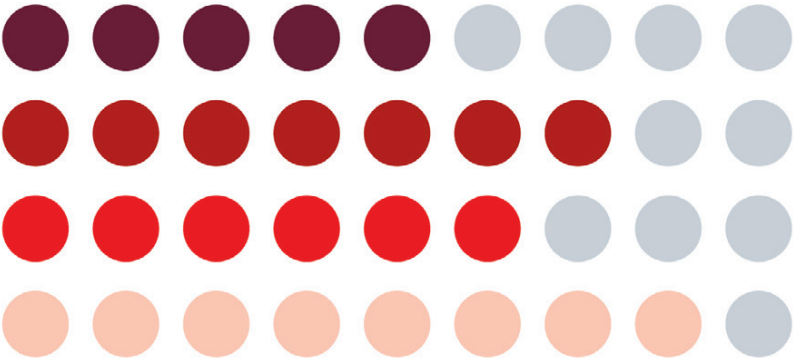
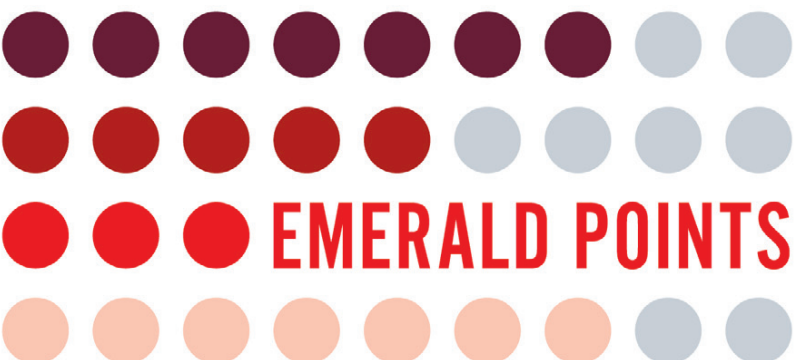


ACCELERATING ORGANISATION CULTURE CHANGE

Innovation Through Digital Tools

Dr. Jaclyn Lee



EMERALD POINTS

ACCELERATING ORGANISATION CULTURE CHANGE

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ACCELERATING ORGANISATION CULTURE CHANGE

Innovation through Digital Tools

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INVESTOR IN PEOPLE

To my husband, Moon Chong, and my children, Michael, Amy, and Matthew.

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PREFACE

After completing my PhD in 2015, I wondered what was next for me. Should I just place the Doctoral Certificate on a shelf and dust if off every few years? I knew that was not what I wanted. After a few months of deliberation, I decided I should use my knowledge to help make a difference to the industry and to the profession in which I work.

I started writing columns on LinkedIn and also began sharing the results of my PhD work at conferences. The more I wrote, the more people gravitated toward my words and my sharing. Soon, my LinkedIn followers increased substantially and many Human Resource (HR) professionals, students, and mid-career professionals began approaching me seeking advice on their careers, as well as professional advice in the areas of HR, Data Analytics, Organizational Development (OD), and Culture. I also began working with many Small to Medium Enterprise (SME) owners to help with their culture transformation journeys.

A full four years after my Doctorate on Digital Culture Change, I've garnered many new experiences from these interactions and decided to put my ideas together with my research into a new book called *Accelerating Organisation Culture Change*.

This book contains elements of my research as well as experiences I've gained along the way, together with

interviews and insights from CEOs and other seasoned professionals with whom I've interacted over the years.

I hope you will find this an inspiration, and the sharing will help you in your culture transformation journey.

ACKNOWLEDGMENTS

This book is the result of my research and work in the area of digital tools for culture change. Many people made this research and book possible and I would like to acknowledge and thank them for their guidance, coaching, support, and wisdom in the process.

Firstly, I would like to thank Professor Kuldeep Kumar who has been my inspiration in doing this work. He spent tireless evenings working with me and guiding me in my research and I learnt so much from him. Professor Jos Hillegersberg, who is my other promoter, is someone I am forever grateful for giving me the opportunity to enroll in the University of Twente as a PhD candidate and for teaching me all I need to know about ADR.

Others who have made this book possible are my HR team at SUTD, particularly Adeline Wang and Sharon Yeo, who worked tirelessly with me throughout the years to test out the digital toolkit and made it work.

Lastly, my grateful thanks to Professor Thomas Magnanti, President Emeritus of SUTD, who gave me support for this research and Professor Chong Tow Chong, my current President, who encouraged and gave me the room to experiment within SUTD.

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1

CHANGE IN THE DIGITAL AGE

The world seems to be moving at a greater speed than ever before. Change is a constant in the twenty-first century due to technological disruptions that are happening at an accelerated pace. In this age, change management will have to take on a different meaning as companies reinvent and adapt their organisational strategies to cope with this digital revolution. Changes in this digital age will include looking at digital talent, digital leadership, and digital transformation.

Among all, digital transformation is probably the most important and disruptive organisational change to happen in recent times. It is the process of integrating digital technology into all areas of businesses and its processes, thus changing how you operate and deliver value to customers. One of the key critical elements in this process is culture change, which requires an organisation to continually innovate and transform the mindsets of employees to cope with Industry 4.0.

1.1 IMPORTANCE OF CULTURE IN DIGITAL TRANSFORMATION

Many organisational leaders I have met opined that technological barriers were far easier to overcome than barriers relating to organisational culture. However, for those organisations that were successful in digital transformation, they were also able to transform their culture and help their employees align to the organisation's realigned values and purposes throughout the transformation journey. Culture is, thus, a vital component in the facilitation of organisational transformation. Leaders will need to help their workers change mindsets so they are ready for the future of work. Professor Namgyoo K. Park (2019), in his article on the cultural impact of automation, shares that the impact on corporate culture brought on by Industry 4.0 are great. They include looking at corporate governance, company communications, organisational structure, working conditions, and HR practices. In another article by Josh Bersin, entitled, "The New Organisation: Different by Design" (Bersin, 2016), he states, "One of the biggest drivers and facilitators of the 'new organisation' is the need to drive culture, employee engagement, learning and feedback throughout the company. Millennials are looking for mission and values at work, and when they work in small teams, they need a shared culture to ensure that strategies, programs, and compliance takes place in a consistent way."

In yet another study, "Culture for a Digital Age[1]" (Goran, LaBerge, & Srinivasan, 2017), the authors share that shortcomings in organisational culture are one of the main barriers

1 https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/culture-for-a-digital-age.

to a company's success in the digital age. The survey emphasized three digital culture deficiencies present today. These three deficiencies are:

1. Functional and departmental silos;
2. Fear of taking risks;
3. Difficulty forming and acting on a single view of the customer.

The research also shows that cultural obstacles correlate with negative economic performance. In view of this, executives will need to be proactive in shaping and measuring culture, and approach it with the same rigor with which they tackle operational transformations. Alyson Clarke (2018) shares that digital transformation will demand changes to strategy, technology, processes, and structure – and culture is the glue that brings it all together. Cultural transformation is one of the biggest barriers to digital transformation, and digital leaders must seed cultural changes to start shifting their organisation toward a digital culture that is customer focused, empathetic, agile, experimental, and collaborative.[2]

In view of the need to accelerate culture transformation, Park (2019) says that collaboration platforms for brainstorming, idea generation, and open communication in which ideas can be shared in real-time are vital components of success. They allow for faster and more efficient collaboration – one of the key ingredients to successful culture transformations.

2 https://go.forrester.com/blogs/prioritize-culture-change-to-accelerate-digital-transformation/.

1.2 MY RESEARCH WORK IN THE AREA OF DIGITAL TOOLS FOR CULTURE CHANGE

In moving organisation culture in today's world, digital tools are a great way to facilitate change and a means of bringing communities together. Innovative and low-cost platforms can be easily integrated to start building a digital culture in a non-threatening manner. This book is a culmination of my research in the area of developing digital tools for culture transformation through a robust design methodology.

In my earlier days of working as a Human Resources Leader, I often had to lead culture transformation projects with thousands of employees. These change projects took a long time as we often had to conduct communication and feedback sessions manually. In addition, not everyone had the chance to voice their opinions or views as there was limited time. The sessions were also subject to process losses due to group dynamics which compromised the integrity of the change project.

I began to look for ways in which I could work on culture transformation projects using digital tools that can speed up the change process and improve its effectiveness in an objective manner. In 2009, I started working as Director of HR in the Singapore University of Technology and Design (SUTD), a new university set up by the Singapore government, to develop technically grounded leaders who will make a difference to the world through Design. While there, I had the opportunity to work with the senior leadership team to build and develop an innovative culture necessary for the success of SUTD. I began to explore the idea of using technology for culture transformation. This began my PhD work in developing digital tools and its associated methodology for change in a new university. In conjunction with a commercial company in the Netherlands who sponsored

their software platform for the project, and through the use of an openly available culture tool, I developed the architecture and platform for the digital tool and tested it with the university population of faculty, staff, and students to validate the methodology and the results. Many positive outcomes came out of the tool, which continues to help facilitate the success of SUTD today. In this book, I will share the developmental process and methodology of the digital tool, called the "Culture Acceleration Tool and Methodology (CATM)," and its successful outcomes through the case study of two organisations. There will be explanations of the concepts underpinning the design and configuration of CATM and its associated culture tool. We will also discuss, in detail, the use of group decision support systems as a platform in which CATM was built.

Before we move on to the topic of CATM, we will talk about Industry 4.0, the future of jobs, workforce planning, and digital leadership. These are necessary preambles to the topic of culture transformation. Next, we will touch on the theoretical concepts underpinning organisation culture and change management before moving on to the use of digital tools for culture acceleration.

1.3 RAPID DIGITIZATION AND ADVENT OF INDUSTRY 4.0

Industry 4.0 is here, today. When we trace through history, starting with the development of the steam engine in the 1800s to where we are now, in 2019, we have actually moved from the "First Industrial Revolution" to what is now called the "Fourth Industrial Revolution." This is a period ushered by rapid digital transformation where end-to-end digital and intelligent systems, artificial intelligence (AI), internet of things

(IoT), robotics, and data analytics dominate the world. We have shifted from what we call "mechanization" to what is now deemed the period of "autonomy."

As depicted by Hawksworth, Berriman, and Goel (2018), the three waves of digital automation are described as the Algorithm Wave, Augmentation Wave, and Autonomy Wave (see Table 1.1).

Following this autonomy wave, we see six megatrends taking place today.[3] These megatrends are as follows:

1. People and the Internet. This is where wearable and implantable technologies are changing how people connect and interact with the world around them.
2. AI and Big Data. This is the ability of software to learn and evolve, thus building on big data for effective decision making.
3. Sharing Economy and Distributed Trust. This is where disruptive technologies that can enable new efficiencies and business models arise. In this ecosystem, assets can be shared, replacing third-party suppliers to provide trust for financial, contract, and service activities.
4. Computing, Communications, and Storage Everywhere. There will be a rapid decline in the size, power, and cost of technology, which will lead to ubiquitous computing and connectivity anywhere and anytime
5. Digitization of Matter. In this scenario, 3D printing will revolutionalize industries, ranging from manufacturing to human health, as well as transplantable organs in the future

3 Taken from WEF Global Agenda Council on the Future of Software & Society. Survey Report, *Deep Shift: 21 Ways software will transform global society*, November 2015.

Table 1.1. Algorithm Wave, Augmentation Wave, and Autonomy Wave.

Phase	Description	Tasks Affected	Industries Affected
Algorithm wave	Automation of simple computational tasks and analysis of structured data, affecting data-driven sectors (e.g., financial services)	Manually conducting mathematical calculations or using basic software packages and Internet searches. Despite increasingly sophisticated machine learning algorithms becoming available and commoditized, more fundamental computational job tasks will be most affected first	Data-driven sectors (e.g., financial and insurance, information and communication and professional, scientific and technical services)
Augmentation wave	Dynamic interaction with technology for clerical support and decision making, including robotic tasks in semi-controlled environments (e.g., moving objects in warehouses)	Routine tasks that include the physical transfer of information (e.g., filling out forms and exchanging information). A decreased need for many programming languages is also likely, as repeatable programmable tasks are increasingly automated and machines themselves build and redesign learning algorithms	Financial and insurance sectors, along with other sectors with a higher proportion of clerical support (e.g., public and administration, manufacturing and transport and storage)

Table 1.1. (*Continued*)

Phase	Description	Tasks Affected	Industries Affected
Autonomy wave	Automation of physical labor and manual dexterity and of problem solving in dynamic real-world situations that require responsive actions (e.g., transport and manufacturing)	Artificial intelligence and robotics will further automate routine tasks and tasks that involve physical labor or manual dexterity, including the simulation of adaptive behavior by autonomous agents	Construction, water, sewage and waste management and, with the advent of fully autonomous vehicles and robots, transportation and storage

Source: Hawksworth et al. (2018).

6. IoT. This is where smaller, cheaper, and smarter sensors are becoming commonplace in homes, clothing, cities, transport, energy networks, manufacturing processes, transportation, and more.

The impact of digital transformation in the fourth industry revolution is seeing a major shift in work as jobs are gradually being replaced by advanced robotics and machine intelligence at a faster rate than is being created. The innovation economy will result in a new currency called information and data, a new form of human capital that lies in creative talents and multi-disciplinary capabilities, and new skills in the area of AI, data analytics, and 3D printing. The ability to work across disciplines is critical, as the workplace needs to have the means to assemble multi-disciplinary teams to develop eco-systems to support the future of work. Mr Elon Musk, the famous technopreneur, is an expert generalist, as he is able to integrate concepts from different fields, thus transferring knowledge across different domain areas.

1.4 FUTURE OF JOBS

In the future of jobs, more jobs will move from physical manual labor to work that is creative and innovative. The new skills that will be in demand will be the ability to work across disciplines, being creative and innovative, and possessing good communication and people skills. In this digital age, knowing how to work on different media platforms and leveraging them for persuasive communication will be a key strength for individuals and companies. Virtual collaboration and social intelligence both become critical as we harness the ability to not only work virtually across boundaries, but also having the

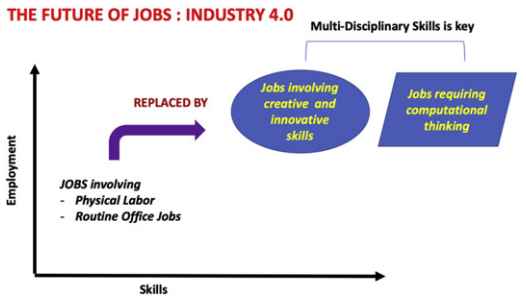
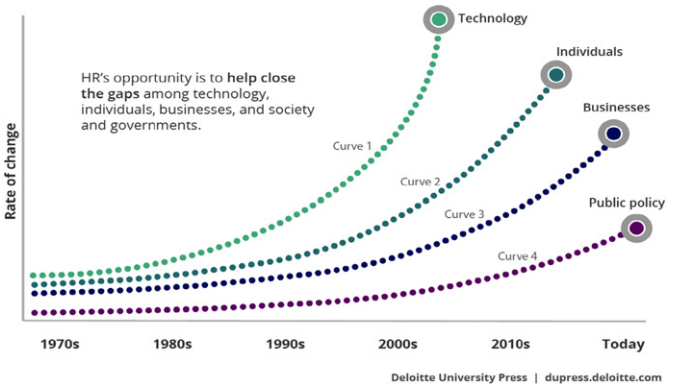


Fig. 1.1. The Future of Jobs.

ability to assemble a virtual team together through technology to develop deep collaborations. Lastly, having innovative and adaptive thinking to be able to derive solutions beyond which is routine will become more and more important (Fig. 1.1). *Design Thinking* is one of those skill sets gaining popularity today, as new innovations in products and services goes through design cycles and iterations before they are launched.

In view of the sweeping changes in the future of work, there is currently a big gap between the advent of technology and the ability of businesses to catch up with the changes. Companies are not adopting technology as fast as they could due to a skills gap within the workforce and the lack of resources to automate. In a recent study by Deloitte Consulting, it was discovered that public policy was the slowest to catch up as compared to the rate of technological changes. On the contrary, individuals are catching up with technology at a faster rate as compared to businesses and public policy. This is a result of the ubiquitous nature of the mobile device that individuals carry with them. They can tap into various types of applications (apps), platforms, digital media, and payment gateways to fulfill their lifestyle needs, which drive adaptation. As shared, in most countries public policy is still too slow in catching up with the rate of change (see Fig. 1.2).



Source: Taken from the article, "Rewriting the Rules for the Digital Age," 2017 Deloitte Global Human Capital Trends Report, Deloitte University Press. Used with permission.

Fig. 1.2. What Is Really Happening.

In Singapore, we are in a unique situation, as the government has been very proactive in addressing these challenges at a very early stage. They have mapped out the Smart Nation Strategy and also developed Industry Transformation Maps in various sectors to cope with the sweeping technological changes happening in the world. In a recent Automation Readiness Index, reported by *The Economist Intelligence Unit* on 25 select countries based on various technological and socio-economic indicators, Singapore ranked third among the 25 countries, after South Korea and Germany, with a score of 87.3% (Fig. 1.3).

In its transition toward a digital economy, the government has developed skills frameworks for the 23 areas of Industry Transformation and also developed maps to highlight the skills required in the near future. They are also addressing the skill shortages in different sectors. Strategies in Singapore include providing employment support enhancement and career enhancement. Employment support

Source: Adapted from "The Automation Readiness Index- Who is Ready for the Coming Wave of Automation" – The Economist Intelligence Unit.

Fig. 1.3. Ranking of Singapore in the Automation Readiness Index.

includes career conversion and wage support programs deployed to minimize job losses, improve skills, and reduce wage mismatches.

In order to ensure workers catch up with the pace of digital transformation, public funding of the Skills Future Program provides subsidies of up to 90% for workers seeking to enroll in courses related to future skills such as data analytics, cybersecurity, and development of network infrastructure, to name a few. Singapore's institutes of higher learning also work closely with the government to provide education at both undergraduate and graduate levels which are relevant to industry needs. All of the institutes of higher learning have also set up lifelong learning institutes or academies to provide training for adult learners in relevant skills. SkillsFuture Singapore (SSG), a key statutory board set up to look at future skills needed to drive Singapore's industry transformation, have mapped out core skills needed in each of the different sectors. These skill sets have been developed in consultation with employers, unions, associations, lead agencies and education institutions, and they provide a reference point to

the different stakeholders to make informed decisions on their career development journey and for employers to design progressive human resource practices to recognize and develop those skills. Training providers can also use the framework to develop industry relevant programs to respond quickly to employers' and individuals' needs. SSG have kindly provided for us, for the purposes of this book, a sample table (Table 1.2) with the mapping of skill sets needed in the fields of AI, Automation, and Technology. The list gets refreshed as the economy progresses and is not meant to be comprehensive for the purposes of this publication.

1.5 WORKFORCE PLANNING

Workforce planning is a critical component of reshoring and identifying critical skills gaps for the future of work. It allows organisations to take a strategic view of things and employ strategies to:

- Attract a skilled workforce for current and future capabilities.
- Retain valued employees to help propel growth.
- Build capacity in the long run.
- Provide strategic leadership necessary to model the right behaviors.
- Develop an efficient and flexible workforce to cope with constant change.

Workforce planning involves the benchmarking of current capabilities against future strategic requirements. Capability

Table 1.2 In Demand Skills in AI, Automation and Technology as of 2019.

