturity level it has to progress through the interim maturity levels step by step. Given the need for urgent action in defence of a compromised planet, the question arises whether a stepwise approach is still optimal or a more radical approach is needed.

In conclusion, it needs to be acknowledged that, like all models and frameworks, SMMs are a starting point in the business transformation process. Indeed, they can provide valuable guidance, however, they are only as good as the people using them. They require skilled and committed leaders to put them into practice in order to transform businesses to make a meaningful contribution towards overcoming the sustainability challenge. Future research could look more closely into the human aspect of these models by studying the implementation of SMMs.
Reference List


## APPENDIX A: Overview of FSSD

<table>
<thead>
<tr>
<th>Level</th>
<th>FSSD</th>
<th>FSSD organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SYSTEM</strong></td>
<td>The systems level includes principles for the functioning of the global socio-ecological system and an overview of the sustainability challenge</td>
<td>Does the organisation understand how it is embedded in social ecological sub-systems? Is the organisation aware of its impact to these systems and the impact of these systems on the organisation? Does the organisation understand its complete product/service value chain and the impacts on the environment or society? Where does the organisation draw its boundaries with regards to the value chain? Does the organisations understand the business case of sustainability beyond economic means?</td>
</tr>
<tr>
<td><strong>SUCCESS</strong></td>
<td>The success level includes the definition of a vision framed by, or in compliance with, Sustainability Principles</td>
<td>Does the organisation understand what sustainable business practices look like? What could sustainable business goals look like? What does a sustainable business model need to look like?</td>
</tr>
<tr>
<td><strong>Strategic guidelines</strong></td>
<td>The strategic guidance level includes guidelines for how to approach the principled definition of success in a strategic way. The generic guidelines for any strategic planning process using the FSSD include backcasting from a principle based definition of success and the use of basic prioritisation questions. As a minimum, every action should be assessed on economic feasibility, being a flexible platform and a stepping stone towards the vision.</td>
<td>How does the organisation decide about internal or external measures to achieve sustainable business practices? Are the actions, programs or projects taken by an organisation in line with the boundary conditions of sustainability? Does the organisation include other internal or external stakeholder in the decision making process?</td>
</tr>
<tr>
<td><strong>ACTIONS</strong></td>
<td>The action level includes all actions that help move the global socio-ecological system towards sustainability</td>
<td>Action, program or projects initiated to achieve sustainable business practices or a sustainable business model.</td>
</tr>
<tr>
<td><strong>TOOLS</strong></td>
<td>The tool level includes tools that support efforts to reach global sustainability</td>
<td>Tools needed to achieve sustainable business practices or a sustainable business model when utilizing the ABCD process/mindset.</td>
</tr>
</tbody>
</table>
## APPENDIX B: Summary of FSSD Criteria