Electronics (semiconductor)/precision engineering/manufacturing	Cyber Risk Management, Data Analytics System Design, Data Synthesis, Embedded System Integration, Internet of Things (IoT) Management, Automated Operation Monitoring, Automated System Design, Automated System Maintenance, Automation Process Control, Process Integration, Sustainable Manufacturing
Energy and chemicals/energy and power	Process Optimization, Robotics and Automation Application, Data Analytics System Design, Business Intelligence and Data Analytics, IoT Management, Autonomous Systems Technology Application
Marine and offshore/sea transport	Additive Manufacturing, Laser and Optics Application, Robotics and Automation Application, Big Data Analytics, Interface Management, Systems Architecture Design, System Configuration Management, Systems Integration, Condition-based Monitoring
Engineering services	3D Modeling, Building Information Modeling Application, Artificial Intelligence (AI) Application, Condition-based Assets Monitoring Management, Data and Statistical Analytics, IoT Management, Financial Modeling

Logistics	Data and Statistical Analytics, Material Flow Modeling, Supply Chain Solutioning/ Modeling/Planning/Strategising, Automation Design, Autonomous Logistics Design and Application, Technology Infrastructure Management and Integration, Integrated System Design and Application, Cloud Computing Application
Air transport/aerospace	IoT Application, Data Analytics, Human–Robot Collaboration (HRC), Composites and Advanced Coatings, Additive Manufacturing
Environmental services	Data and Statistical Analytics, IoT Management, Knowledge Management, Robotics and Automation Application
Security	Access Control Management, Robotics and Automation Application, Security Surveillance Management
Healthcare	Data Analytics, Automated Distribution Management
Landscape	Data Analysis and Interpretation, Automation of Landscape Operations
Retail	Consumer Intelligence Analysis, Customer Behavior Analysis, Market Trend Analysis Sentiment Analysis, Inbound Marketing, Paid Search Engine Marketing, Search Engine Optimization, Social Media Marketing, Social Media Management, E-Commerce Campaign Management, Marketing Campaign Management, Data Analytics, Data-Mining and Modeling, Infographics and Data Visualization, Merchandise Performance Analysis, Delivery Optimization

Table 1.2 (*Continued*)

Infocomm Technology/media	Analytics and Computational Modeling, Applications Development, Business Innovation, Business Needs Analysis, Business Process Re-engineering, Cyber Forensics, Data Design, Data Engineering, Data Governance, Data Strategy, Data Visualization, Enterprise Architecture, Emerging Technology Synthesis, Infrastructure Design and Strategy, Integrated Marketing, Network Configuration, Security Architecture, Security Assessment and Testing, User Experience Design, Game AI Development, AI Application, IoT, Cybersecurity, Immersive Media, 5G
Financial services	Technical Analysis, Behavioral Finance, Credit Assessment, Credit Risk Management, Customer Experience Management, Data Analytics and Computational Modeling, Emerging Technology Synthesis, Fraud Risk Management, Market Risk Management, Regulatory Compliance, Technology Application, Trading Management
Accountancy	Audit Compliance, Fraud Risk Management, IT Adoption and Innovation
Human resource	Human Resource Digitalization, Technology Integration, Human Resource Analytics and Insights, Digital Marketing and Communication

Public transport	Computer-based Asset Monitoring Management, Data and Statistical Analytics, IoT Application, Robotics and Automation Application
Design	Data Analysis and Interpretation, Data and Information Visualization, Emerging Technology Synthesis
Wholesale trade	Social Media Management, Data Analytics, Technology Integration, Data Mining and Modeling, Market Profiling, Market Research, Credit Risk Management, Fraud Risk Management, Market Risk Management, Customer Experience Management, Customer Relationship Management, Credit Assessment, Delivery Management
Hotel and accommodation services/ tourism	Data Analytics, Hospitality Data Collection and Analysis, Business Data Analysis, Data Mining and Modeling, IoT, Technology Adoption and Innovation, Digital Marketing, Social Media Marketing
Training and adult education	Emerging Technology Synthesis, Technology-Enabled Learning Delivery

Source: Table courtesy of SkillsFuture Singapore (2019).

gaps can then be proactively addressed and rectified through job redesign, restructuring, external recruitment, performance management, and learning interventions. In the HR Division at the Singapore University of Technology and Design, we've been preparing the team for the advent of technological changes. While the workload has increased three to four times, the workforce has not increased. As we anticipate the future, the team has equipped themselves with new skills in data analytics and social media communications. In addition, we have also invested in technology and automated many of our manual processes. This has resulted in improved productivity.

1.6 ROLE OF LEADERS IN DIGITAL TRANSFORMATION

How then do leaders lead and transform the workforce? How do they manage diverse teams and equip their workforce with the new capabilities, while leading the digital transformation in the workplace? How can they develop innovative and adaptive thinking skills in their employees while harnessing social intelligence? The five capabilities include:

1. A visionary mindset and change management capability;
2. Capabilities to manage multi-disciplinary teams;
3. Ability to manage and communicate in various media forms;
4. Ability to develop computational thinking capabilities;
5. Harnessing innovative and adaptive thinking.

A discussion of each of these follows in the remainder of this section.

1.6.1 A Visionary Mindset and Change Management Capability

How do leaders lead and manage change in the digital age? They need to have a good understanding of the digital market and a visionary mindset to manage digital disruptions. This includes setting a vision for the future and championing and promoting the buy-in for change by listening to the views of their teams and working alongside them in the change process. Employees want to see that their leader's vision is based on a deep sense of what is necessary, right, and good for the business and the people. A good leader has the ability to paint a future that responds to the changes in the environment and crafts out plans and strategies that align with their team members' aspirations. This is necessary to achieve individual and collective success.

1.6.2 Capabilities to Manage Multi-disciplinary Teams

The ability to bring together diverse capabilities to form teams able to solve complex problems or work on a new solution is a crucial skill for digital leaders. This will require the leader to assemble people who have deep functional expertise while capturing enough breadth to cover the scope of the project at hand. After assembling teams, they will need to foster deep collaboration within the team to deliver performance. In essence, leaders need to think like designers and use the concept of Design Thinking to work with their multi-disciplinary teams to skillfully harness ideas, develop prototypes, and provide solutions in the area of a product, service, or system. The skills in Design Thinking include being

a good facilitator and mediator, challenging and trusting teams to come up with innovative solutions, stimulating learning and exploration, and fostering a creative atmosphere for success.

1.6.3 Ability to Manage and Communicate in Various Media Forms

Due to the advent of the digital age and permeation of social media, leaders need to learn how to use different digital platforms to engage with the workforce. He or she should be hyper-connected and provide real-time interactive feedback and coaching to their team members, who are very used to interacting through new technologies and social networks. This is especially true of the millennial workforce who will form the main bulk of our teams in the years to come.

1.6.4 Ability to Develop Computational Thinking Capabilities

Leaders need to cultivate talent in the area of data analytics, and develop a plan to build, procure, develop, or partner to improve data and automation know-how. This includes creating a people strategy to plan transition, and training employees to ensure their skills are kept up to date. Digital skills training can be done through developing and promoting an environment of continuous learning via technological tools, apps, and other digital platforms. Good digital leaders are, themselves, able to make quick decisions based on data and develop the right team in order to deliver key analytics-driven insights when needed.

1.6.5 Harnessing Innovative and Adaptive Thinking

Good leaders manage risk, exhibit curiosity, take risks, and have the courage to make strategic decisions that can benefit the organisation. They encourage a spirit of experimentation and development of ideas in their team to foster an innovative and adaptive workforce. At the same time, they also provide a degree of direction to employees by removing barriers so as to enable them to succeed.

1.7 CULTURE AS THE CATALYST FOR CHANGE

In today's fast changing technological landscape, many organisations are struggling to catch up with the changes in Industry 4.0. This includes reconfiguring the workplace and jobs, as well as developing systems and processes to cope with new technologies storming the workplace. In order to help leaders and workers adapt to these changes, as shared in the beginning of this chapter, culture transformation becomes a critical element of this process. However, culture change can be a slow and tedious process, often taking a long time in the organisational transformation process. The ability to move fast and transform fast is the ethos of successful organisations. Microsoft, Netflix, and Google are examples of companies that have successfully managed radical changes to help their organisations move ahead of the curve, thus enabling success. The secret to this is the ability to change fast and to anticipate and create customer demands. They also create a collaborative and entrepreneurial culture so as to harness new ideas and creativity. Netflix, for example, uses collective intelligence, harnessing the power of many teams to solve complex problems, rather than a single team or a single idea. Ross Brooks (2018), in his article, "Netflix Company Culture," shares that

Netflix's culture is about "people over process" and that the company places a great deal of importance on teamwork. Individualism is discouraged and people are, instead, encouraged to be highly effective collaborators. Values are very important and team members are likely to be promoted based on how much they exemplify the Netflix core values.[4]

In another example of harnessing collective intelligence, an ex-Googler that I met recently, shared that Google uses the idea of small autonomous full stack teams that are empowered to deliver solutions. These teams operate like mini start-ups and are allocated resources and guidance so they can independently manage and quickly deliver solutions and products to market.

Companies who have quickly transformed their culture to meet the demands of Industry 4.0 are the ones who have proven to be successful as can be seen in the above examples. Company culture is an integral part of business and cuts across every aspect of an organisation – from its values and mission to performance, staff morale, loyalty, and engagement.

What is culture and how does an organisation use the right cultural tools, and methods to get their workforce to align to the new world as well as the company's vision and mission? In this book, I hope to shed more light on culture and the principles needed to ensure successful culture transformation in organisations.

4 https://peakon.com/blog/workplace-culture/netflix-company-culture/.

2

ORGANISATIONAL CULTURE AND CHANGE MANAGEMENT

2.1 DEFINITION OF ORGANISATIONAL CULTURE

Cameron and Quinn (2011) defined organisational culture as, "…the taken-for-granted values, underlying assumptions, expectations, and definitions that characterize organizations and their members. It is an enduring slow-to-change core characteristic of organisations" (Cameron & Quinn, 2011).

Edgar H. Schein, a well-known culture guru, defines organisational culture as "A pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid. It is therefore taught to new members as the correct way to perceive, think and feel in relation to those problems" (Schein, 2004).

Culture is also very complex and not easy to crystallize. However, it is a critical part of the organisational glue that binds people together toward a common vision and

goal. Fralinger and Olson (2011) state that a strong and well-defined culture helps to pave the way for stakeholders to align their actions toward achieving an organisation's vision and objectives. Satya Nadella, in his book, *Hit Refresh* (2017), shares that an organisational culture is not something that can simply unfreeze, change, and then refreeze in an ideal way. It takes deliberate work, and it takes some specific ideas about what the culture should become.

In another definition, the concept of culture, as described by a very successful CEO of a large global company with whom I recently spoke to, is one in which culture and values are very much integrated. It is the reason customers trust a company and why employees feel attracted to and have a sense of belongingness. This is also what holds a community together. He shares that culture needs to be built over time and protected, as it is something that can be fragile and easily broken.

On a practical application, culture also means getting the team to be self-aware and able to apply the organisational values and actions that validate the current organisational culture. It is also about internalizing and walking the talk. In his organisation of 35,000 employees, alignment of culture and values becomes even more important, and this needs to be achieved through various levels of engagement, communication, and work systems, as well as through common understanding. This common understanding is reinforced by Van den Berg and Wilderom's (2004) notion of culture as "shared" perceptions of organisational work practices within organisational units. Given that these are shared perceptions, it is important that members of the organisation participate in the process of agreeing upon their perceptions of the current culture, define their desirable cultures, and share these perceptions.

2.2 CULTURAL ALIGNMENT

In order to walk the culture journey, senior management, key stakeholders, and HR professionals will need to be aware of and well-equipped with the necessary knowledge and tools to help members in the organisational unit achieve the desired culture change. This will need to be done, together with the support of employees across business units, functions, and levels. In a case study on Google's people practices, the company embarked on a project entitled "Aristotle." In this project, a team called the "Aristotle team" set out to determine what facilitated constructive collaboration and also identify what appeared to be a cornerstone of constructive collaboration. They found that what marked successful and collaborative teams was that each tended to develop its own unique set of informal but powerful "group norms" – traditions, unwritten rules, and informal standards – that govern how people should behave when engaged in pursuing this particular team's goals and objectives. After they tracked over 100 groups for more than a year, Project Aristotle researchers concluded that understanding and reinforcing each team's group norms was the key to understanding team performance – if not necessarily improving it. In other words, they found culture matters more than competency.[1]

In another aspect of cultural alignment, members of an organisation will also need to have a common understanding of the shared beliefs of the organisation. Through this understanding, cultural alignment can then be achieved. As such, given that these are shared perceptions, it is important that members of the organisation participate in the process of

1 Taken from: https://www.shrm.org/resourcesandtools/hr-topics/organizational-and-employee-development/pages/viewpoint-what-we-can-learn-from-google-about-collaboration.aspx.

agreeing upon their perceptions of the current culture, defining their desired cultures, and working toward a common culture that will shape the organisation.

However, subcultures may exist across different organisational units, levels, and even among individuals. This is due to a variety of reasons, including different personalities, motivations, goals, needs, agendas, and backgrounds. Consequently, these stakeholders may also have different perceptions of the current state of culture in the organisation, and their desired organisational culture. It is, therefore, important to identify the perceptions of the key stakeholders in the various units about the organisation's current and desired cultures. If the current culture and/or subcultures are found to be different from the desired organisational culture that is needed to drive organisational strategy, then the organisation will need to undergo a culture change exercise.

2.3 ORGANISATIONAL CHANGE MANAGEMENT

How do you ensure that everyone in the organisation subscribes to the new culture that you are setting and aligns with it? Marcella Bremer, in her book, *Unleashing your Organisation's Potential in Circles of 10* (Bremer, 2012), states that the most successful way to change is by engaging co-workers and employees so they are motivated to share interesting information, insights, and ideas to improve culture, leadership, engagement, strategy, diversity innovation, and performance. Many other authors have described the necessary steps for organisational culture change (Buch & Wetzel, 2001; Cameron, 2008; Hooijberg & Petrock, 1993; Kotter, 1995). The eight steps, as collated through various authors, are shown in Fig. 2.1.

Fig. 2.1. The Eight Steps to Culture Change.

First, a period of assessment is required to identify which aspects of the organisation will need modification. An initial step toward cultural transformation is to define "what it means" and "what it doesn't mean" for the culture of the organisation to change (Cameron & Quinn, 2011). Hooijberg and Petrock (1993) used surveys based on the "Competing Values Framework" (Quinn, 1988) to identify the current values and desired cultures. Other authors recommended directly observing the material cultural objects and espoused values within the workplace and inferring how these objects and espoused values reflect the basic underlying values and culture of the company (Buch & Wetzel, 2001).

The second step is to identify some (at least one or two) positive stories (anecdotes) that reflect the desired culture. These stories, for instance, may highlight a recent example of excellent customer service in a company that desires to become more "customer-centric." The stories may be motivating, and clarify what is to be accomplished by the change. LaGuardia (2011) suggests that the best way to identify stories is through a process of "inquiry, engagement, and review," incorporating surveys, interviews, debates, and posting results in a common forum.

Thirdly, the organisation must then determine strategic initiatives, outlining which activities will be initiated, terminated, or modified. As a group, the stakeholders identify these strategies through brainstorming, reviewing the current processes and policies for improvement, and ultimately discussing and agreeing on an action plan before moving on to step four. Moreover, the groups regularly monitor progress toward these initiatives in a continuous iterative manner.

Fourth, the organisation should identify "small wins," describing quick and easy, but successful, changes. The small wins will serve as incentives and motivation for bigger changes that are needed and help to reduce resistance. This is akin to the "tune-ups" described by Buch and Wetzel (2001). Tune-ups are shallow changes, often to "artifacts" or visual symbols of culture. This type of change can be as simple as hanging a new, highly visible, sign. "The immediacy of the changes produced by tune-ups can build trust and commitment to the change process" (Buch & Wetzel, 2001).

The fifth step entails crafting metrics, measures, and milestones. The organisation must determine the key indicators of success, what to measure, how to measure it, and when certain levels of progress will be noted as a crucial part of the change process. Change requires the identification of indicators of success in culture change, as well as interim progress indicators. A data gathering system needs to be designed, as does a timeframe for assessing the results. What gets measured gets attention, so the key initiatives and outcomes must be associated with the metrics and measuring processes. In a way, overloading systems with multiple measures is a sure way to kill change initiatives, so the key to good metrics, measures, and milestones is to identify few enough to be helpful, attach them to decisions, resource

allocations, and key levers and indicators of change. In addition, we have to ensure they are understood by those involved in the culture change process. This should form part of the change document where we capture key outcomes to be achieved and track the milestones of the identified culture change projects.

The sixth step, "communicating the culture change process is a critical tool in helping to overcome resistance and generate commitment. When we explain why the culture change is necessary and beneficial, it will be a vital step in generating commitment" (Cameron, 2008).

Seventh, communications need to be shared with as much information as possible, disseminated broadly on a regular basis, and should highlight positive aspects of the environment. It should also describe the parts of the past that will not be carried forward while avoiding their criticism. Visual symbols of change, e.g., new logos or structures, can be helpful in this regard. This should also constitute the broader project of change through regular management forums, key management meetings, and employee communication sessions. Communications can also be done through using social media and group decision support systems in order to ensure commitment and overcome resistance.

For the eighth step, Kotter (1995) underscored the importance of creating a sense of urgency. Although rather risky, in some cases this could mean that organisational leaders sometimes "stage" or identify a crisis. Public reports of customer dissatisfaction and financial losses are often effective catalysts for change, even when purposefully manufactured by company leadership.

Ninth, form a "powerful guiding coalition" (Bremer, 2012; Kotter, 1995). According to K. Cameron, "Building coalitions of supporters among key opinion leaders, involving

individuals most affected by the changes, and empowering individuals to implement aspects of the change process are also ways to help reduce resistance" (Cameron, 2008). Leaders of the organisation must champion the culture change, and develop future leaders with the necessary competencies to sustain the change.

2.4 BARRIERS TO CULTURE CHANGE

In change management, we must also consider the barriers to change. Understanding these barriers will help us to manage the change process much more effectively. There are many different types of barriers to culture change. Schein shares that "If an organisation has had a long history of success based on certain assumptions about itself and the environment, it is unlikely to want to challenge or reexamine those assumptions" (Schein, 2004). These assumptions often serve as a source of pride and identity and, thus, are seldom examined or challenged. Schein further states that, "Once a culture exists, once an organisation has had some period of success and stability, *the culture cannot be changed directly, unless one dismantles the group itself*. As a result of this, a company turnaround or transformation may sometimes require outright coercion" (Schein, 2004).

Some culture changes occur naturally, over time, as the company evolves, while others are planned. The process of initiating change may also differ based upon the stage of the organisation (Schein, 2004). When a group is formed, the decisions made by company leadership, in some sense, also establishes workplace culture, such as hiring practices and resource allocation. At this stage, culture is likely to be strongly adhered to, as "… (1) the primary culture creators are still present, (2) the culture helps the organisation define

itself and make its way into a potentially hostile environment, and (3) many elements of the culture have been learned as defences against anxiety as the organisation struggles to build and maintain itself" (Schein, 2004).

Once the organisation is established and successful, however, its culture is difficult to change. It often takes a catastrophic event to spur change, such as a major loss or product failure. "To embed new assumptions in a mature organisation is much more difficult than in a young and growing organization because all of the organization structures and processes have to be rethought and, perhaps, rebuilt" (Schein, 2004). Several barriers to rapid cultural change have been identified. They include:

- The development of subcultures. "No real-world company works as one uniform whole" (Vilet, 2013). Schein (2004) characterized three types of subcultures: Operations (drivers of daily activities), Engineering (focused on technology), and Executive (often focused on financial matters). Cultural change may occur through the systematic promotion of members of a selected subculture; however, this is a particularly slow process and the basic underlying culture of the organisation may overshadow any attempts at change (Schein, 2004). Furthermore, a worker who is transferred between subcultures requires "time to adjust and get accustomed to the sub-culture like that of a brand-new employee."
- Effects of broader social culture. Corporate culture may be more complex than anticipated, as the organisational culture typically descends from, or is influenced by, its broader social culture (Weeks, 2004).
- Effects of the existing culture. The existing culture of an organisation may be one of resistance to change, or the

desired culture may clash with the existing one (Smith, 2003). In a case study of the company "Eurel" (a pseudonym), it was stated that "The company culture of tolerance and its aspiration in being an employer for life, perhaps create[d] an amount of stagnation in terms of it being slow to change" (Ryan, 2005). Other cultures that experience difficulty with change include those that are inward-looking, bureaucratic, and autocratic (Kotter & Heskett, 1992).

- There are too many interrelated, complex pieces of the puzzle. It is difficult to change culture because "an organisation's culture comprises an interlocking set of goals, roles, processes, values, communications practices, attitudes and assumptions. The elements fit together as a mutually reinforcing system and combine to prevent any attempt to change it. That is the reason why single-fix changes, such as the introduction of teams, or Lean, or Agile, or Scrum, or knowledge management, or some new process, may appear to make progress for a while, but eventually the interlocking elements of the organisational culture take over and the change is inexorably drawn back into the existing organisational culture."
- Ineffective or slowly transitioning leadership. New leadership does not necessarily mean a shift in culture. Grooming new leaders takes time. When a leader selects and trains a successor, it is often someone from within the company, usually in the leader's own image. There may be less resistance to new management if the leader is "one of us." Particularly when leadership is passed down through a founding family, this person is likely to adhere to the present culture and is trained in the likeness of past leaders. If a successor appears to stray too far from

established values, the previous leader may intervene (Schein, 2004). Cultural shifts may occur if new outside leadership is established and workers who do not adhere to new standards end up resigning or are forced to leave. As with the promotion of internal employees, however, new outside leadership does not necessarily translate to a change in culture. When James Wolfensohn was brought in to lead World Bank from 1995 to 2005, he "launched a massive reorganisation that preoccupied managers and staff for several years, though as in earlier reorganisations, the -culture re-emerged largely unscathed from the experience, despite the changes in personnel and structures." In later years, under new outside leadership from Paul Wolfowitz, "the organisation, which has no tradition… of bringing in new managers from outside, responded like an immune system reacting to invading pathogens." If new leadership is not accepted, new systems fail to result in improvements, the new leader is not given credit for success, or the new systems are too threatening to core beliefs, the new management may then be discredited or forced to resign (Schein, 2004). Culture change may also be stimulated by bringing new employees from outside the company into jobs below the top management level and then allowing them to gradually educate and reshape the thinking of company leadership. This is most likely to happen when the new employees serve as managers of subgroups, reshape the cultures of those subgroups, become highly successful, and, hence, create a new model of organisational function (Kuwada, 1991; Schein, 2004). This process takes time. Perhaps the turnaround of World Bank under the guidance of Robert McNamara in the late 1960s to early 1970s was relatively rapid, with a new philosophy accepted within four years because of a new leader with a clear vision, but one who

did not waste time at the beginning with reorganization or hiring a new workforce (Denning, 2011).

- Excessive turnover. In an attempt to transform the culture of long-term care facilities, it was noted that the effective administrators were "frequently removed temporarily from their facility to 'fight fires' and deal with crisis situations in other facilities or they were promoted into regional supervisory positions. In both situations, these actions effectively delayed and short-circuited the development and/or implementation of culture change in the primary facility" (Scalzi, Evans, Barstow, & Hostvedt, 2006).
- A lack of psychological safety. A worker may feel anxious when learning new information or methods (Schein, 2004) or when his/her role or value within an organisation is unclear (Hill & McNulty, 1998). To create psychological safety requires a significant investment of time and effort into training. Furthermore, staff members "are not going to change their way of seeing their job and their own role overnight" (Hill & McNulty, 1998). A digital platform will serve as a basis for staff to voice their concerns anonymously and provide the platform for change. The tool allows for staff interaction and participation in the change process, thus reducing the anxiety associated with change and learning of new methods.
- The need for confirming data. It takes some negative experiences to spur change; it will take some positive, confirming data to stabilize and internalize a new cultural viewpoint. If these positive data are not presented, further change may be catalyzed (Schein, 2004). Depending upon the outcome measures, it may take time to see the effects of a cultural shift.

- Unclear or ineffective processes for attaining goals. A new goal may be established, but senior management may not be clear about how to attain that goal, leaving the employee to adopt a "trial and error" approach. While, perhaps, time-consuming, this approach of employee involvement often leads to greater internalization of a new value system (Schein, 2004). Moreover, as our culture change process has the stakeholders participating in defining the desired culture, and the means to achieve it, there is less chance that the stakeholders and senior management will not be clear about how to attain the goal. In other cases, a new goal may be established, but processes are not changed to reflect new values. Hence, change is slow or nonexistent. As in the case of World Bank under the leadership of Wolfensohn, the "goal was for the first time clearly focused on fighting poverty. However, as all of the management systems and processes remained focused on getting out the lending program, the [new] mission statement has still had little operational impact" (Denning, 2011). Again, as the stakeholder groups are participating in identifying measures for culture change, there is less likelihood that process change will accompany the change of goals.
- Issues related to resources and controls. A lack of working capital or other resources, or poor resource allocation, may inhibit change. In the case of the nurse education merger described by (Hill & McNulty, 1998), the organisation ran into roadblocks due in part to the "contract manager's need to keep tight central controls on the budget in at least the first year of the contract." placed in his full support behind this project and provided the needed resources.
- Changes are not carried forward. Successful strategies may not be passed down to new leaders, or memories may

become blurred regarding why strategies were successful (Kotter & Heskett, 1992; Smith, 2003). It is possible that online platforms and word of mouth could help to transmit strategies and success stories to the next generation of leaders. Collaborative platforms would allow for a regular iterative measure of progress toward culture change. Regular monitoring means that we would get an early warning if the change is not carried forward, or if (or when), with experience, the goals themselves change.

- The need for clear communication. This is, perhaps, the most important. In the case of the nursing education merger (Hill & McNulty, 1998), "One of the first tasks was to involve the senior team in a range of activities that would encourage their commitment to the new contract management. This involved setting up meetings, sharing information and involving them in a range of project teams to address particular issues." Face-to-face meetings take time and may be particularly difficult if there are a large number of people involved and employees are spread across multiple campuses. As Hill and McNulty (1998) noted, "it is very difficult to get everyone together regularly and involve them in departmental matters, although shared meetings such as teaching workshops, academic liaison meetings and research forums are available to all staff." The importance of communication was echoed by Smith (2003) and Spicer (2011). In 1991, Kuwada suggested that "face-to-face communication is the most powerful way of exchanging and processing rich information." Other activities to perpetuate the culture change can be performed through regular forums, meetings, and the use of other social media platforms.

2.5 MANAGING CULTURE CHANGE IN MAJOR TRANSITIONS USING THE EIGHT-STEP MODEL: THE CERTIS CISCO STORY[2]

In my initial days as Vice President of Human Resources for a large security company based in Singapore, I worked very closely with the CEO to transform the culture and practices of a 60-year-old organisation. Following are portions of the story extracted from *Human Resources Magazine*, 2006

> *Certis CISCO was originally a statutory board set up some 60 years ago and is in the business of providing subsidiary law enforcement services as part of the Singapore's Ministry of Home Affairs. In 2004, a decision was made to liberalize the security services market and as a result CISCO was corporatized and bought over by sovereign fund, Temasek Holdings. When I joined the organization in January 2005, I was tasked at that time to work with the CEO to ensure that the workforce of 5,000 people became aligned with the purpose, vision, and goals of the new organization. This meant employees had to first understand the objectives for the restructuring and then encouraged to feel positive about the new directions the organization was heading. Therein lies one of the greatest culture transformation job that I facilitated in my 28 years of career as a HR Professional.*
>
> *At that time, many of the statutory board employees were used to an organization that did not have to worry about revenue and profitability. The transition*

2 Story obtained with permission from *Human Resources Magazine*. This was first published at https://www.humanresourcesonline.net.

was going to be something many were not used to as they have to transform and drastically change their way of performing their jobs. Taking reference from the eight steps to culture change listed, we started by looking at aspects of the organization that needed transformation. One of the immediate tasks was to help employees change their mindsets to one that was customer focused and revenue generating. Secondly, we worked as a team to develop the new organisational value proposition and with that proposition, we organized company-wide communication sessions to explain the restructuring. The number of sessions totalled more than 50 as we had to speak to groups of about 100 at a given time. This was definitely a very time-consuming exercise. I recalled every one of them was riddled with difficult questions surrounding job security, whether salaries would remain intact and how the change would affect the company. Aside from the communication sessions, we also produced FAQ booklets to help our supervisors answer tough questions. In order to ensure staff had the opportunity to provide feedback, we also set up hotlines and email to encourage them to voice their concerns. At that time, the sessions were taken very seriously by our top management including the CEO himself, who took time to take questions and address employee concerns. This was important, demonstrating not only management's sincerity but also helping staff get acquainted with the recently reshuffled team. Considering that job security and salary were amongst the issues most frequently raised by staff, my task was made that much easier by the fact there would be no job cuts and that salaries would remain intact. We focused on

aligning employees to the new direction and ensured that the sessions were handled properly to ensure no employee fallout occurred. Our focus at that point was mainly to become a more revenue and bottom line– driven organisation.

Moving to step three of the eight steps to successful change management, the company focused on which of the key changes that were needed to help move the company forward. When the security market was liberalized, CISCO had to move out of its comfortable monopolistic position to compete in the open market with other key players. On the one hand, while we were conscious of the need to engage staff in the change, we were also aware that the sooner the company restructured, the faster it could concentrate on working its competitive edge. We really did not have time to wait for all employees to be ready for the new business directions. When management and HR sense that they have done more than enough to facilitate the change and the majority of employees are ready, the organisation moved ahead with the changes.

Change Management and Mindset Shifts

After the dust had settled, it was one thing to get employees riled up and energised about the new business imperatives but another to ensure the organisation was adequately prepared to meet the new challenges. The best strategies had to be backed by the right business tools and systems. In order to ensure that the various HR systems and processes were up to speed, the company reviewed the way the key HR functions were managed and found three key

areas that needed to be improved on. These were compensation and benefits structure, employee engagement, and the recruitment process for rank-and-file employees. Firstly, Cisco's old compensation system was too limiting and rigid. It consisted of a few disparate salary structures for different levels and classifications of staff. There was hardly any room for an employee to progress beyond their existing scale or move across classifications. An employee who had been classified under the non-management group, for instance, will be not be able to grow further once he or she hits the band's ceiling. The company did away with the clumsy structures by integrating the different pay schemes into one single robust system that had the depth to cater for different aspects of career growth including movements across functions and countries. The new structure we implemented allowed for smooth progression of grades laterally and vertically and offered a career path for all levels of employees. As a result of that, the company was able to contain and reduce the attrition rate of key staff.

The voluntary turnover of top performers reduced as a result of the overhaul which indicated that compensation and career development were indeed key motivators. As part of step four of the change management initiatives, these were wins that we were happy to communicate to our employees. As a further step to improve organizational culture and employee engagement, we dug deeper into the mindset of employee by talking to line staff and visiting 'men at work' in various locations that they were deployed. As long as a Cisco officer was on duty

at a particular location, no place was considered too far or deserted for our team. I fondly recalled an incident when a HR team member visited a Cisco officer who was deployed to safeguard a reservoir. It happened to be raining that day. When the officer saw his first 'visitor' came by and asking him all these questions about how his work was getting on, he was extremely touched as no one from the corporate office had ever done that before. The kind gesture the company showed towards employee welfare was a strong morale booster. Moving towards step five of the process, we embarked to measure the success of our change management efforts through a major employee climate survey conducted five months after the corporatization. We found an unexpectedly high level of employee satisfaction with an engagement score of 75%. This was 20% above market average. A declining voluntary turnover rate and a high level of employee satisfaction are undoubtedly of high significance to any organisation. Steps six to eight of the change management steps were embarked throughout the next 3 to 4 years. The organization had an extremely strong communication process in place to ensure that whenever changes were made to wage structures, or when new systems and policies were implemented, we sought the opinions of line managers and supervisors and involved them in the change management process. This alleviated any mistrust and created a culture of inclusion.

The change process was of course not an easy one. There were obstacles along the way such as effects of current culture, existing bureaucratic processes, resistance to change, and others such as existing

> *sub-cultures. As illustrated by the story above, many of the existing structures and business processes had to be changed to adapt to a new organisational model. However, by adapting a systematic approach to change, and through sheer perseverance, we took many years to overcome it. One of the key success factors of the change was the constant communication to discuss the desired culture versus the current culture and the harnessing of ideas and suggestions from the employees on the ground in order to help make the changes and implementation much more effective. Although successful, the change process took a long time to achieve. In comparison, if we had digital tools like that of today, I believe the acceleration would have been faster. (*Human Resources Magazine, *2006)*

2.6 CULTURE INSTRUMENTS

In the process of managing culture change, the need to measure the current culture and desired culture and to identify the gaps is necessary for transformation to happen. The necessity for using a structured and validated instrument is crucial in the process. There are, currently, many different instruments for doing that. We reviewed about eight instruments, including the Organisational Culture Inventory, Harrison's Organisational Ideology Questionnaire, Competing Values Framework, MacKenzie's Culture Questionnaire, Survey of Organisational Culture, Corporate Culture Questionnaire, Hofstede's Organisational Culture Questionnaire, and the Organisational Culture Survey. These different tools have their advantages and disadvantages, but among all of them, we like the

Competing Values framework and its accompanying instrument, the Organisational Culture Assessment Instrument (OCAI).

The OCAI has strong face validity, is easy to use and administer, measures both the current and desired culture, and is relevant to Industry 4.0's requirements for innovation and collaboration. Its cultural dimensions also have congruence to the goals of promoting a culture of innovation and collaboration. Kim S. Cameron and Quinn (2011) also showed that the OCAI has a strong theoretical basis and, as explained, accesses both congruence and strength of culture. This has been proven by the extensive testing done by Cameron and Freeman (1991) in a study that encompassed four-year colleges and universities (n = 334) in the United States that covers 3406 participants.

2.6.1 The Competing Values Framework

The Competing Values Framework (CVF), and its associated culture measurement tool OCAI is suitable for bringing about an innovation and collaboration-oriented culture change in organisations. The CVF/OCAI classifies organisations into four quadrants: clan, hierarchy, market, and adhocracy. It does so by allocating 100 points among these four quadrants for six dimensions or six facets of the organisation (Cameron & Quinn, 2011). The CVF framework is based on a statistical analysis of the key indicators of organisational effectiveness proposed by Campbell, Personnel Decisions International, Navy Personnel Research and Development Center, and the United States National Technical Information Services (1974). It is formulated on the basis of fundamental assumptions about how organisations work and how they are managed. CVF and its associated OCAI describes and assesses

organisational culture at micro (individual) and meta (organisational) levels.

In our projects, we chose the CVF and its accompanying instrument, the OCAI, as an instrument of choice for the digital change management projects undertaken in the case studies. This will be further illustrated in following chapters.

3

ACCELERATE CULTURE CHANGE THROUGH DIGITAL TOOLS

3.1 INTRODUCTION TO DIGITAL TOOLS FOR CULTURE CHANGE

In the previous chapter, we noted that, although the CISCO culture project change was successful, it was a process that was long and tedious and took years to complete. This was especially so for a large-scale organisational culture change project where you have thousands of employees in different locations. As part of the change process, employee participation in idea generation and alignment is crucial to success. When we do not have the use of digital tools, the process is manual and required many face-to-face sessions in order to solicit feedback. However, with the use of digital tools and platforms, such feedback can be accelerated and asynchronous, reducing process time. In addition to its ability to reach thousands of people at the same time, such platforms allow for idea generation in real time, thus making the change process effective. These technologies and their abilities to speed up the process of culture change and reduce process losses will be important elements in change projects. In an article by Ewenstein, Smith, and Sologar (2015), the

authors commented that change management, as it is traditionally applied, is outdated and organisations will need to utilize digital tools to make change more meaningful and durable. Wearable technology, adaptive interfaces, and integration into social platforms are examples of digital tools that can be applied with great effectiveness to change management techniques. Digital tools could possibly address the problem of scalability and allow for users to connect through social platforms for more effective communication and discussion.

Today, there are many types of collaborative tools that can be used for the purposes of employee communication and deliberation. In the area of information sharing, you can use file sharing platforms such as Dropbox, Google Drive, or Wikis. There are other tools in the area of organisation and management such as Asana and Basecamp. Erin Leary, in her article, "Fostering Employee Engagement via Digital Workplace Tools,"[1] shares that crowdsourcing ideas and allowing various platforms for collaboration is the key to good employee engagement. She opined that "One of the foundational components to a digital workplace is a means of connecting people to information and expertise" (Leary, 2017). The elements of this type of platform, which should be available on mobile devices, should also include a central location where every employee has an identity and can establish a profile, a quick way to find expertise, forums where people can share information, links, or even files with each other, community for groups by skill or domain, a place to share company proprietary information securely, ways for a global workforce to be connected, as well as the ability for such integrated systems

1 https://www.nojitter.com/fostering-employee-engagement-digital-workplace-tools.

to provide a way for people to establish trust relationships with peers throughout the company.

Professor Namgyoo Park (2019) in his article on the cultural impact of automation shares that executives should encourage open communication within the company, utilizing conversational platforms to share information with the entire workforce. On these platforms, such as Yammer, Slace, and Hipchat, an executive can upload an analysis of a common concern, available for anyone within the company to offer insight on. Ideas can also be shared in real time, allowing for faster, more efficient collaboration.

3.2 COLLABORATION AND CULTURE CONVERSATIONS

All these methods and platforms allow a way for people to communicate and collaborate. Open communication and conversations are important aspects of organisational listening that is necessary for successful transformation. Digital tools are an effective way of enabling such conversations to happen. Conversations and discussions through the use of digital tools can effectively facilitate change and harness the power of collective intelligence to help with organisational transformations. Professor Park (2019) reiterated that, in order to produce collective intelligence, managers must ensure that employees do not feel isolated but are connected to a social, collaborative, and participatory environment in which everyone feels engaged, valued, and eager to contribute. Integration of social platforms into culture transformation projects is, thus, crucial. As an example, in Google, crowdsourcing platforms are used to harness ideas from both

employees and users. Through this method, collective intelligence and ideas are harvested to improve performance.

3.3 DIGITAL TOOLS USED FOR COLLABORATIVE DECISION MAKING

Digital tools facilitate collaboration and crowdsourcing of ideas and provide a platform for employees to work across regions and geographies. In the new organisation, networks of teams are the new mode of working, as can be seen from my previous comments about how new organisations like Netflix, Google, and Facebook operate. In this model, there should be platforms for the free flow of information and feedback to facilitate decision making and problem solving.

What exactly is collaborative decision making? It is defined as individuals collectively making a decision or a choice from alternatives laid before them. In today's complex world, collective ideas and teamwork can lead to better outcomes because you get more diverse ideas from people who are closer to the problem or issue, those who are well-versed on the topic at hand, and who have the relevant expertise. You also obtain buy-in from all stakeholders for purposes of implementation and alignment. In today's connected world, people want to participate, collaborate, and be part of creating solutions that affect them.

In the case of culture transformation, the use of collaborative tools for decision making can help with alignment of stakeholders to the desired culture at a faster speed than a manual process, as people are able to share ideas and come to a consensus in real time. The use of Group Decision Support Systems technology can provide many advantages in this case. Together with the use of such technology for digital

conversations, there must be a methodology to employ in order to ensure that the technology is effectively deployed.

3.4 STRUCTURED PROCESS IN THE USE OF DIGITAL TOOLS

When it comes to culture conversations, as shared, it is important to have a structured process to ensure consistency and alignment. This is particularly so in the area of culture transformation. Although digital tools have rapidly improved scalability and speed of change, change projects are still very complex and subject to process losses that can occur in large deliberation sessions that prohibit problem solving. Process losses are aspects of group interactions that might inhibit problem solving. It is typically exemplified in factors such as conformance pressure, failure to remember, concentration blocking, dominion, slower feedback, ambiguity, and evaluation apprehension, to name a few (Nunamaker, Dennis, Valacich, Vogel, & George, 1991). In addition, various stakeholders may have different motivations, needs, agendas, backgrounds, and perceptions about the current and desired states of culture. It is, thus, important to:

- Measure and make explicit the perceived current and desired cultures of each stakeholder group in an organisation. Each group may need intra-group (within the group) discussions to ensure that members of the group agree upon the group's perceptions of the current and desired cultures.
- Discuss these explicitly represented and agreed-upon perceived current and desired cultures across groups in order to come to an inter-group agreement or a common understanding.