<table>
<thead>
<tr>
<th>Level</th>
<th>Criteria</th>
</tr>
</thead>
</table>
| **System**       | The SMM articulates how the organisation is embedded in the social ecological sub-systems. The SMM supports the organisation to be aware of its impact to those systems and the impact of these systems on the organisation. The SMM supports the organisation to understand its complete product/service value chain and relationships to other organisational subsystems. Key elements within the SMM must relate to any of these topics:  
  - Sustainability Challenge  
  - Taking a broad systems perspective  
  - organisation as a system                                                                                                                                                                                                                                               |
| **Success**      | The SMM supports the organisation to articulate organisational scope, a principled vision of success, a principled definition of sustainability and other organisational aspects like an organisational learning culture. Examples are sustainability integrated in the business strategy; organisation is purpose driven; business model, business goal and practices are aligned with 8 SPs; organisation influences the larger systems (outside-in approach); organisation is aware of internal and/or external structural obstacles present within its system of influence.   |
| **Strategic Guidelines** | The SMM articulates strategic guidelines to assist decision makers in deciding on actions that can bring them towards the next level of maturity when deciding about organisational projects/initiatives or to achieve sustainable business practices. These can be strategic and operational decisions which support the shift of an organisation towards sustainability. It is important to consider when being strategic to have the long term perspective in mind and apply upstream thinking/accounting and prevention, instead of downstream root cause analysis. There is a balance between long-term strategic planning and mid/short term actions. A systems thinking approach is considered or the precautionary principle are taken into consideration. The three minimum and standard prioritisation questions are:  
  1. flexible platforms  
  2. right direction - individual maturity levels present in a SMM  
  3. Return on Investment. Return can extend beyond financial measures.  
Examples for additional prioritisation questions are:  
  1. Are the actions, programs or projects taken by an organisation in line with the boundary conditions of sustainability?  
  2. Does the organisation include other internal or external stakeholder in the decision making process?                                                                                                                                                                                                 |
| **Actions**      | The Actions level determines specific actions which help to move towards the defined state of success as defined by SMM (e.g. maturity levels). These actions can lead to projects or initiatives with the intent to achieve sustainable business practices or a sustainable business model. Actions should be tailored to the specific circumstances of an organisation.                                                                                                       |
| **Tools**        | The tools level contains information about additional and complementary tools (methods, indicators, processes) that provide support in the process of achieving success defined by SSM. Tools are dependent on specific actions chosen by the organisation to achieve success. Tools can address different levels (system, success, strategic guidelines, actions) and different steps in the ABCD mindset. Tools are used for measuring and monitoring:  
  - the relevance of actions with reference to the set of principles for the process. To support the application of a SMM, they should measure how an organisation has matured from one level to the next level  
  - status of the system itself and its impact. To support the application of a SMM, they should measure the impact the organisation is having on the bigger system it is nested in. For example an organisation is utilizing sustainable business practices/model after sustainability journey and impacting the society in a positive way, by helping to solve global sustainability problems. |
APPENDIX C: Analytical Tool used to Assess SMMs

### Future Vision of Success (A Step)

<table>
<thead>
<tr>
<th>FSSD Level</th>
<th>Main Criteria</th>
<th>Sub-criteria (note that each sub-criteria has a detailed description in the coding table to guide the researchers’ analysis and maintain internal consistency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>The sustainability challenge</td>
<td>Funnel Metaphor, Unsustainable Society, Systematic Decline, Decreasing potential to support fulfillment of human needs, Systematic character of the sustainability challenge, Unknown negative impacts, Examples of sustainability issues, Understanding the business case of sustainability (self-benefit)</td>
</tr>
<tr>
<td></td>
<td>Taking a broad systems perspective</td>
<td>Interconnection to other systems (sub systems, nested systems, superordinate systems), Socio-ecological system, Complex-adaptive system, Nesting and inter-linkages to subsystems, Science provides knowledge about the system, Link to global sustainable development, Value Chain Perspective</td>
</tr>
<tr>
<td></td>
<td>organisation as a system</td>
<td>Link to a change in the organisations Business Model, Network building between people, organisational Purpose, organisational Culture, organisational Structure</td>
</tr>
<tr>
<td>Success</td>
<td>A principled definition of sustainability</td>
<td>Definition of sustainability, Ecological Sustainability, Social Sustainability Sustainability Justification</td>
</tr>
<tr>
<td></td>
<td>A principled vision of success</td>
<td>Scope Outside-In, Clear vision statement, Sustainability Principles, Long Term Perspective, Common understanding and dialogue, Shared sense of importance, Core purpose, Core values, BHAGs</td>
</tr>
<tr>
<td>Organisational aspects</td>
<td>Learning Culture, Human/Intellectual Capital, Transparency, Pro-active purpose, Leadership Role, organisational Culture support, Core organisational Processes, Change Management/Transformation approach, Collaborative structures</td>
<td></td>
</tr>
</tbody>
</table>

| SG*        | Backcasting | Redesign for sustainability |
| Tools*     | General A support | To support any elements of A (e.g. external system progress) |

### Current Baseline (B Step)

<table>
<thead>
<tr>
<th>FSSD Level</th>
<th>Main Criteria</th>
<th>Sub-criteria (note that each sub-criteria has a detailed description in the coding table to guide the researchers’ analysis and maintain internal consistency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>System*</td>
<td>Assess/ Baseline organisations maturity level</td>
<td>Sustainability Value Chain Assessment (SPs), Risk/Opportunities Assessment, Internal Aspect Analysis, SWOT Results</td>
</tr>
<tr>
<td>Tools*</td>
<td>General B support</td>
<td>To support any elements of B</td>
</tr>
</tbody>
</table>