- Based upon this inter-group common understanding and possible agreement, identify the differences or gaps between the current and desired cultures for each group.
- Collectively discuss and come to an agreement about the possible means of reducing these gaps between current and desired cultures.
- Collectively assess the progress toward the reduction of these gaps.

Participatory discussion process. A participatory process in culture change is important as you want to get all stakeholders on the same page. Smith (2003) reported that only 10–32% of companies may attain the desired cultural shift. Baker (2002) observed that cultural change "is not easy to achieve; it is a difficult, complicated, demanding effort that can take several years to accomplish" (Baker, 2002). Due to these difficulties, it is important that members of the stakeholder groups fully participate in group discussions to align their values and perceptions, collectively, to a common vision in order to achieve consensus toward a shared culture.

Genuine participation should increase the likelihood of stakeholders subscribing to the same culture. However, it may be likely that, with effective discussion, people may achieve a common understanding, but not consensus. Common understanding might lead to opinion polarization. It is thus important that these group discussions are skillfully guided to reduce such polarization and to ensure more effective outcomes (Bostrom, Anson, & Clawson, 1993). Clear participation is, thus, needed to ensure that groups, or individuals within a group, fully subscribe to an understanding of the current culture and commit to the desired culture and the means to attain it. It is, therefore, important to have a discussion tool that allows various members of the stakeholder

groups, and the groups themselves, to participate in and collectively influence this process of discussion. In the use of this tool, all stakeholder groups should be able to provide their input, and groups and members of the group should feel that they are being heard. Currently, while there are many culture-related tools available in the market, most of these tools only measure culture, and do not have the ability to allow for effective and efficient group discussions. These discussions are necessary to reach a common understanding and participatory group decision making that is necessary for alignment and potential consensus building.

3.5 FEATURES OF A CULTURE BRAINSTORMING TOOL

A culture brainstorming tool should have features that allows it to measure culture, facilitate culture conversations, and obtain consensus for alignment. It should also allow a platform for brainstorming of ideas for culture transformation. Key features should include the ability to:

- Measure and identify the perceived current and desired cultural profiles of each group using a culture instrument.
- Represent these current and desired cultural profiles explicitly and present the representations to all members in the group for all persons to review and understand.
- Provide a means for openly discussing these profiles, as a group, to arrive at a common group understanding of these profiles.
- Be scalable (i.e., allow a large number of people to participate in the group discussion process).
- Ameliorate the possibility of process losses.

- Allow a platform for members to suggest ideas to close the culture gap
- Allow for ranking and prioritization of suggestions for implementation

For the above objectives to be achieved, it is important for the process to be accompanied by expert facilitation.

Current technologies that can enable an integrated process flow are not readily available in the industry and, thus, in this work, I have developed a digital tool and a methodology to integrate the culture measurement instrument with a digital brainstorming platform, so as to achieve efficiency and integration in the culture change process. This is enabled through the use of a clear design methodology in building this integrated platform. The tool I've employed is named the Culture Acceleration Tool and Methodology (CATM). This tool uses a combination of a culture tool, integrated with a Group Decision Support System, and uses design concepts anchored in technology. These are important concepts in driving change. In the next chapter, I will explain in detail how the tool was designed and built, and also illustrate some case studies of successful implementation with CATM.

4

A DIGITAL TOOLKIT FOR CULTURE ACCELERATION: CATM

4.1 INTRODUCTION TO CATM

In this chapter, we will share in detail the components that comprise the digital toolkit for culture acceleration, named CATM, which stands for **Culture Acceleration Tool and Methodology (CATM)**. CATM deploys a culture survey tool, called the Organisational Culture Assessment Instrument (OCAI), which is based on Cameron and Quinn's competing values framework (CVF). This culture survey is integrated with a Group Decision Support System (GDSS), to comprehensively measure current and desired culture, present the gaps, and allow a platform for users to brainstorm ideas, rank, and make decisions on top voted ideas in order to close the culture gap. The toolkit is designed with the use of a design methodology and component-based software development (CBSD) method. Fig. 4.1 illustrates the architecture of CATM. CATM should be able to do the following:

- Collect, group, summarize, and report OCAI data from multiple participants;

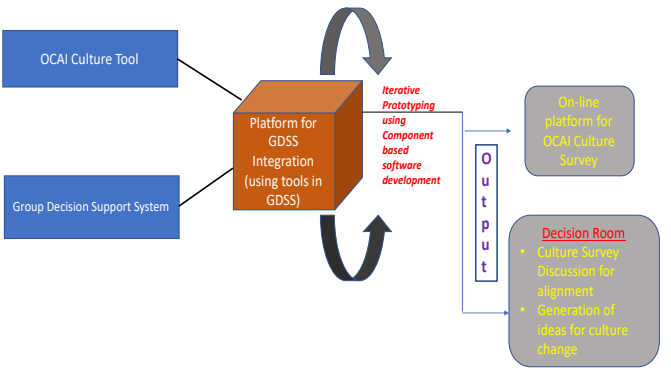


Fig. 4.1. Architecture of CATM.

- Support group discussion and decision making at both intra- and inter-group levels for arriving at consensus and agreeing upon culture change measures;
- Regularly and iteratively measure progress toward the culture change project.

CATM helps top management and key stakeholder groups explicate and discuss their respective perceptions of the organisation's current culture and their visions for the desired culture. The tool is effective in helping them to achieve a common understanding of their perceptions of the current culture and reach a consensus on the desired culture at a much faster rate as compared to a traditional method of culture transformation. It is crucial that, in the use of digital tools for culture transformation, it is also accompanied by a robust culture survey tool and methodology. This is subsequently facilitated by a brainstorming tool with the desired functionalities to perform the task of structured participation and decision making for culture alignment. Finally, the entire integration needs to be skillfully designed to ensure optimum yield.

The CATM design should also be anchored in a robust design methodology and framework to ensure that the functionalities of the toolkit are configured to facilitate a structured process for effective culture conversations and decision making. The three components – the OCAI culture tool, GDSS, and design methodology and iterations – are necessary elements to make CATM successful as an accelerated digital toolkit for culture transformation.

In subsequent sections of this book, we will explicate the components of CATM, which includes the following:

- CVF and OCAI
- GDSS – Digital Brainstorming
- Design Theories necessary to develop and build CATM.

Let's begin with the following sections.

4.2 COMPETING VALUES FRAMEWORK AND OCAI

To facilitate the group discussion process using a digital tool, we first need to establish a culture framework that is able to assist us in measuring the current and desired culture. The culture framework that we deploy in CATM is Cameron and Quinn's CVF. Consequently, this framework is also used as a basis for selecting the OCAI, which is our instrument of choice for measuring organisational culture.

OCAI profiles possess face validity in this culture assessment and as a change management tool. The OCAI-CVF measures and represents an organisation's cultural profile as scores along four quadrants: adhocracy, clan, hierarchy, and market. The first two quadrants, adhocracy (innovative) and clan (collaborate), emphasize flexibility, discretion, and

dynamism, while the other quadrant, "hierarchy" (control) and "market" (compete), emphasize stability, order, and control. The continuum ranges from organisational versatility and pliability on one end to organisational steadiness and durability on the other end (Cameron & Quinn, 2011, p. 38).

As a basis, due to the "enduring and slow-to-change" nature of culture, it is important that the members of each group feel there is a genuine opportunity to participate in the culture measurement and culture change exercise. When there is even a hint of less than genuine intentions for participation, this can make participants mistrust the process, and thus, adversely affect the process. Most discussions of organisation culture (Cameron & Ettington, 1988; O'Reilly & Chatman, 1986; Schein, 2010) agree that culture is a socially constructed attribute of organisations that serves as the social glue binding an organisation together. Therefore, group discussion is important to arrive at a common understanding and potential consensus of current and desired cultures.

Levin and Gottlieb (2009) state that any "successful organisational cultural realignment efforts must begin with reaching agreement among senior leaders and key stakeholder groups about the preferred future culture required to successfully help achieve business goals and implement planned changes." In addition, broad-based meaningful engagement and participation across business units, functions, and levels is a key mechanism for mobilizing and building ownership and commitment. Coch and French (1948) share that people more readily commit to change with enthusiasm and are willing to help enact it when they have had the opportunity to understand its rationale, have their voices heard, and are provided concrete ways to contribute to its design and implementation (Axelrod & Cohen, 2000; Kotter, 1996). Cultural realignment efforts should not just be imposed from the top, but must tap into the wisdom and talents of all organisational members.

Cameron and Quinn (2011, p. 102) also further reinforce that "organisational culture change is a 'group process,' requiring buy-in from the members of the organisation" regarding both their perception of the organisation's current cultural profile and its desired cultural profile. The differences between the common understanding of the current and preferred profiles, in turn, influences the steps the organisation needs to take to move from the current to the desired cultures.

The group discussion instrument will help top management and key stakeholder groups explicate and discuss their respective perceptions of an organisation's current culture and their visions for the desired culture. This should, hopefully, help them in coming to a common understanding of the agreed-upon profiles of their perceptions of the current culture and eventually reach a potential consensus on the agreed-upon desired culture. In a recent article by Roger Connors and Tom Smith on "Transforming Culture at the Speed of Light," the authors share that the key to culture transformation lies in the ability to accelerate change and speed it up and to engage the masses. In addition to this, millennials today also prefer to collaborate with each other online using collaborative and social tools. The key to success lies in embedding collaborative technologies and digital tools to facilitate change efforts[1] (Connors & Smith, 2015).

4.2.1 The Competing Values Framework

In the previous section, we discussed the CVF and its associated culture measurement tool, OCAI, which are suitable for our purpose of bringing about change. The CVF/OCAI classifies organisations into four quadrants: clan, hierarchy,

1 https://trainingmag.com/transforming-culture-speed-light-go-digital.

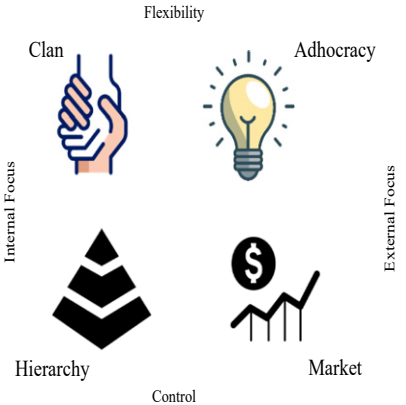
market, and adhocracy. It does so by allocating 100 points among these four quadrants for six dimensions, or six facets, of the organisation (Cameron & Quinn, 2011).

In this book we used the theoretical model of culture, the CVF, and its associated culture assessment instrument OCAI. The CVF framework is based on a statistical analysis of the key indicators of organisational effectiveness proposed by Campbell, Personnel Decisions, Navy Personnel Research and Development Center, and the United States National Technical Information Services (1974). It is formulated on the fundamental assumptions about how organisations work and how they are managed. CVF and its associated OCAI describe and assess organisational culture at micro (individual) and meta (organisational) levels.

CVF is based upon the work by Quinn and Rohrbaugh (1983) on organisational effectiveness indicators. Quinn and Rohrbaugh (1983) analyzed these organisational effectiveness indicators and organised them into four main clusters along two major dimensions. One dimension differentiates effectiveness criteria that emphasize organisational flexibility, discretion, and dynamism versus criteria that emphasize stability, order, and control. Thus, the first continuum ranges from organisational versatility and pliability (flexibility and discretion) on one end to organisational steadiness and durability (stability and control) on the other.

The second continuum ranges from organisational cohesion and consonance on the one end (Internal Focus and Integration) to organisational separation or differentiation and independence on the other (External Focus and Differentiation).

Cameron and Quinn (2011) name the four quadrants produced by the intersection of these two dimensions: *clan, hierarchy, market, and adhocracy* (see Fig. 4.2). It is important to recognize that Cameron and Quinn state that all



Source: Adapted from "*Diagnosing and Changing Organisational Culture*" by Cameron and Quinn (2011).

Fig. 4.2. Competing Values Framework (CVF).

organisations have some characteristics of each of these four archetypes. However, different organisations can be differentiated by dominance of one or more of these archetypes.

The *clan* archetype is like an extended family, where members work with each other based on internal focus, agility, and flexibility. William Ouchi's work on markets, bureaucracies, and clans (Ouchi, 1980) likened a clan culture as displaying a high degree of goal congruence, typically through relatively complete socialization brought about by high inclusion. Clan organisations also produce a strong sense of community.

A *hierarchy*, on the other hand, is characterized by a formalized and structured place to work and is attuned toward stability with an internal focus. The *market* form is based on transaction costs as foundation of organisational effectiveness and it promotes an external stability-oriented focus. *Adhocracy* refers to a temporary, specialized dynamic unit, focused externally and on agility and flexibility.

Adhocracy is based on the assumption that innovation and creativity lead to success. Cameron and Quinn (2011) explained that adhocracies do not have centralized power or authority relationships. Power flows from individual to individual or from task team to task team, depending on what problems are being addressed. Emphasis on individuality, risk-taking, and anticipating the future is high as everyone in this type of culture becomes involved in production, testing, research, and other matters. This experimentation allows for the generation of new ideas and innovation occurs.

4.2.2 The Organisational Culture Assessment Instrument

The OCAI, designed and validated by Cameron and Quinn (Cameron & Quinn, 2011), is based upon the above CVF. It measures the strength of the above four organisational culture types along six content dimensions or six facets of the organisation. These six dimensions are: (1) Dominant Characteristics; (2) Organisational Leadership; (3) Management of Employees; (4) Organisational Glue; (5) Strategic Emphasis; and (6) Criteria for Success.

Each of the six dimensions can be measured along each of the four organisational characteristics (quadrants) thereby creating 24 questions ($6 \times 4 = 24$) in the OCAI instrument. Thus, OCAI includes 24 (4×6) items (questions) on which respondent data are collected. An organisation may have scores on each of the four cultural types, just more or less of each. The total scores of each of the six dimensions add up to 100 points; the 100 points being allocated between four items corresponding to each of the four organisational archetypes. The sum total of responses to all items is calculated as a culture type and plotted on the diagonals in the relevant

quadrants. You can refer to Cameron and Quinn's (2011) book on "Diagnosing and Changing Organisational Culture," (pp. 30–32) for the complete questionnaire used to diagnose organisational culture through the OCAI.

4.2.3 The Six Dimensions of Culture

At present, according to Cameron and Quinn (2011), group aggregation of profiles is a simple averaging process where the OCAI scores are added together for all persons in the organisational unit, and then divided by the numbers of responding persons in the unit. Such group profiles are created for each of the six dimensions. Other possible group aggregations could be weighted averages where unit members with high levels of influence in the unit may be awarded a higher weight.

4.2.4 How Is OCAI Used?

Cameron and Quinn (2011) and various users of the OCAI instrument use OCAI as an instrument for profiling the current and desired (preferred) organisational culture profiles; coming to a group consensus about the group profiles; discussing and implementing organisational culture change measures for moving from current to desired profiles; and measuring progress in their assessment of organisation culture change and measuring culture change itself (from the perceived current profile to preferred or desired profile). OCAI can be used as an instrument for progressively tracking the changes in the organisation's culture profiles at different times during the culture change processes. The differences between profiles at different times along the culture change process provide an indication of the progress toward culture change.

In the use of CATM, we employ the use of the OCAI instrument to assess the "gap" between the current culture versus the desired culture among each of the stakeholder groups: Results from the survey will assist us in assessing the results of the culture change process, and devising methods for bringing about a culture change. In the next segment, we talk about the use of GDSS tool for helping to bridge culture gaps and for facilitating change management.

4.3 GROUP DECISION SUPPORT SYSTEM (DIGITAL BRAINSTORMING)

In the absence of digital tools, manual interactive group techniques are the only option for culture conversations. In today's hyperconnected world, the use of GDSS provides a means for collaboration digitally. GDSS technology has proven to have tremendous potential for improving group performance and can be used for culture change and consensus building. It can also manage scale, ameliorate shortcomings of process losses, and improve the cycle time for long and tedious manual sessions needed to reach consensus. Process losses, as explained by Nunamaker, Dennis, Valacich, Vogel, and George (1991), are explained in Table 4.1.

Numerous US studies have found that groups using GDSS technology experience more process gains (e.g., satisfaction, synergy, more information, more learning, stimulation) and fewer process losses (e.g., production blocking, domination, apprehension, conformance pressure, coordination problems) than groups using non-GDSS technology or manual technology.

GDSS is also shown to be able to provide a platform for employees to voice their concerns anonymously, allowing them to participate in the change process, thus reducing their

Table 4.1. Group Process Losses.

Name	Description
Attention blocking	New comments are not generated because members must constantly listen to others speak and cannot pause to think. This can result in an organisation not getting consensus in the change process
Failure to remember	Members lack focus on communication, missing or forgetting the contributions of others. Key ideas might be lost in the change process
Conformance to pressure	Members are reluctant to criticize, missing or forgetting the contributions of others. This might result in lesser buy-in to the change process
Evaluation apprehension	Fear of negative evaluation causes members to withhold ideas and comments. This will result in lesser buy-in to the process of challenge
Free riding	Members rely on others to accomplish goals, due to cognitive loafing, the need to compete for airtime, or because they perceive their input to be unneeded. This will result in passivity to the change process

Table 4.1. (*Continued*)

Name	Description
Airtime fragmentation	The group must partition available speaking time among members. Key ideas are thus lost in the process
Attenuation blocking	This occurs when members who are prevented from contributing comments as they occur, forget or suppress them later in the meeting because they seem less original, relevant, or important. This could result in resentment toward others and resistance to the change process
Concentration blocking	Fewer comments are made because members concentrate on remembering comments until they contribute them. Again, in this, lesser ideas are generated
Information overload	Information is presented faster than it can be processed. Members in this case are not able to grasp all the information needed and participate in the change process

Note: Adapted from Nunamaker et al. (1991).

anxiety. GDSS also provides an accessible and a convenient platform for employees to gather together to share and exchange views and ideas, regardless of time or location differences. It can be complemented with other activities such as regular forums and meetings and use of social media platforms such as Facebook or the organisation's intranet.

GDSS allows regular iterative measuring of progress toward culture change. Regular monitoring means that there will be early warning if the change is not carried forward, or if (or when), with experience, the goals themselves change.

Huber (1984) was one of the first few authors who expounded the need for the use of GDSS. He noticed in the early days that, "the need for such Group Decision Support Systems, whether designed by the user or by a vendor, is a consequence of the clash of two important forces – the environmentally imposed demand for more information sharing in organisations and the resistance to more meetings."

Later, Nunamaker et al. (1991) observed that Electronic Meeting Systems in the early days were used to directly impact and change the behavior of groups to improve group effectiveness, efficiency, and satisfaction. This technology resulted in fewer process losses, sped up group decision making, and reduced biases. A GDSS is defined as an interactive, computer-based system that helps a group of decision makers solve problems and make choices. A GDSS is targeted to supporting groups, working together as a group, analyzing problem situations, and performing group decision making tasks (DeSanctis & Gallupe, 1987; Huber, 1984).

Professors Jungwoo Lee and M. Jae Moon from Yonsei University, in their latest article, "Coming of Age of Digital Automation" (2019) describe GDSS as Decision Support for complex and cognitive decisions. As compared to numerical monitoring, which involves complex variable formulae, this

decision support technology includes decisions based on a bit longer-horizon information, such as strategic decisions. Decision support systems developed in the 1980s belong to this category, although the associated technologies were a bit less advanced. "Decision support" may be a misnomer, as this terminology has been long used, especially in the information systems area, just because its concept appeals to the public, with its connotations about intelligent decision making via the help of technology (Sol, Cees, & de Vries Robbé, 2013).

Decision support refers to technology that supports complex decision making, involving not only algorithmic processes but also evaluative and heuristic processes. An example is a medical diagnosis system that facilitates doctors' prognosis. As decision support systems have existed for a while, they have progressed with technological advancement. According to Sol (2013), decision support systems have migrated over the years. In the 1970s, they were described as computer-based systems for aiding decision making. In the 1980s, they were described as interactive computer-based systems that helped decision makers utilize databases and helped models solve ill-structured problems. Now, they are facing new challenges with the technological development of infrastructural technologies, such as the internet of things and big data.

Based upon a dozen years of research and experience with GDSS (Nunamaker, Briggs, Mittleman, Vogel, & Balthazard, 1996), other observations include the ability of GDSS to do the following:

- Increase buy-in from key stakeholders;
- Increase the speed of goal achievement;
- Enhance the effectiveness of a well-led team (but does not replace leadership);

- Reduce labor costs by more than 50%;
- Enable role clarification: Help to identify those having a stake in a project and to reveal underlying assumptions;
- Allow more participation;
- Increase the number of ideas contributed as a result of anonymity;
- Improve cross-cultural collaboration.

A descriptive evaluation of 54 case and field studies from 79 published papers spanning two decades of GDSS research by Fjermestad (2000) reported the following key benefits of GDSS.

- Leads to improved effectiveness and efficiency of the group (Adelman, 1984).
- Allows much larger number of personnel to be actively involved in the planning process resulting in higher quality product (Adkins, Shearer, Nunamaker, Romero, & Simcox, 1998).
- Leads to the generation of more high-quality ideas in a shorter period of time (Alavi, 1993).
- Reduced the amount of time and the number of times that teams were in conflict (storming) (Caouette & O'Connor, 1998).
- Provides structure and flexibility, as well efficiency and effectiveness for large groups (Dennis, Heminger, Nunamaker, & Vogel, 1990).
- Outweighs the obstacles encountered in a manual session. In addition, the users report high levels of satisfaction with the outcomes and rate the GDSS as an important tool for idea generation (Nunamker, Applegate, & Konsynski, 1987).

- Helps to achieve global objectives in a system design project by supporting efficient data collection and model construction activities (De Vreede & Dickson, 2000).

Chidambaram, Bostrom, and Wynne (1990) conducted a longitudinal study of the impact of GDSS on Group Development. They conducted this study by comparing the behavior of GDSS groups versus manual groups over four sessions, in a controlled lab setting. In general, they found that groups with computer support and those without computer support exhibited different patterns of development over time. The ability to manage conflict and the degree of cohesiveness were both higher for manual groups during the first session. However, this was not true for the entire duration of the study. As the experiment progressed, GDSS groups became more cohesive and managed conflict better than manual groups.

4.4 HOW DOES GDSS WORK?

4.4.1 Decision Rooms

A decision room refers to a physical or virtual location for using a GDSS. In the past, when technology was not so developed, laptops were made available to meeting participants for a same-place, same-time meeting. The objective in using a decision room is to enhance and improve the group's decision making process. At the same time, a decision room can also be virtual in today's world. Characteristics of a decision room include:

- Each participant having a laptop or workstation.
- A leader (facilitator) coordinating the meeting.

- The room having a display screen that all participants can view.
- Computers integrating through a GDSS platform.
- Specialized software being made available to all participants.

A GDSS decision room allows participants to sit together anonymously and have equal airtime through using GDSS software. By having equal airtime, individuals can actively participate in the group's strategic meetings and contribute ideas productively. GDSS reduces process losses through task structure, task support, process structure, and process support (Nunamaker et al., 1991). Firstly, **Task Structure** assists the group to better understand and analyze task information. This is achieved through problem modeling, multicriteria decision making, and other methods. The ensuing group discussion helps the participants consider multiple aspects of the culture change problem and thus helps in multi-criteria decision making. Secondly, **Task Support** reduces process losses arising due to incomplete use of information and incomplete task analysis by providing information from previous meetings. As the GDSS session information is made available to all participants, the problems of incomplete information, use, and incomplete task analysis are reduced. Process structure built into the GDSS allows for a proper flow of the meeting and thus reduces process losses due to coordination problems. Lastly, **Process Support** allows for parallel communication, group memory, and anonymity. This allows everyone to communicate simultaneously.

Nunamaker et al. (1991) argue that EMS, a channel of communication, in the GDSS, strengthens process support through group memory, anonymity, parallel communication, and media effects. Effective communication is achieved through support, task structure, and process structure to

reduce process losses. An EMS/GDSS, by making the group discussion available to a large number of people, improves meeting scalability and reduces process losses as follows:

- ***Parallel communication***, as compared to sequential communication, reduces the time required for people to express their opinions, promotes broader input into the meeting process, and reduces the chance that a few people dominate the meeting.
- ***Anonymity*** mitigates evaluation apprehension and conformance pressure, so that issues are discussed more candidly.
- ***Group digital memory*** (reproduced on the computer screen) enables members to pause and reflect on information and opinions of others during the meeting and serves as a permanent record of what occurred.
- ***Process structure*** helps focus the group on key issues and discourages irrelevant digressions and unproductive behaviors, while task support and structure provide information and approaches to analyze it.

Nunamaker et al. (1996) explain that the groupware inside GDSS caters to three work group levels:

1. An individual level which is uncoordinated individual effort toward a goal.
2. A coordination level which is coordinated but independent effort.
3. A group dynamics level which is concerted effort toward a goal.

This allows for participation at all levels of the work group. For example, in a culture change scenario, individuals and groups can input their individual ideas, as well as pull their ideas together for reaching group consensus.

4.4.2 Usability

On the topic of GDSS and user interface, Huber (1984) highlights two important points for developing software for GDSS:

1. The GDSS should be built as independent special-purpose modules. It is important that subtle differences in user interface be made as this can lead to big differences in group dynamics.
2. Provide easy import and export capabilities both between modules and with external tools.

One important feature of GDSS is a ***polling and ranking feature***. The purpose of decision support systems is to increase the effectiveness of individual decision makers by facilitating the interactive exchange and use of information between the individual and the computer. On the other hand, the purpose of GDSS is also to increase the effectiveness of groups by facilitating the interactive sharing and use of information among group members and between the group and the computer. The polling and ranking feature allows for members to put a poll to the ideas that they like and to rank them in the order of what they think are important. This feature allows for maximum participation and response from participants as it is interactive and allows for freedom of expression and contribution of ideas.

4.4.3 Effective Utilization of the GDSS

In order to effectively make use of GDSS to obtain maximum input, the following are necessary:

- The user skills are key. User skills (e.g., facilitator skills, chauffeur skills, and participant skills) decline if they are not utilized. There may be a critical frequency of GDSS use that must be attained in order for the system to survive in any given organisational environment.
- Since the frequency of a GDSS use is partly a function of the number of group tasks it supports, there may be a critical number or set of group tasks that the GDSS must support in order for it to survive in a particular organisational environment.
- Finally, since the number of group tasks that a GDSS supports is partly a function of the number and nature of the GDSS capabilities, there may be a critical number or set of capabilities that the GDSS must possess in order for it to survive in a particular organisational environment (Huber, 1984).

The GDSS tool that has been developed in this book has been used and tested in several use situations. At the same time, we are also using and evaluating it in a "use" situation. These two criteria and the four requirements for GDSS outlined by Huber (1984) are included in our digital tool.

4.4.4 Facilitators and Group Systems Support

Bostrom, Anson, and Clawson (1993) argued that the use of GDSS by itself, although having many benefits, would not yield its maximum effectiveness without the input of a good

facilitator. The authors stated that a facilitator plays a key role in the success of GDSS.

In a recent paper on GDSS adoption (Van Hillegersberg & Koenen, 2014), the authors explained that although the use of such technology aids in effective decision making, the adoption is poor due to improperly designed GDSS sessions, technology breakdowns, and unskilled participants or facilitators. They ran a study to validate this proposition through interviews with frequent users, less frequent users, former users, and non-users. Conclusions from the study found that low adoption was due to several factors such as resistance to new tools, long preparation time needed to set up GDSS, and fear of losing face-to-face contact. These results support the claim that a skilled facilitator is crucial to the success of GDSS adoption. In addition, picking the right meetings and user groups for early adoption is also crucial (Table 4.2).

4.4.5 Current GDSS Technologies

Technology has advanced in the twenty-first century, and many of the GDSS technologies in the present day have moved from traditional decision rooms to modern-day on-line interactive systems that can be accessed anytime and anywhere in the world on a 24/7 basis. The many GDSS tools include commercial systems like Think-Tank and Spilter, which are business collaboration tools that allow for professionally facilitated workshops. Others such as Meeting Sphere and Monsoon are more integrated toolkits for everyday online meetings and workshops.

4.5 DESIGN PRINCIPLES OF CATM

Next, we touch on the topic of design and its underpinning principles in the configuration of the CATM tool. The tool is

Table 4.2. Key Findings from Group Processes (Intervention Studies).

Interventions that Improve Group Processes and Outcomes

1. Apply structured procedures
   - Providing instructions to group members (Hall & Watson, 1970)
   - Extending problem formulation (Volkema, 1983)
   - Separating idea generation from evaluation (Van de Ven & Delbecq, 1974)
2. Encouraging effective task behaviors
   - Discussing task procedures (Hackman & Kaplan, 1974)
   - Applying explicit criteria (Hirokawa & Pace, 1983)
   - Using factual information (Hirokawa & Pace)
   - Maintaining focus on task goals (Dalkey & Helmer, 1963)
3. Encouraging effective relational behaviors
   - Encouraging broad participation and influences (Maier & Hoffman, 1959)
   - Emphasizing consensus acceptance over majority votes (Hall & Watson, 1970)
   - Applying active listening techniques (Bostrom, 1989)
   - Discussing interpersonal processes (Hackman & Kaplan, 1974)
4. Training
   - Drilling group members and/or leaders (Hall & Williams, 1970)
   - Training external facilitators (Bostrum, 1989; Hirokawa & Gouran, 1989; Maier & Maier, 1957)

Note: Bostrom et al. (1993).

designed with the use of an action design research (ADR) methodology and CBSD method to:

- Collect, group, summarize, graph, and report OCAI data from multiple participants.

- Support group discussion and decision making at both intra- and inter-group levels for arriving at consensus, and agreeing upon culture change measures.
- Regularly and iteratively measure progress toward the culture change project.

CATM helps top management and key stakeholder groups explicate and discuss their respective perceptions of the organisation's current culture and their visions for the desired culture. The tool is effective in helping them to achieve a common understanding of their perceptions of the current culture and reach a consensus on the desired culture.

4.5.1 Introduction to Design Theories Underpinning CATM

The design of CATM follows the framework of ADR anchored in the concepts of Design Research (DR) and Action Research (AR). The framework is an important underpinning foundation for the design of this tool used for organisational culture change. It first follows the seminal work of Herbert Simon, who is the father of design. In Simon's book, *The Sciences of the Artificial* (1996), he reiterated that thinking and problem solving behavior is artificial-learned, and subject to improvement through the invention of improved designs.

Simon emphasized that "man," the designer, must learn more about the theory and process of design. This relates to the formal logic of design, search methods, the theory of structure and design, and the representation of design problems.

In the *Science of Design: Creating the Artificial*, Simon (1988) noted that engineering, architecture, and business schools, whose central task was that of design, revolted some

years ago against a "cookbook" approach to their subject, and started to gain technical mastery and increased respectability by turning over more and more of their courses to the basic sciences.

Simon argued that an unfortunate side effect was that students in professional schools had very little teaching on how to bring together (integrate) the various techniques they had learned from basic sciences into the **creative solution of design problems**. Simon lists the following topics as needed for "design:"

- The evaluation of designs. This would include theory of evaluation, such as utility theory, statistical decision theory, as well as computational methods (Simon, 1996, p. 134).
- The formal logic of design. This would include imperative and declarative logics (Simon, 1996, p. 134).
- The search for alternatives. This would include heuristic searches such as factorization and means-end analysis (Simon, 1996, p. 134).
- The theory of structure and design organisation. This would include hierarchic systems (Simon, 1996, p. 134).

Simon defines the term, *designer*, broadly to refer to anyone "who devises courses of action aimed at changing existing situations into preferred ones" (Simon, 1996, p. 55). Design theory, as expounded by Simon, is, thus, aimed at broadening the capabilities of computers to aid design, drawing upon the tools of artificial intelligence and operations research. Design is concerned with improvement, or how "things ought to be," and with "devising artifacts to attain goals and about problem solving."

In a paper co-authored with D. Kulkarni, "The Process of Scientific Discovery: The strategy of experimentation"

(Kulkarni & Simon, 1988), Simon simulated the reasoning of chemist Hans Krebs during the experiments, which led him to discover the "Ornithine Cycle." The program simulated search procedures where hypotheses were generated and evaluated. After several iterations, a satisficing level of comparative confidence characterized the discovered effect. Thus, to Simon, design, creativity, and discovery are subjected to the same repertoire of heuristics that we can find in usual problem solving within a bounded-rationality perspective.

Simon, thus, argued that, whether we are looking at the evolution of animals or the progress of human problem solving or design, if useful solutions are to be achieved in reasonable times, then some sort of hierarchical organisation seems almost necessary. As a particular formal expression of such a hierarchical arrangement, he introduces the idea of a nearly decomposable system, in which we may distinguish subsystems within which there are strong interactions, but between them there are only weak interactions. He also discussed the problem of finding simple descriptions of complex systems and contrasted the state description with the process description.

The Sciences of the Artificial, as a contemporary research methodology, was developed through three streams:

1. DR. Designing computer-based tools to improve the human condition (Hevner et al. 2004).
2. AR. Especially participative AR, where the developer works together with the stakeholders to design a solution to address a human problem (McNiff, 2013).
3. ADR. Research where the developer works with the participating stakeholders to develop an action solution that could also include a computer-based tool (Sein, Henfridsson, Sandeep, Rossi, & Lindgren, 2011).

In this subsection, we briefly examine what is (a) **AR**, (b) **DR**, and (c) **ADR**.

4.5.2 Action Research

AR, as explained by McNiff in her book, *Action Research*, is a process that involves the designer not just being a passive observer, but as an active participant in the development process. "The Action Researcher or Designer (AR) thinks carefully about the circumstances they are in, how they got there, and why the situation is as it is" (McNiff, 2013). AR helps to generate knowledge that can lead to improved understanding and experience for social and environmental benefit. The key principles of AR, as expounded by McNiff, include the following (McNiff, 2013, p. 20):

- Action Designers see knowledge as something they do, a living process in a constant state of development. Reality is a process of emergence, surprising and unpredictable.
- The Action Designer believes in improving lives and the status quo.
- Action Designers use learning and experience as processes that enable individuals and groups to negotiate choices about who they are and how they are together.
- Action designers ask questions about the implications of knowledge on socio-political and environmental issues.
- Action designers use their knowledge for social and environmental well-being.

AR is grounded in a robust methodology when producing new knowledge. This involves gathering data, generating evidence, producing theory, and making judgments about its

quality and usefulness. *The action designer will need to produce professional narratives, gather data, and provide evidence to show that their work has influenced the quality of life for others.*

AR is a *change-oriented approach* which seeks to introduce changes with positive social values, the key focus being on a problem and its solution (Elden & Chisholm, 1993).

Baskerville and Wood-Harper (1996) mentioned that "the ideal domain of the action research method" is one where "the designer is actively involved, with expected benefit for both designer and organisation; the knowledge obtained can be immediately applied. This is a cyclical process linking theory and practice" (Baskerville & Wood-Harper, 1996, p. 239). The designer can intervene in the problem situation, before applying and subsequently evaluating the value and usefulness. This practice enables the designer to both validate and improve upon existing theories and to introduce practical improvements in the problem situation investigated (Checkland, 1981).

The Canonical Action Research (CAR) (Davidson, 2004) based AR on five principles:

1. The principle of the designer-client agreement. Solving problems in a joint collaboration within a mutually acceptable ethical framework (Rapoport, 1970).

2. The principle of the cyclical process model. Diagnosing, action planning, action taking, evaluating, and specifying learning (Susman & Evered, 1978)

3. The principle of theory. Need theory to guide action (Davidson et al., 2004).

4. The principle of change through action. An improvement in the client's problematic situation should occur with the AR cycle.

5. The principle of learning through reflection. The designer and client examine what they have learned in an explicit, systematic, and critical manner (Davidson et al., 2004).

In the case of CATM, we designed an IT digital toolkit to facilitate and help effect organisational culture change. Consequently, these principles and practices of AR came into play.

4.5.3 Design Science

Used in conjunction with AR or design, design science is aimed at devising or improving artifacts to attain goals and to create things that serve human purposes. Typically, it is technology oriented. The products of design science are assessed against criteria of value or utility. "Does it work? Is it an improvement?" Design to improve value and utility is a key activity. Flyvbjerg (2006), however, suggested that improvement, value, and utility are commonly defined by the prevailing culture, accepted by the technician, and not investigated by the organisational or social scientist (Flyvbjerg, 2006).

Hevner et al. (2004) noted that design science seeks to extend the boundaries of human and organisational capabilities by creating new and innovative artifacts, including constructs, models, methods, and instantiations. This includes the systematic knowledge of the design process and methodology, as well as the technological underpinnings of the design of artifacts (Cross, 2010).

In the latest collection of articles in *Design Science* compiled by Panos Y. Papalambros (2015), Amaresh Chakrabarto described the following facets of design science:

- Designs are plans for intervention that may include artifacts. Not all designs include artifacts, and not all designs consist of artifacts only.

- The concepts of undesirable and desirable situations are essential to the act of designing. Without an undesirable situation, there is no designing.
- Designing involves identifying these situations as well as developing the plan with which to change the undesirable into the desirable.
- A design is implemented with the hope that it will bring in the desired change, which may or may not happen; hence the need for design science.

In a broader sense, DR can be about designing any technology-based artifact that may either be computer based or based upon other physical technologies. Iivari and Venable (2009) define DSR as a research activity that invents or builds new, innovative artifacts or solutions for solving problems or achieving improvements. In DSR, no client nor joint collaboration is involved. Instead the artifact is used to address a class of problem situation (Walls, Widmeyer, & El Sawy, 1992).

In his three cycle view of Design Science Research, Hevner (2007) analyzed DR as an embodiment of three closely related cycles of activities: the relevance cycle, the rigor cycle, and central design cycle.

In the *relevance* cycle, design science research is initiated with real-world problems, opportunities, and an application context that not only provides the requirements for the research as inputs but also defines acceptance criteria for the evaluation of the research.

In the *rigor* cycle, design science draws from a vast knowledge of scientific theories and engineering methods to provide foundations for rigor. It draws on the experience and expertise of state-of-the-art application domains, as well as existing theories, artifacts, and processes.

In the *design* cycle, the cycle of research activities iterates rapidly between the construction of an artifact, its evaluation, and subsequent feedback to further refine the design. The design cycle may also include the concept of "creativity."

In an article by Alexandra Ossola from *The Atlantic*, she exclaims that Albert Einstein once said, "The greatest scientists are artists, as well." Ossola referenced several great thinkers such as Rex Jung and Charles Limb, who all agree that, whether in medicine or in other forms of research, just like artists who built upon the foundation of impressionism, scientists innovate based on work conducted prior.[2]

In their seminal essay on "Anatomy of a Design Theory," Gregor and Jones (2007) stressed the importance of design knowledge as theory to add rigor and legitimacy to the design of computer solutions. They argued that understanding the nature of design theories supports the cumulative building of knowledge, rather than the reinvention of design artifacts and methods under new labels.

After reviewing several schools of thought and theories on DR and theory, Jones and Gregor (2007) devised a proposed framework for IS Design Theory (ISDT). According to Gregor and Jones, design goals in this definition can be either "object-design" or "realization-design" (van Aken, 2004, p. 226). On the other hand, the range of artifacts that are the object of design theorizing covers a broad spectrum and includes customer-centric websites, auction markets for supply chain organisations, and schema of inter-organisational workflows as well as organisational processes. Thus, a design theory

2 http://www.theatlantic.com/education/archive/2014/11/the-creative-scientist/382633.

instantiated would have a physical existence in the real world. The phenomenon for DR should include:

- ***Instantiations or material artifacts.*** Artifacts having a physical existence in this world, such as hardware or software, or the series of physical actions that lead to the existence of a piece of hardware or software or an IS.
- ***Theories or abstract artifacts.*** These artifacts do not have a physical existence, except in that they must be communicated in words, pictures, diagrams, or some other means of representation.
- ***Human understanding of the artifacts.*** Human beings conceptualize and describe artifacts in abstract, general terms.