### organisational Initiatives (C Step)

<table>
<thead>
<tr>
<th>FSSD Level</th>
<th>Main Criteria</th>
<th>Sub-criteria (note that each sub-criteria has a detailed description in the coding table to guide the researchers’ analysis and maintain internal consistency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>Strategic Action Plan</td>
<td>Actions to move to next level of the SMM, Actions prioritized into strategic plan</td>
</tr>
<tr>
<td>Tools*</td>
<td>General C support</td>
<td>To support any elements of C (e.g. Capacity Building, Internal System Progress)</td>
</tr>
</tbody>
</table>
### Strategic prioritisation (D Step)

<table>
<thead>
<tr>
<th>FSSD Level</th>
<th>Main Criteria</th>
<th>Sub-criteria (note that each sub-criterion has a detailed description in the coding table to guide the researchers’ analysis and maintain internal consistency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SG*</td>
<td>Strategic guidelines for prioritisation</td>
<td>prioritisation, Stepping stone/Right direction, ROI, Flexible Platform, SP action guidance, Social/Ecological Impacts, organisations relative contribution, Urgency, Visibility, Technical Feasibility, Uncertainty</td>
</tr>
<tr>
<td>Tools*</td>
<td>General D support</td>
<td>To support any elements of D (e.g. Decision Making)</td>
</tr>
</tbody>
</table>

* Indicates additional insights by merging the ABCD mindset and FSSD.
## APPENDIX D: Primary and Supporting Literature

<table>
<thead>
<tr>
<th>SMM</th>
<th>Primary literature</th>
<th>Supporting Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Sustainability Typology (BST)</td>
<td>Dyllick and Muff 2015</td>
<td>Dyllick and Hockerts 2002</td>
</tr>
<tr>
<td></td>
<td>Muff and Dyllick 2014</td>
<td>Dyllick 2018</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muff, Kapalka, and Dyllick 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Landrum 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Landrum 2018</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sambhathan 2019</td>
</tr>
<tr>
<td>Business Sustainability Maturity Model (BSMM)</td>
<td>Cagnin, Loveridge and Butler 2005º</td>
<td>Cagnin, Loveridge and Butler 2005º</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cagnin, Loveridge and Butler 2005º</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cagnin, Loveridge and Butler 2005º</td>
</tr>
<tr>
<td>Corporate Sustainability Strategies: Sustainability Profiles and Maturity Levels (CSS)</td>
<td>Baumgartner and Ebner 2010</td>
<td>Itzel et al. 2017</td>
</tr>
<tr>
<td>CollaborateUp Sustainability Maturity Model* (CU)</td>
<td>Crespin 2014</td>
<td>Crespin 2015</td>
</tr>
<tr>
<td>Sustainability Management Maturity Model* (SM3)</td>
<td>Johnson 2010</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Bertels and Schulschen 2015</td>
<td>Bertels and Dobson 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dobson and Bertels 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bertels and Toews 2018</td>
</tr>
</tbody>
</table>

*Some documentation about the model was not accessible due to confidentiality.*
APPENDIX E: Sample Interview Question List

Background:
- Can you share a little about your current field of work and areas of specialization and expertise?

Maturity Models in General:
- What do you see as the main strengths and/or weaknesses of maturity models in general?
- Do you think maturity models are underutilised or over utilised?

Corporate Sustainability Strategies: Sustainability Profiles and Maturity Levels Specific:
- What was your purpose and motivations for designing the model?
- What do you want users of the model to achieve?
- What is the rationale behind the different aspects you chose? (Economic, ecological, social (internal) social (external))? popular concepts of sustainability include GRI, FTSE, DJSI.
- Does the model offer any guidelines or processes for prioritizing strategic actions in order to reach the next level of maturity?
- What do you see as the main benefits of your model?
- What do you see as the main limitations of your model, if any?
- Are you aware of any unintended consequences from the use of your model?
- Was this model based on research of a particular company? Or, a set of organisations?

Intended Application:
- Is it equally useful for all industries and scales of organisations?
- Who is the intended audience of the model? C-suite or sustainability managers?
- When implementing the model, should the users of the model have a certain skill set?
- Is the model designed to be supported by other tools or to support other tools or models? (e.g. ISO14001, ISO26000 etc.)