Gregor and Jones further reiterated that an IS theory includes the principles prevalent in the process of designing an IS artifact with an end goal through using **knowledge of IT processes and human behavior** such as that of our digital culture tool. This will include both the principles underlying the form of design as well as the act of implementing the design in the real world (See Table 4.3).

Tim Brown (2008) in his *Harvard Business Review* article on design thinking discussed the use of design principles in the daily processes that happen at work. He used the illustrative example of Kaiser Foundation Hospital, where nurses worked on a project to re-engineer shift changes. A project team was formed to identify the problems encountered in the way shift changes occurred. They compiled the information and explored potential solutions through brainstorming and rapid prototyping. Next, the team built a working prototype that included new procedures and some simple software which nurses could use to call up previous shift-change notes and

Table 4.3. Components of a Design Theory for Managing Risk as Illustrated in Software Development.

Eight Components	Description
Purpose and scope	What the system is for, the set of requirements or goals that specifies the type of artifact to which the theory applies Example: The aim is to develop an approach for understanding and managing the risk in software process improvement
Constructs	Representations of the entities of interest in the theory. They could be physical phenomena or theoretical definitions Examples: Risk item, risky incident, resolution actions
Principle of form and function	The term "blueprint" or architecture that describes an IS artifact, either product or method/intervention Example: A risk framework is given to aid in the identification and categorization of risks and a process with four steps is given to show heuristics that can be used to relate identified risk areas to resolution strategies
Artifact mutability	The changes in state of the artifact anticipated in the theory, that is, what degree of artifact change is encompassed by the theory Example: Suggestions for improving the approach are given for further work: one example is that parts of the approach could be packaged as a self-guiding computer-based system
Testable propositions	Truth statements about the design theory that is testable against all the stated objectives and requirements.

Table 4.3. (*Continued*)

Eight Components	Description
	Example: It is claimed that the approach is adaptable to other organisational settings, although it is seen as a general approach, rather than a procedure to be followed blindly
Justificatory knowledge	The underlying knowledge or theory from the natural, social, or design sciences that gives a basis and explanation for the design. This knowledge links goals, shape, processes, and materials together Example: The approach proposed is derived from other risk management approaches
Principles of implementation	A description of the processes for implementing the theory (either product or method) in specific contexts. It concerns the means by which the design is brought into being – process linking agents and actions Example: It is stated that the approach requires facilitation by a facilitator experienced in risk management, SPI, and running collaborative workshops
Expository instantiation	A physical implementation of the artifact that can assist in representating the theory both as an expository device and for purposes of testing Example: Four examples of variants of the approach are given in descriptions of four iterations of an AR cycle

Note: Adapted from Gregor and Jones (2007, pp. 322, 324).

add new ones. This resulted in a higher quality knowledge transfer and reduced prep time, vastly improving patient care. Brown commented that "The myth of creative genius is resilient: We believe that great ideas are fully formed out of brilliant minds, in feats of imagination well beyond the abilities of mere mortals" (Brown, 2008).

What the Kaiser nursing team accomplished was neither a sudden breakthrough nor the lightning strike of genius. It was the result of hard work, augmented by a creative human-centered discovery process, followed by iterative cycles of prototyping, testing, and refinement (Brown, 2008). Brown states that these design projects must go through three stages mainly, "Inspiration, Ideation, Implementation." *Inspiration* would trigger a problem, and/or opportunity, or both that motivate the search for solutions. *Ideation* is the process of generating, developing, and testing ideas that may lead to solutions. Finally, *implementation* is for the charting of a path to market. Projects will loop back through these stages – particularly the first two – more than once as ideas are refined and new directions taken (Brown, 2008).

Further taking Brown's design thinking process to the next level, Peffers et al. came up with a model for producing and presenting information systems research (Peffers et al., 2006). The authors reiterated that, in addition to applying theories to solve problems, information systems research needs to deploy theoretical models to expound the design science research process as in the Tim Brown design thinking model. In the process of synthesizing theories with background papers, they came up with a design science research process detailing six steps. These steps are:

1. Problem identification and motivation. Defining the problem and justifying the value of the solution.

2. Objectives of the solution. Inferring the objectives of a solution from the problem definition.
3. Design and Development. Creating the artificial solution.
4. Demonstration. Demonstrating the efficacy of the artifact to solve the problem.
5. Evaluation. Observing and measuring how well the artifact supports a solution to the problem.
6. Communication. Communicating the problem and its importance, the artifact, its utility and novelty, the rigor of its design and its effectiveness to relevant audiences. (Peffers et al., 2006)

4.5.4 Overlap of AR and DR

After conducting a review of AR and DR principles in the previous sections, we applied both these methodologies and methods in our development of CATM for accelerating culture change. While AR and DR differ in their approaches, there is considerable overlap between them (Iivari & Venable, 2009). This overlap occurs when the action designer is also conducting DSR where he or she is inventing a new, innovative artifact or solution technology to better address the client's problem solving needs. The client's needs are conceptualized as a socio-technical problem. The design process includes the development and evaluation of the solution technology as well as active involvement by the designer in organisational intervention. This includes theory building, solution technology invention, and naturalistic evaluation activities.

This leads us to the next section ADR. ADR combines AR with DR.

4.5.5 Action Design Research Methodology

In an earlier paper by Cole, Purao, Rossi, and Sein (2005), the authors observed that Information Systems, as a discipline, has been accused of having no relevance in the practical world. We need to make a dual contribution to both academia and practice. Two research methods with this dual orientation are DR and AR. As shown by Ivari and Venable (2007), both methodologies, though distinct, are closely related and offer unique strengths to the business community. When examining two distinct projects with overlapping AR and DR, Ivari and Venable (2007) found that the two methods shared important assumptions regarding ontology, epistemology, and axiology. The authors proposed a model to integrate the two approaches together. Their integrated model involves four ADR steps, which have the **PIER** principle. The integration of these two methods allows IS as a discipline to be able to use IS design discipline to solve real-world problems in collaboration with practitioners. The PIER principle is defined as follows:

- Problem Definition. Problem definition in DR and diagnosing the problem in AR.
- Intervention. Similar to the build stage of DR, and a combination of the action planning and action taking stage of AR.
- Evaluation. Evaluation of the solution based on the usefulness to the practitioner.
- Reflection and Learning. Abstract knowledge to make a practical and theoretical contribution to the field and learnings for the next project.

Fast forward to year 2011. In a MIS-Q article, Sein et al. (2011) developed and described a research methodology

called ADR methodology. ADR is a methodology for generating prescriptive design knowledge through building and evaluating ensemble IT artifacts in an organisational setting. Prescriptive knowledge "concerns artifacts designed by humans to improve the natural world" (Gregor & Hevner, 2013). The four types of prescriptive knowledge include constructs, models, instantiations, and design theory (March & Smith, 1995). ADR is in fact an adaptation of AR and DR and borrows from many ideas from the Cole paper authored in 2005. ADR deals with two seemingly disparate challenges:

1. Addressing a problem situation encountered in a specific organisational setting by intervening and evaluating. A problem situation in the case of CATM would be to try and align the organisational culture of an organisation amid the diversity of members involved, so as to achieve a stated goal.
2. Constructing and evaluating a digital tool that can address the class of problems typified by the encountered situation (Sein et al., 2011).

The class of problems associated with culture change are many and include:

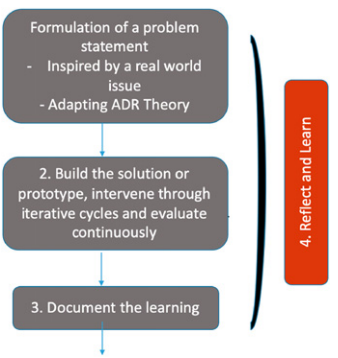
- Low level of participation rate as a result of conflicting work demands and time taken to attend face-to-face meetings;
- Scalability;
- Process losses;
- Accuracy of information being captured;
- Getting consensus to agree on a desired culture;

- Long lead time;
- Sub-cultures.

The proposed solution is both a computer program and a group improvement discussion methodology. CATM is an integration of OCAI, a culture assessment instrument to devise organisational change management, with a GDSS/EMS system. This integration project covers theory building, solution technology invention, and naturalistic evaluation. Sein et al. (2011) suggested four stages for the ADR method (Fig. 4.3).[3]

1. Problem Formulation. Identifies and conceptualizes the problem opportunity.

    - This stage identifies and conceptualizes a problem opportunity based on existing theories and technologies. It is practice-inspired and not only provides for organisational intervention but generates new knowledge.



Source: Adapted from *The ADR Method* (Sein et al., 2011).

Fig. 4.3. The Action Design Research Model.

3 Adapted from *The ADR Method*, pp. 40–44.

- This stage also structures the problem, identifies the solution, and guides the design process.

2. Build, Intervene, and Evaluate. In this stage, we use the problem framing and theoretical premises adopted in stage one to develop the initial design of the digital solution. This solution is subsequently shaped by organisational use and new design cycles. This phase interweaved the building of the digital solution, and included intervention in the organisation and evaluation. The outcome is the realized design of the digital solution. There were two end points for the design continuum in this stage and they are:

   - IT-Dominant BIE. At the Dominant stage, designers work on the digital solution through continuous improvements and user feedback.
   - Organisation Dominant BIE. In the Organisation Dominant stage, the participants' existing ideas and assumptions about the solution's specific use are challenged to create and improve the design.

3. Document Learning. In this stage, we move from reflection and learning to building a solution and document the learning for a broader class of problems.
4. Reflect and Learn. Designers at this stage outline the accomplishments realized in the solution and describe the organisational outcomes to formalize the learning.

4.5.6 Key Features and Capabilities of CATM

As shared, CATM was built with the underpinning principles of DR and AR. The integration of this design philosophy and

practice is called ADR. ADR in the development of CATM will deal with:

- Addressing a problem situation encountered in a specific organisational setting by intervening and evaluating. A problem situation in the case of CATM would be to try and align the organisational culture of an organisation amid the diversity of members involved, so as to achieve a stated goal.
- Constructing and evaluating a digital tool that can address the class of problems typified by the encountered situation (Sein et al., 2011).

The CATM is, thus, designed based on the following key features:

- Automating the OCAI culture survey within the GDSS to allow for easier access and participation by respondents.
- Graphing, collecting, and consolidating culture survey data through the use of the GDSS to establish the current and desired culture.
- Enabling the culture alignment process by establishing common understanding of current and desired culture through the use of group discussion within the GDSS.
- Using the GDSS to brainstorm ideas for culture change from the perceived current to desired organisational cultures.

The system design should also take into account the ability for the solution to allow the following:

- Allow a large number of people to participate in group processes.

- Elicit time (and elapsed-time duration) savings.
- Improve participation rates with the use of intuitive and user-friendly screens.
- Allow participation anytime and anywhere in the world.
- Reduce process losses that can occur in face-to-face meetings.
- Easy consolidation and output of survey and culture discussion results.

The typical process losses evident in face-to-face meetings are reduced through the following capabilities built into the GDSS for culture change. Capabilities of the system include the ability to:

- Provide a sequential flow of meeting that enables participants to focus on one task at a time, thus facilitating participation and decision making.
- Enable simultaneous participation and sharing their ideas by multiple users, thereby reducing the time required to bring out everyone's ideas, and addressing attention blocking and airtime fragmentation issues that have been observed in manual meetings.
- Allow anonymity so that users are free to share their ideas without fear of repercussions and without apprehension, thus reducing the pressure to conform.
- Allow all participants an equal chance to participate and share their ideas without being singled out.
- Process vast amounts of information in a short time, while reducing information overload.

- Enable participation from different locations at any time, eliminating the need to travel to and assemble at a specified location, thereby making it easier and more convenient to participate which will help to increase participation rate.

4.5.7 Framework of CATM Using ADR

Table 4.4 outlines the proposed ADR design methodology for the building of CATM that we adopted in this project. Previously, we explained the use of OCAI as a cultural instrument. As for the GDSS, we made use of Spilter, a commercially available GDSS, courtesy of the company that developed it. The four cycles of Problem Formulation, Building Intervention and Evaluation, Reflection and Learning, and Formalization of Learning were embedded in the CATM testing and deployment.

4.5.7.1. Organisational Dominant BIE Model

The proposed BIE form selected is the *Organisational Dominant BIE*. Organisational Dominant BIE is used as the project deals with intervention of culture at the organisational level. The CATM tool is deployed in the design iterations and tested with members of the community. Feedback obtained was incorporated into subsequent versions of the solution until changes and improvements become stable and are only marginal. Throughout the process, we kept a record of observations of the solution "in-use," and the consequent iterative, continuous improvement to the solution. The process model of an organisation dominant BIE in the building of CATM was adopted in Fig. 4.4.

Table 4.4. Summary of the ADR Process in the Culture Acceleration Tool and Methodology (CATM).

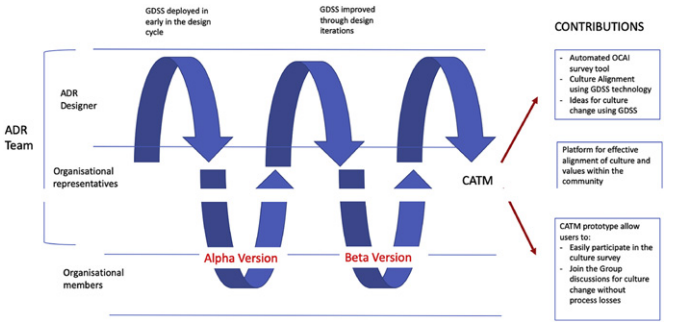
Stages and Principles	CATM Digital Tool	
Stage 1: Problem formulation		
Principle 1: Practice-inspired research	Project is driven by the need to develop and test a computer-based group discussion tool for group discussions and deliberations about coming to a group consensus for culture change using the results of OCAI	Recognition: • Shortcomings of the existing manual process used to reach consensus using the OCAI instrument • Scalability of the digital tool
Principle 2: Theory-ingrained artifact	Use of the OCAI instrument to reach the desired culture through GDSS	
Stage 2: BIE		
Principle 3: Reciprocal sharing	Group process losses were expected to be an ongoing problem as a result of manual intervention. Problems encountered will be used as design principles for the digital tool	Alpha version: The artifact conceived should address the issue of participation and group process losses

Table 4.4. (*Continued*)

Stages and Principles	CATM Digital Tool	
Principle 4: Mutually influencing roles	The ADR team will include a multi-disciplinary team, including practitioners and designers to build the prototype and they should incorporate theoretical, technical, and practical perspectives	Beta version: Prototype developed to speed up the decision making process of desired culture will be called the Culture Acceleration Tool
Principle 5: Authentic and concurrent evaluation	The CATM tool will be tested with focus groups to gauge the usability of the survey. The GDSS platform for culture change will be tested out with a selected senior group for group decision making before it is rolled out to the wider group	

Stage 3: Reflection and learning		
Principle 6: Guided emergence	The Culture Acceleration Tool should be an emerging evolution as the programmers and users work together to improve its usability and collation of survey results, as well as for culture change	Emerging version and realization: The IT artifact should be continually refined through continuous feedback
Stage 4: Formalization of learning		
Principle 7: Generalized Outcomes	New set of design principles should be articulated for the Culture Acceleration Tool, plus the GDSS platform for achieving culture change	Ensemble version: An ensemble embodying the design principles for achieving the desired culture through the Culture Acceleration Tool

Source: Adapted from *The ADR Method* (Sein et al., 2011).



Source: Adapted from The ADR Method (Sein et al., 2011).

Fig. 4.4. Organisation-dominant BIE in the CATM Project.

The design process in the development of CATM includes the following steps.

- Developing functional requirements;
- Building usable screens for the prototype;
- Building iterations with organisational intervention in the prototype;
- Finalizing the prototype after the feedback and iterations;
- Reflection and abstraction of learning principles.

4.5.8 Design Iterations

The following design iterations outlined the various functional requirements of each stage of the prototype in sequence of version (a) RS0, (b) RS1, (c) RS2, and (d) RS3.

4.5.8.1. Requirements: Version RS0

The list of functional requirements for the solution was compiled from the features of OCAI, GDSS/EMS, and the

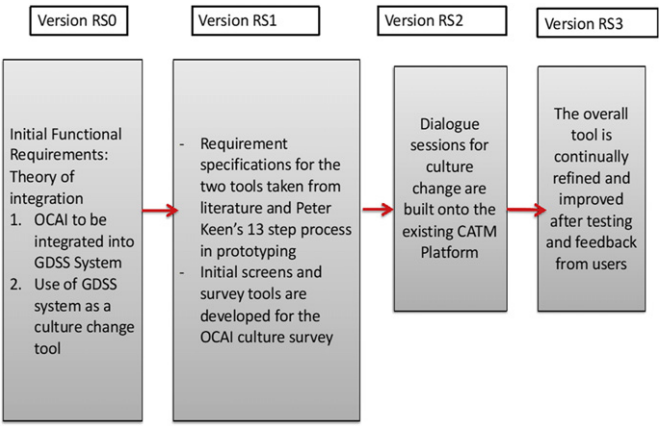


Fig. 4.5. Design Iterations.

exploratory test done with users in pilot testing. This functional requirement is called "RS0" – or Requirement Specifications at time "0". Subsequent iterations of requirement specifications are called RS1, RS2, and so forth. Refer to Fig. 4.5.

Cameron and Quin's CVF was the choice theoretical framework to gauge culture gaps between the perceived current organisational culture, and the perceived desired culture. The OCAI is the CVF-based measurement instrument used in RS0.

The OCAI-CVF measures and represents an organisation's cultural profile as scores along four quadrants: adhocracy; clan; hierarchy; and market. The first two quadrants, adhocracy (innovativeness) and clan (collaboration), are directly consistent with the vision of promoting innovation and collaboration. The "hierarchy" quadrant, on the other hand, although an essential part of the Singapore culture, is shown in Cameron and Quinn's CVF (Cameron & Quinn, 2011) as diagonally opposite of the "adhocracy" quadrant.

Furthermore, the "market" quadrant is diagonally opposite to "clan" quadrant. A market culture, with its external, stability orientation is necessary for the ongoing operations of an organisation. Consequently, to promote an organisation's vision of innovativeness and collaboration, we need to move the culture to higher scores on the adhocracy and clan quadrants, while maintaining the hierarchy and control, as well as the market orientation.

Individual profiles measured by the OCAI can be aggregated to produce the cultural profiles for the organisational unit. At present, aggregation is a simple average where the OCAI scores are added together for all persons in the organisational unit, and then divided by the numbers of responding persons in the unit. Other aggregations could be weighted averages where unit members with high levels of influence in the unit may be awarded a higher weight. These profiles include both "perceived current profiles" of the organisation, as well as "desired organisational culture profiles

4.5.8.1.1. How is OCAI Used in This Project? Cameron and Quinn and other users of the OCAI use OCAI as an instrument for profiling the current and desired (preferred) organisational culture profiles. They use these profiles for coming to a group consensus about the group profiles; discussing and implementing organisational culture change measures for moving from current to desired profiles; and measuring progress in their assessment of organisation culture change and measuring the culture change (from the perceived current profile to preferred or desired profile) process (Cameron & Quinn, 2011, p. 135). OCAI can also be used an instrument for assessing the organisation's culture profiles at different times during culture change. The differences between profiles at different times provide an indication of the progress toward culture change.

4.5.8.1.2. Group Process Requirements for Using OCAI. The use of OCAI-based measurement, and the use of OCAI results to establish an organisation's culture profile in group discussion, is mainly to come to a consensus about the current OCAI and preferred future OCAI, as well as presentation of the organisational profile to group members. Deliberations about the actions to be taken to change the organisational culture from the current to desired culture uses minimal computer support as most organisations still use manual sessions for cultural alignment. These sessions are mainly using paper-based manual tools such as markers and flipcharts, whiteboards, PowerPoint slides, and manual facilitators. This, being a manual process, takes a lot of time and can be subject to many "group-process losses."

Moreover, as the organisational culture change process takes time and requires repeated measures and interactions within the whole community, multiple iterations of the process can be expensive and prone to repeated losses. It is to remedy these shortcomings of the process that we are suggesting the development of CATM.

OCAI, except for its measurement, and culture profile representation aspects, itself does not provide a platform for a group of people (especially large groups of people) to (a) discuss the results of the OCAI measurements and come to a common understanding of the results or (b) discuss and prioritize actions needed to move the organisation's culture in the desired direction. Therefore, OCAI measurements, the subsequent iterative group discussions to come to a common understanding of perceived profiles, and the development of means to intervene in the organisation to change the current perceived culture profile to the desired culture profile, can be time-consuming and error prone.

4.5.8.1.3. Measurements Using OCAI. OCAI produces two profiles: (1) the respondent's perception of the current cultural profile of the organisation (the current perceived culture profile) and (2) the respondent's preferred or desired profile for the organisation (the desired culture profile). Individual respondent profiles can be combined to produce an organisational profile and the instrument can be administered within an organisation to either the whole organisation (i.e., all members of the organisation) or to smaller samples of the population. OCAI results (the two graphs, current and preferred) in themselves do not provide any guidelines for culture change in an organisation. The current and preferred OCAI graphs provide a visual measure of the extent of desired change in the organisation's culture. Thus, they provide a graphical and explicit basis for discussion of the organisation's current and perceived cultures within the members of the organisation. The measures to change the culture of the organisation are collectively designed by the organisation members through group discussion.

The organisation's current and desired profiles are presented to the organisation as a basis for discussion to (a) come to a common understanding of the organisation's current and desired cultures and (b) developing and hopefully agreeing upon actions to be taken to change the culture. As we understand that OCAI is only a culture measurement instrument, the organisation's members still need to:

- Develop a common understanding and hopefully consensus about the current perceived and desired culture profiles.
- Discuss and develop a common understanding, and hopefully consensus about change measures to change the current perceived profiles to desired profiles.

- Implement the change measures.
- Continuously, at regular intervals, assess progress toward the goal.

Measuring organisational culture at one point, and later discussing actions for change, can be time intensive. Iterative measures will multiply this time and cost manifold. When the process is repeated iteratively for organisational culture change, the repeated process can quickly become onerous, and, consequently, organisations either do not measure progress or they try to take the easy way out by imposing progress from the top and hoping that progress will happen.

In addition, the process of discussion is subject to the shortcomings of typical face-to-face meetings. These shortcomings can include the following:

- Typically, not all members of the group participate equally. The most vocal and assertive members of the group, or the most influential members of the group dominate the meeting and may get the most "floor-time" for expressing their views. Even if the most influential members remain silent, their views are usually already known to the organisational unit members. In face-to-face sessions, especially in hierarchical cultures, the views of top influential members may still influence the discussion disproportionately, and may distort the group's common understanding and potential consensus.
- On the other hand, the less assertive or shy members of the group (typically, the majority of the members) remain quiet, and are unable to express their views. This does not mean they do not have dissenting views, or that they do not care. It is just that they cannot express their views, and consequently

give up and may only pay lip service to the change. This would defeat the very purpose of the cultural change.

- Furthermore, scheduling a same-place/same-time meeting between all members of the group can be a lengthy and time-consuming process. This problem is even more acute if the members of the group are needed to travel frequently for their work-related duties. Those people who cannot attend the same-place same-time meeting may still have some valid and useful ideas to contribute. But because of structural impediments built into such meetings, their views may not be considered.
- The meeting process is sequential – each person sequentially presents his/her views; this takes time. Moreover, often, as views may be expressed slowly and deliberately by some speakers, they are often overruled or overwritten by more vocal, assertive, and impatient members of the group. This not only wastes time but can also lead to significant process losses.

4.5.8.1.4. Community and Groupings. At this point, communities and groupings need to be developed to measure inter- and intra-group feedback on current vs. desired culture, and to align views on culture change measures that are required to reach desired culture state. The two tools to be developed and evaluated are as follows:

1. The Culture Acceleration tool which is built with survey capabilities that can assess the current and desired organisational cultures
2. A platform and a methodology using the GDSS to engage various stakeholder groups in discussing the requirements and actions for culture change. This platform is the GDSS or the Electronic Meeting Support System (EMS)

4.5.8.2. Requirements: Version RS1

We continue to refine the requirement specifications by examining the initial requirements (RS0) and modifying them by adding additional requirements derived from our understanding of existing literature and case studies to produce an enlarged set of Requirements Specifications; namely, RS1 This will involve STAGE II of the ADR methodology, including deployment, evaluation, and iteration. During this stage, Principal 3: Reciprocal Shaping, Principal 4: Mutually Influencing Roles, Principal 5: Authentic and Concurrent Evaluation, Principal 6: Guided Emergence, and Principal 7: Generalized Outcomes of the ADR Methodology were used.

4.5.8.2.1. Part 1: OCAI Culture Survey (Reciprocal Shaping). The OCAI tool was used in this book to assess current culture vs. the desired culture. This is a necessary first step for culture change. The manual process is time consuming and laborious, especially with a large workforce. In addition, there are many barriers to culture change, such as process losses during group deliberations, as well as the long and tedious procedures required in the administration of change. By automating the survey using the GDSS platform, the questionnaire is delivered electronically to participants, thus reducing cycle time and encouraging higher levels of participation.

Next, we look at Peter Keen's 13-step process in the prototype development. In his paper on GDSS development, he describes the prototyping process of GDSS. These steps for the GDSS development specified by Meador, Guyote, and Keen (1984) include:

1. Planning. User needs assessment and problem diagnosis.
2. Application Research. Identification of relevant fundamental approaches for addressing user needs and available resources.

3. Analysis. Determination of best approach and specific resources required for implementation.
4. Design. Detailed specifications of system components, structure, and features.
5. System construction. Technical implementation of the design.
6. System testing. Collection of data on system performance to determine whether the system performs in accordance with design specifications.
7. Evaluation. Determination of how well the implemented system satisfies users' needs and identification of technical and organisational loose ends.
8. Demonstration. Demonstrating the system capabilities to the user community
9. Orientation. Instruction of top-level managerial users in the capabilities of the system.
10. Training. Training of direct users.
11. Deployment. Operational deployment of the full system capability for all members of the user community.
12. Maintenance. Ongoing support of the system and its user community.
13. Adaptation. Planned periodic recycling through the above tasks to respond to changing user needs.

Next, we examine the literature of prototyping approaches and component-based software engineering techniques used to build and fine-tune the CATM artifact.

Working through this 13-step process, we first examine the specification requirements at RS0 to review the requirements

of the CATM tool. RS0 requirements covered steps a, b, c, and d of Peter Keen's DSS development methodology. The development team worked on two working prototypes for the system. Camburn et al. (2013) described prototyping methods as strategies for conceptual phases of design framework and experimental assessment. By performing an extensive research and review of the best practices of prototype development, Camburn integrated their findings into a methodology for an enhanced prototyping process. Various independent design context variables like budget, time, and difficulty of meeting the design requirements derive this strategy. Beaudouin-Lafon and Mackay (2003) stated that a prototype as a design artifact should include certain characteristics.

A perfect prototype should (a) support creativity, (b) encourage communication within and outside the development team, and (c) ensure early evaluation of the product with proper user feedback. They explained this further by categorizing two major types of prototypes: offline prototypes and online prototypes.

Offline prototypes do not use a computer. They are usually implemented using paper sketches, storyboards, cardboard mock-ups or videos. These are generally created at the earlier stages of the development. Online prototypes depend on the use of a computer to implement. Online prototypes include animations, product presentations, application mock-ups created using scripting languages, and other similar methods. Sefelin, Tscheligi, and Giller (2003), in their study, investigated the major differences between paper-based and computer-based low fidelity prototypes. Even though their study indicated that clients mostly preferred computer-based prototypes to paper-based prototypes, there were certain situations where clients preferred paper-based prototypes.

In our project, we compared initial offline (paper-based) prototypes with online (computer-based) prototypes developed

for this research. The inefficiencies inherent in the paper-based prototypes are our primary motivation for developing and testing the computer-based (online) prototype. We reviewed the inefficiencies and used them as a basis for developing the structure and flow of the computer artifact to facilitate change management at a greater and more efficient speed.

Coughlan, Suri, and Canales (2007) presented some powerful objectives enabled by a process of prototype design. Firstly, prototyping enables organisational thinking to develop concretely through action, thereby creating tangible expressions like learning faster by failing early and often, allowing low-impact failures to occur early and providing faster organisational learning. Secondly, the development of a prototype gives the developers permission to explore new behaviors, thereby reliving individuals from the responsibility to consciously change what they do. Different prototypes which differ in their life span lengths may be created in order to suit their applications and scenarios in which they are used.

Beaudouin-Lafon and Mackay (2003), in their book, classified prototypes based on the length of their life span as follows:

Rapid prototypes are created for some specific purposes and then thrown away. These are essentially useful in early stages of software development. For example, Guger et al. (2001) supplemented this idea of a rapid prototype by creating a new type of EEG-based brain–computer interface. This interface uses rapid prototyping to enable a fast transition of estimation of various types of parameters and classification algorithms to real-time implementations and testing.

Iterative prototypes work in iterations, or steps, in order to work out some details and increasing their precision. Here, each iteration should inform some aspect of the design.

Evolutionary prototypes are a special case of iterative prototypes in which the prototype evolves into part or all of the final system. Evolutionary prototypes require more planning and practice than other approaches since these prototypes are representations of the final system and the final system itself, hence making it more difficult to explore alternative designs.

4.5.8.2.2. Component-based Software Development. CATM was used in a real-life "use" situation, and the feedback was used to iteratively fine-tune and improve the artifact. This iterative prototyping process was employed through the use of a CBSD technique. This means that the prototype need not be developed from scratch, but as a sub-system within the GDSS. As explained by Vitharana (2003), key advantages of CBSD include reduced lead time and costs as business applications can be developed from an existing pool of components. This also leads to enhanced quality as components are retested, easily maintained, and easily replaced. The life cycle of CBSD includes doing a requirement analysis, preparing the preliminary design which involves component specification, detailed design which consists of component search and identification, and, finally, implementation. In implementation, it is important to conduct unit testing and integration testing, as well as system testing.

Expertise in matching user requirements with components available in the repository before assembling them into applications will be a crucial aspect of CBSD (Vitharana, 2003). As CBSD requires seamless communication between developers, assemblers, and the customer, in the development of the CATM, we have built a strong communication pipeline and cooperation between the Spilter developers and the programmers developing the OCAI component within the Spilter GDSS, as well as the end customer and users of the artifact.

Component-based systems development is the correct approach to develop the prototype for CATM. Instead of developing the system from scratch, which is costly and time consuming, the culture software component portion of the prototype was developed using tools a current GDSS to build the survey. The OCAI survey is then automated through this system and data captured is exported to another component within the system for statistical reporting.

The second phase consisted of designing the decision room within GDSS for culture discussion, agreement, and gathering ideas for culture change. They included the OCAI Survey.

We next used the steps e and f of the 13-step process listed in Peter Keen's Model. We utilized the features in GDSS to automate the OCAI survey. The development process included the following steps:

1. Survey Building. The Spilter GDSS (courtesy of Spilter) allows the creation of interactive meetings and surveys. It incorporates various built-in tools to enable the process of survey creation. The tools provided are classified by their functionality into the following types:

Name	Description
Topic	Used to place a number of questions or analyses
Open question	Used to ask open-ended questions with inputs spanning a single to multiple lines
Closed question	Used to ask closed-ended and multiple-choice questions
Analysis	Used to analyze answers from previous questions or to test a set of questions for the same answer options

(*Continued*)

Name	Description
Category topic	Used to cluster answers from previous questions into relevant categories
Text	A page with text can be used to clarify the purpose or subject of the next question or questions
Conclusion or remark	Add a conclusion or remark to the report
Template	Import a previously saved part of a meeting structure.

Of the various tools that Spilter GDSS provides, the team used the following two tools because of their compatibility with the current OCAI survey question structure:

Name of Tool	Description	Type
Selection menu radio buttons	Selection menu with radio buttons only allows the user to select one option out of a number of options available	Closed question
Distribution	With a distribution analysis, the participant distributes an exact number of points among a series of questions	Analysis question

In our implementation of the OCAI survey, we used the selection menu radio buttons for the registration questions, and the distribution analysis questions tool for the OCAI questions.

2. Survey Registration. Provides the ability to register users directly into the survey through the uploading of an Excel file. Through pre-loading in the participants' information into the system, the registration process is easier and faster as it eliminates the need for manual registration.

3. Survey Dissemination. It is essential to be able to inform users about the survey, its purpose, and the procedures required to participate in the survey. The email function within the system can add all the registered users to an email list and generate a customized invitation for each user. When users receive the email, all they need to do is to click on a link which will direct them to the first page of the survey. The email message also includes contact information of the survey administrator should users require any assistance or want to provide any feedback. This feature helps to explain the basis and need for the survey as well as the procedures for participating in the group discussion – at the participants' convenience. It eliminates the need to deploy manpower to manually explain and guide each participant. The tool substantially reduces the time and effort required and enables scaling up of the process to large groups of employees.

4. Survey Flow. The flow of the survey sequence is mapped to ensure that the process of culture alignment is taken into consideration. The following illustrates the flow of the survey and alignment process:

    - *Overview and Survey Flow*. Provides participants with an overview and flow of the survey.

    - *Introduction*. Displays an introductory message from the head of the organisation explaining the purpose of the survey and encourages employees to fully partake in this exercise to share what they perceive of the current and

desired organisational culture. The message can also ensure participants of the confidentiality of the survey and anonymity of the participants.

- *Registration*. Users enter their personal particulars as required by the organisation.
- *Current Culture*. Takes the participants through what they think are the dominant characteristics of the current culture by answering the survey questions.
- *Desired Culture*. Takes the participants through what they think are the dominant characteristics of the desired culture by answering the survey questions.
- *Survey Monitoring*. During the course of the survey, monitoring is done through a dashboard, which provides real-time information on the number of participants who answered the survey.
- *Survey Analysis*. Data from the survey can be downloaded and analyzed anytime

4.5.8.3. Requirement Specifications: Version RS2

The process flow for enabling group discussion on culture change using CATM is illustrated in Fig. 4.6.

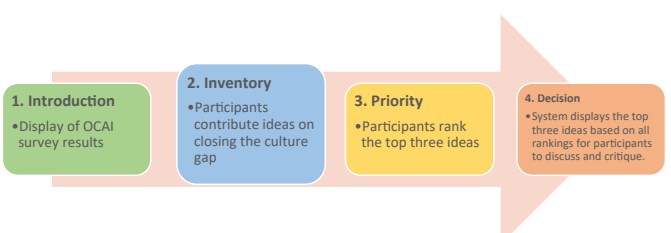


Fig. 4.6. Process Flow for Enabling Group Discussion on Culture Change Using CATM.

- ***Introduction Phase.*** Outlines and explains the results of the culture survey.
- ***Inventory Phase.*** Participants input their suggestions to help the organisation move toward the desired culture. At this stage, all participants are able to see one another's ideas in real time on the screen. All suggestions are anonymous at this point. This will encourage participants to freely suggest ideas without being pre-evaluated.
- ***Priority Phase.*** Participants rank the top three ideas out of all the ideas suggested by the participants.
- ***Decision Phase.*** Participants critique the overall top three ideas and express what they like or do not like about the ideas for culture change.

4.5.8.4. Requirement Specifications: Version R3A

In this version, the software is tested out with a pilot group for its functionality and features suggestions gathered, which are incorporated into the final prototype. The following sections review the software evaluation protocol and steps.

4.5.9 Prototype Evaluation

One of the aims of this step is to evaluate the user friendliness and interface of the CATM tool for culture change. The feedback is used to help improve the interface so that organisational members can find this a purposeful and easy platform on which to share on ideas for culture change. The feedback from the previous session is thus used to improve the interface progressively so that there is a continuous iteration to improve the GDSS software tool according to ADR methodology.

4.5.10 Digital Tool Evaluation Methods

It is important to evaluate the solution to validate the usability, ease of learning, as well satisfaction with the features of the software. This evaluation is according to the Technology Acceptance Model (Davis, 1989) that states that users come to accept a technology based on perceived usefulness and ease of use. We will look at accredited instruments and literature that were used to develop the survey (Table 4.5).

Table 4.5. Methodology for Software User Testing.

Acronym	Instrument	Reference	Institution	Example
QUIS	Questionnaire for user interface satisfaction	Chin, Diehl, and Norman (1988)	Maryland	27 questions
PUEU	Perceived usefulness and ease of use	Davis (1989)	IBM	12 questions
NAU	Nielsen's attributes of usability	Nielsen (1993)	Bellcore	5 attributes
NHE	Nielsen's heuristic evaluation	Nielsen (1993)	Bellcore	10 heuristics
CSUQ	Computer system usability questionnaire	Lewis (1995)	IBM	19 questions
ASQ	After scenario questionnaire	Lewis (1995)	IBM	3 questions
PHUE	Practical heuristics for usability evaluation	Perlman (1997)	OSU	13 heuristics

Table 4.5. (*Continued*)

Acronym	Instrument	Reference	Institution	Example
PUTQ	Purdue usability testing questionnaire	Lin, Choong, and Salvendy (1997)	Purdue	100 questions
USE	USE questionnaire	Lund (2001)	Sapient	30 questions

Source: Extracted and adapted from the indicated sources.

The evaluation of CATM will be conducted using two methods.

1. An **online questionnaire survey** to gather feedback on CATM regarding technology frustration.

   - Usefulness;
   - Ease of use;
   - Ease of learning;
   - Satisfaction with the software.

2. A structured focus group interview to gather qualitative feedback on the CATM software on:

   - What respondents liked best about the software;
   - What respondents liked least about the software; and
   - What improvements they would suggest or recommend.

This interview will be facilitated step by step according to each screen of the GDSS platform to gather the feedback in a structured manner

4.5.10.1. Reflection and Learning

Principles for reflection included three key principles:

1. Reflect on the design and redesign during the project;
2. Evaluate adherence to principles;
3. Analyze intervention results according to stated goals.

CATM should be subjected to continuous improvement as the programmers and users work together to improve its usability as a survey tool and platform for culture change. The transition from version RS0 to version RS3 proved for a prototype that is used effectively to measure the culture gap between current and desired cultures and to provide a platform for stakeholders to discuss and share ideas for closing the culture gap.

As we can see, the development of CATM follows an extensive methodology that involves culture principles and tool, extensive understanding of GDSS technology and how it works, and, lastly, a clear and systematic design process to ensure sequential flow and skillful facilitation to obtain desired outcomes for culture transformation. In the next two chapters, we will study in detail the deployment of CATM in a start-up university striving to be the best in the world for nurturing technically grounded leaders anchored in the foundations of design. We will also study the application of CATM in a start-up technology company.

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5

DEVELOPING A CULTURE OF INNOVATION: THE SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN STORY

5.1 BACKGROUND

The Singapore University of Technology and Design (SUTD) is a Singapore public university set up by the government of Singapore. SUTD was created in 2009 with the mission of advancing knowledge and nurturing technically grounded leaders who will serve vital societal needs by designing solutions to meet human needs and problems. In a statement on the purpose of SUTD, Prime Minister Mr. Lee Hsieng Loong, reiterating this vision, stated the following:

> *The Singapore University of Technology and Design will provide something different from the existing institutions – a very high-quality education, not just an academic education, but one which is going to stimulate students to go beyond the book knowledge,*

> *to apply it to solving problems. It will teach students to be creative, not just in the technology and the design part, but also to be creative in bringing ideas out of the academic environment into the real world, into the business arena and into the real economy.*[1]

On May 2015, at the grand opening of the university, the prime minister again reiterated the important role that SUTD is intended to play in Singapore's economy when he emphasized that "Many projects in the future, such as building greener homes and the planned high-speed rail link between Singapore and Malaysia, will require expertise and skills in engineering, technology, and design. As such, there will be no lack of jobs or challenges for SUTD graduates" (Lee, 2015).