Actual Implementation:
- That you know of, are any organisations using the model/have used the model?
- Have they progressed towards higher levels of sustainability?
- Have they made any recommendations to improve the model?

Going Forward:
- Do you have any future plans for the model?
- Do you know work that has been, or will be based on this model?
- Do you know of other maturity models?

Note that these questions were not necessarily asked in this order or were spoken verbatim. They were used more of a guide and a checklist to ensure all key topics were covered.
## APPENDIX F: List of Exploratory Interviews

<table>
<thead>
<tr>
<th>Name</th>
<th>SMM</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daniela Cristina Antelmi Pigosso, Academic, Author, Consultant</td>
<td>EcoDesign</td>
<td>Extensive research conducted in the field of EcoDesign. Daniela is now operationalizing the EcoDesign maturity framework in consulting as co-founder of <a href="http://essensus.co/">http://essensus.co/</a>. Introduced us to the work of Dr. Stephanie Bertels, director of The Embedding Project (see Designer Interviews)</td>
</tr>
<tr>
<td>Bob Willard Author, Sustainability Industry expert</td>
<td>Developed staged approach</td>
<td>Stages of business sustainability represented in a 5-tiered model. Organisational culture is a key driver in influencing business sustainability consciousness. Leadership turnover can jeopardize strides made. Resources shared on SMM stages.</td>
</tr>
<tr>
<td>Gareth Kane, Founder, Author</td>
<td>Terra Infirma</td>
<td>Extensive industry experience; Author of The Green Executive; Primarily focused on Ecological Sustainability; expressed need to incorporate Social considerations in future work</td>
</tr>
<tr>
<td>Geoff Kendall, CEO</td>
<td>Future Fit Business Benchmark (F2B2)</td>
<td>Significant changes made to F2B2; new online platform; worked closely with Kalle to translate FSSD science-specific concepts to business lexicon. Working with investors to transform large corporations towards sustainability.</td>
</tr>
</tbody>
</table>
## APPENDIX G: List of Interviews with SMM Designers

<table>
<thead>
<tr>
<th>Name</th>
<th>SMM</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Denis Loveridge</td>
<td>Business Maturity Model</td>
<td>Secondary author of paper; Concept of due diligence (corporate responsibility) and organisational self-assessment and accountability</td>
</tr>
<tr>
<td>Cristiano Cagnin</td>
<td>Business Maturity Model</td>
<td>Primary author of paper; Importance of foresight</td>
</tr>
<tr>
<td>Dr. Katrin Muff</td>
<td>Typology Model</td>
<td>Primary author of paper; cultural differentiation; Sustainability efforts futile if not fully supported/embodied by organisation CEO/leader</td>
</tr>
<tr>
<td>Dr. Rupert Baumgartner</td>
<td>Corporate Sustainability Strategies: Sustainability Profiles and Maturity Levels</td>
<td>Primary author of paper; Foundational research paper recommended by Advisor</td>
</tr>
<tr>
<td>Dr. Stephanie Bertels</td>
<td>Embedding Project</td>
<td>Recommended by Daniela Pigosso as a relevant SMM worth investigating; Comprehensive pool of academic resources analysed and translated into a best practices SMM.</td>
</tr>
<tr>
<td>Richard Crespin</td>
<td>CollaborateUp</td>
<td>Identified as one of the few SMM in Northern America; Maturity Model consultancy firm</td>
</tr>
<tr>
<td>Scott Johnson</td>
<td>FairRidge Sustainability Management Maturity Model (SM3)</td>
<td>Comprehensive MM applied successfully in industry (2008-2010); designer willing to be interviewed and share resources</td>
</tr>
</tbody>
</table>
APPENDIX H: The Embedding Project Wheel

The horizontal axis highlights the importance of simultaneously attending to two different goals: meeting existing sustainability commitments (deliver) and making way for the changes that will help improve sustainability performance in the future (advance). The vertical axis reinforces the need to attend to both of these goals using two different means (formal and informal). In the top half of the framework are the more formal practices, those that try to guide behaviour through the use of rules, systems, procedures and metrics (Bertels, and Schulschenk 2015).