Armed with a focus on big "D" (design) and technology, SUTD was designed with four multi-disciplinary "Pillars:"

1. Engineering product development
2. Engineering systems design
3. Information systems and design
4. Architecture and sustainable design

Two supporting foundational clusters, namely Humanities, Arts, and Social Sciences (HASS) and Science and Mathematics were created to be the foundational pillars for the core engineering and architecture programs. HASS was created to help students learn about the groundbreaking ideas, great historical moments, and dominant social paradigms that shape and have shaped the societies in which we live. This knowledge is intended to help them look beyond

1 http://www.youtube.com/watch?v=8tEfk8_E9Dk.

themselves, to develop empathy in social situations, and to foster a sense of fearlessness in their creativity. It is in this respect that the various humanities, arts, and social sciences disciplines – grouped at SUTD under the acronym, HASS – envision their role at the center of the creative process and provide a firm foundation for students' work in technology and design.

The HASS disciplines include psychology, sociology, history, anthropology, economics, literature, film, and urban studies. Management subjects are taught through collaboration with the Singapore Management University (SMU). The science and mathematics cluster aims to provide students with building blocks in biology, chemistry, physics, and advanced mathematics. These programs are crucial to help students prepare for their majors in the areas of information systems, engineering product, engineering design and architecture.

Since its inception in 2009, SUTD has in place a comprehensive academic, administrative, and research leadership team. It has, to date, recruited a total of 160 world-class faculty members, close to 400 research fellows and scientists working in different centers, and about 400 administrative staff supporting the academic and research community. As for the recruited faculty members, they include members from 41 countries and from various disciplines spanning engineering, humanities and social sciences, general sciences, industrial design, computer sciences, and architecture. They are organised to collaborate in research with a multi-disciplinary focus that cuts across traditional disciplinary boundaries.

The university recruited its first batch of undergraduate students in 2012 and, to date, has about 1800 undergraduate students and approximately 600 graduate students enrolled in its various engineering and architecture programs (mainly doctoral and master's degree candidates).

SUTD was designed to be different from typical universities. It is designed in a fluid structure in that it has no boundaries. There are no traditional schools, faculties, or departments. Instead, the concept of pillars of specialization dominates the key educational foundations of the university. These pillars interact through the key themes of research and design. There is multi-disciplinary collaboration across specializations.

The pillars are managed by a "pillar head" instead of a "dean." The purpose of this management structure is to prevent territorial delineation. Administrators, faculty, students, and researchers work together to achieve the mission and vision of SUTD. The seating spaces of faculty are defined by research themes rather than by pillars or schools. This is done to ensure multi-disciplinary collaboration. Table 5.1 compares a traditional university to the design and vision of SUTD.

Table 5.1. The Vision and Design of SUTD Contrasted with Those of Traditional Universities.

	Traditional University	Vision for SUTD
Organisational structure	Hierarchical and territorial	Flat and Agile with no schools, but instead pillars of specialization form the main core of the university
Operating model	Decentralization	Shared services
Student interaction	Big lecture series to achieve economies of scale	Small Cohort size classrooms – to achieve intimacy of interaction

Table 5.1. (*Continued*)

	Traditional University	**Vision for SUTD**
Student learning	Theoretical	A strong theoretical foundation coupled with a hands-on interactive experience that is interlaced with internships and practice
Research	Narrowly focused	Multi-disciplinary, focus on innovation and creativity (development and improvement of artifacts) rather than only description or explanation
Faculty recruitment	Decentralized with a narrow focus	Decentralization at the first level of screening, but centralization when it comes to decision to hire. The President chairs the final selection committee together with a multi-disciplinary team to ensure that each faculty hired has the potential to collaborate across the different specializations
Faculty governance	Dominant in faculty self-governance	Mixed faculty governance with specifically chartered work teams on key projects that may also include administrative staff

The table explicitly shows how the SUTD vision is quite different from that of a typical traditional university. However, through the selection and recruitment process, SUTD may eventually be populated by key stakeholders (students, academic and administrative management, faculty and staff) who could have been brought up and been successful in a traditional university environment. They carry with them the assumptions and values, i.e., the culture that helped them survive and succeed in a traditional university environment.

When creating a university with such a unique vision and mission, culture can become fragile and in danger of reverting back to the traditional university culture. In this case, the development and integration of a strong organisational culture that is consistent with SUTD's vision becomes important. This is because SUTD's students, faculty, and staff come from different disciplinary, national, cultural, and institutional origins and from diverse academic backgrounds. In Clayton Christenson's book, *The Innovative University*, the author noticed that, in the spirit of honoring tradition, universities hang on to past practices to the point of imperilling their futures. They do not reinvent their curriculum to better prepare students for the increasing demands of the world of work (Christensen & Eyring, 2011, p. xxii). SUTD's culture journey is, in another sense, synonymous with the journeys that today's universities must undertake to transform themselves and the traditional culture in order to meet the expectations of the changing world and Industry 4.0.

SUTD is also operating in a very competitive landscape where there are more established universities competing for top students, faculty and staff. There is a sense of urgency to propel members to create a unique culture and vision at SUTD that would be very different from the other local universities.

SUTD senior leadership team would need to develop a desired culture that can drive the vision and mission of SUTD. In building such a culture, there is a need to ensure that through a process of culture change, all key stakeholders of SUTD reach a common understanding and agreement of this desired cultural profile.

These various stakeholders (senior management, faculty, staff, and students) have different motivations, agendas, and backgrounds leading to different perceptions of the current state of culture in the organisation. SUTD senior leadership team is required to find out what is the current culture and engage with staff and faculty to discuss and agree on the desired culture that is needed to drive strategy. The leadership must bring this important message to faculty, staff, and students through regular town halls and forums, as well as through reiteration of its vision, mission, and key goals.

Leaders of the organisation must champion the culture change, and future leadership should be cultivated with training in the competencies necessary in the new environment. In this project, the SUTD senior management team were heavily involved from the beginning and this included rallying key members of staff and faculty to champion projects.

5.2 PHASE 1 OF THE CULTURE PROJECT

During the period of March 2013, 13 members of the SUTD senior academic and administrative management embarked on the process of cultural assessment, change, and alignment.

We started with measuring, discussing, and agreeing upon perceived current and desired cultures; identifying the gaps between the current and desired cultures and the possible ways to reduce these gaps; and finally, agreeing upon the

change measures that are required to achieve the desired culture. This manual process took about half a day for a group of 13 people.

5.2.1 Problems Observed

- The process for filling the culture survey for 13 members took about a week to complete. The manual version of the OCAI tool was used for each member to complete. In order to ensure participation, each member received personal attention to explain and work through each step. While this process was possible for a small group size, it would be inefficient and time consuming if the same manual process was employed for the large number of staff, faculty, and students.
- A great amount of time was spent to organise an off-site meeting and for the 13 members to reach a consensus. While there was general agreement on the type of desired culture in SUTD, the perception of the current culture was quite varied among them. The views differed in terms of the way they perceived the hierarchical makeup of the organisation, innovation, market competition, as well as management of employees. It took half a day of brainstorming to align and agree on the types of initiatives the team could undertake to drive toward the desired culture.

Next, the process was scaled up to the subgroups of the full complement of SUTD faculty and administrative staff. The following was observed for this larger exercise:

- Members of the faculty and staff stakeholder groups were not fully responsive to the request to participate in the

survey and subsequent group discussions. They found the face-to-face sessions lengthy and time consuming. In addition, due to potential problems of scalability and process losses of which the members might already be aware of, they did not consider the results of the group process credible and therefore chose not to participate in the initial survey. This lack of participation and trust rendered the effects of these manual sessions less credible and less valid.

- Given the large numbers of potential participants in the university community, the process of collecting OCAI data from these large groups, tabulating these data, and arriving at an agreed consensus was extremely time- and effort-intensive, and therefore not scalable.
- The face-to-face sessions might also be subject to process losses where many participants in the group remained quiet, and only the most vocal or influential members may be heard in a group discussion.
- It was difficult for a human scribe to capture the comments and suggestions by most participants.
- In a manual process, it was difficult for members to arrive at a common understanding regarding their perceptions of the current organisational culture, agreement about the desired cultures, and the ways (projects) designed to move from the current to the desired state.
- As culture change is a gradual process and requires ongoing measures at frequent intervals, frequent iterations of explorations might be required. This means that each of these iterations was time consuming and obtrusive. As this was a manual process, iterations were much more difficult.

5.3 DEPLOYMENT OF CATM IN SUTD

After Phase 1 of the Culture Exercise, which did not take off well, we began to form the CATM Project Team to start working with senior management to deploy the digital tool. The following functionalities were built.

- Collecting, grouping, summarizing, graphing, and reporting of OCAI data from multiple participants.
- Supporting group discussion and decision making at both intra- and inter-group levels for arriving at consensus, and agreeing upon culture change measures.
- Regularly and iteratively measuring progress toward the culture change project.

We set out to overcome all these issues with the use of CATM that was developed to automate and improve the participation rates of the survey. CATM was formulated to take participants through and complete the survey phase as it was done in the manual sessions. Methodology for deploying CATM used the concept of action design research in which the digital tool was tested out in an initial group of participants from the Human Resources division and based upon their evaluation and feedback, subsequently refined to improve the flow. The underlying objective behind CATM is that a relatively large number of people can participate in group processes.

After refining the tool, CATM was deployed to four key groups of stakeholders in SUTD, namely senior management, faculty, staff, and students. Design principles included:

- Building the OCAI survey tool using the GDSS system.

- Building usable screens to automate the flow of the OCAI survey.
- Building process flow for cultural alignment within the GDSS platform.
- Developing a platform for the easy participation and contribution of ideas for culture change.
- Testing the software with a pilot group of users to assess its usability and user-friendliness.
- Refining the final prototype and deploying to the larger group.

5.4 SCREENSHOTS OF CATM

Fig. 5.1 shows the entire process flow of the OCAI Survey listing the six dimensions of culture (Fig. 5.2).

Fig. 5.3 shows the process flow for enabling group discussion on culture change using CATM.

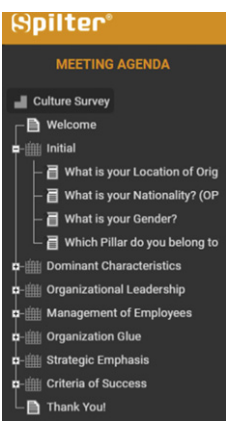


Fig. 5.1. Entire Process Flow of the OCAI Survey.

Fig. 5.2. The Initial Message from the First and Founding President of SUTD.

5.5 RESPONSE AND PROFILE OF SURVEY PARTICIPANTS

The entire SUTD population including senior management, staff, faculty, and students participated in the survey. In order to ensure that the participants had a good understanding of the SUTD culture, only persons who had been with SUTD for at least one year were surveyed. Inclusion criteria were staff, faculty, and senior management who had at least one year of service, and sophomore and senior students in their second and third year of studies. The general demographics and participation rate are illustrated in the following graphs (Figs. 5.4 and 5.5, Tables 5.2 and 5.3).

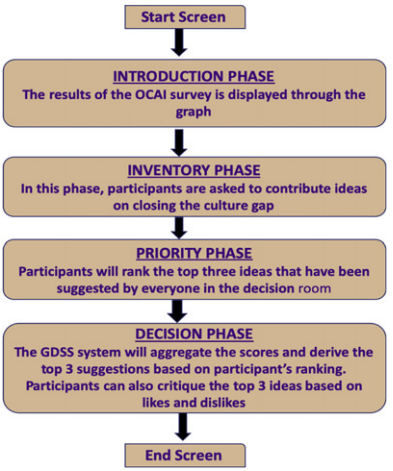


Fig. 5.3. Process Flow for Enabling Group Discussion on Culture Change Using CATM.

5.5.1 Participation Rates

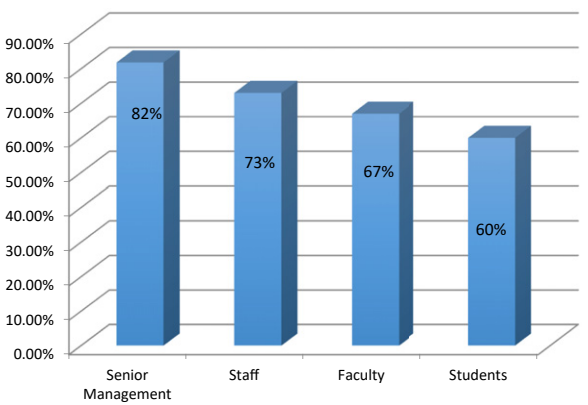


Fig. 5.4. Participation Rates.

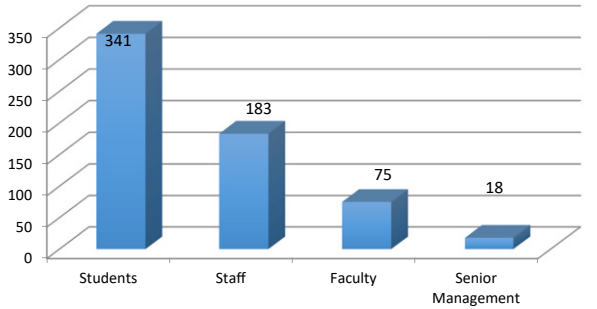


Fig. 5.5. Total Number of Participants.

5.5.2 Participant Profiles

Table 5.2. Percentage Distribution of Nationality of Participants.

	Nationality of Participants				
	Asia	**Europe**	**North America**	**Antarctica**	**Australia Oceania**
Senior management	72.3%	0.0%	27.7%	0.0%	0.0%
Faculty	65.0%	27.0%	5.0%	1.0%	2.0%
Staff	100.0%	0.0%	0.0%	0.0%	0.0%
Students	99.7%	0.0%	0.0%	0.0%	0.3%

Table 5.3. Length of Service of Participants.

	Length or Service	
	Less than 3 years	**More than 3 years**
Senior Management	88%	11%
Faculty	17%	83%
Staff	75%	25%

5.6 RESULTS ON EFFICIENCY OF CATM VERSUS MANUAL METHOD

Table 5.4. Results with Respect to Efficiency.

	Face-to-Face Sessions	**CATM**	**Improvement Rate**
Participation rate	Admin Staff: 24.65% Faculty: 14.9%	Admin Staff: 73% Faculty: 67%	Admin Staff: 48.5% Faculty: 52%
Time taken to fill in Survey	1 hour per person	30 minutes per person	Time savings: 30 minutes per survey
Generation of ideas to achieve desired culture	3 hours at Senior Management retreat conducted a year before using pens and flipcharts	1 hour for session using CATM	2-hour improvement for idea generation session

Note: The senior management team only participated in the manual version of the OCAI survey, so no data are available for comparison.

- The results showed a major improvement in the participation rate of stakeholders for the manual method versus using CATM. The percentages by which participation improved ranged from 48% for staff to 52% for faculty.
- The results also showed a time savings of 30 minutes for every survey undertaken using CATM versus the manual version.
- There was a 200% improvement in the time needed to generate ideas for a culture change session with CATM versus the face-to-face interaction when the system was pilot tested with the senior management team. In the initial manual pilot test, it took the team half a day to derive five general ideas to facilitate collaboration and innovation within the university. After CATM was introduced, it only took one hour to generate more than 20 agreed ideas for culture change. These ideas revolved around reducing hierarchy, introducing innovation through entrepreneurial activities, and improving teamwork through social lubrication (Table 5.4).

5.7 DESCRIPTION OF DATA ABOUT CULTURE CHANGE USING CATM

Along with the deployment of CATM for survey building and alignment of desired culture, we collated and gathered the following data:

- The current and desired states of culture.
- The current and desired states of culture among the different stakeholder groups.
- The current and desired states of culture for each dimension of culture.

- The current and desired states of culture for each dimension of culture for each stakeholder group.
- The current and desired states of culture for different geographical regions, mainly Asia, Europe, and North America.

5.7.1 Validity and Reliability of the OCAI Instrument Used in the SUTD Culture Project

West-Moynes (2012), in a study of culture on Ontario colleges using the Competing Values Frameworks, shares that the validity and reliability for OCAI has been established through numerous studies (Cameron & Freeman, 1991; Collett & Mora, 1996; Quinn & Spreitzer, 1991; Zammuto & Krakower, 1991). The Krakower study is in effect, the most relevant, as they tested the OCAI with 1300 respondents from higher education institutions. The reliability co-efficients from that study ranged from 0.67 to 0.83.

Although this is a digital version of the OCAI, we would still need to evaluate reliability. Cronbach's alpha was used to determine internal consistency and reliability in this CATM Project. Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. Internal consistency describes the extent to which all the items in a test measure the same concept or construct and hence it is connected to the interrelatedness of the items within the test (Tavakol & Dennick, 2011).

In this project, both the current culture and preferred culture's alpha coefficients were greater than ***0.70***, thus indicating a high level of reliability.

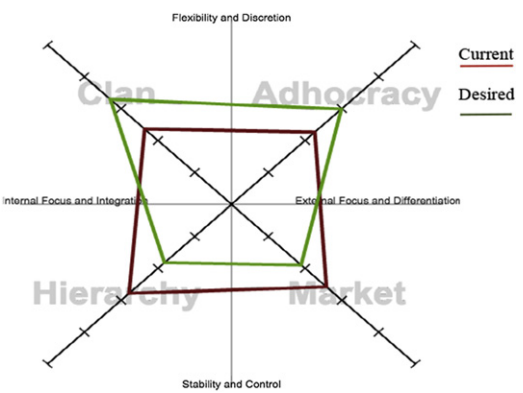
Please refer to Table 5.5 for the reliability tests.

Table 5.5 Reliability Results.

	Clan	Adhocracy	Market	Hierarchy
Reliability coefficients for current (SUTD)	0.8	0.79	0.79	0.79
Reliability coefficients for desired (SUTD)	0.78	0.82	0.74	0.79

5.8 RESULTS OF ORGANISATION-WIDE OCAI SCORES

We will share the outcome of the organisation-wide culture survey (Fig. 5.6 and Table 5.6).



Source: Model adapted from *Diagnosing and Changing Organisational Culture* (Cameron & Quinn, 2011).

Fig. 5.6. Results of Organisational-wide OCAI.

Table 5.6. OCAI Numerical Results for Overall Culture.

	Current Mean	Desired Mean
Clan	23.61	32.92
Adhocracy	22.64	29.87
Market	25.81	18.92
Hierarchy	27.85	18.22
Dominant culture type	Hierarchy	Clan
Secondary dominance	Market	Adhocracy
Key organisation focus	Stability and control	Flexibility and discretion

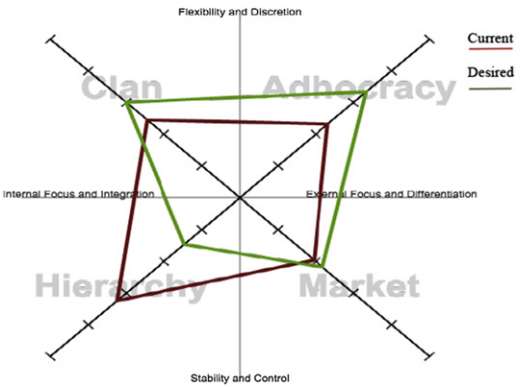
The current culture as perceived by all stakeholder groups was hierarchy, while the second dominant perceived culture was market. The scores are actually quite equally spread out with no strong dominance. Stakeholders perceive the current culture as one of stability and control.

The preferred culture as desired by all stakeholder groups was clan followed by adhocracy. Stakeholders want less hierarchy and a culture with more flexibility and discretion.

5.8.1 Results of Each Stakeholder Group

5.8.1.1. Senior Management

The current culture as perceived by senior management was hierarchy, while the second dominant perceived culture was clan. Senior Management thought the current culture was not market focused enough, and an interesting observation was that Senior Management thought that hierarchy was predominant in the current culture.



Source. Model adapted from *Diagnosing and Changing Organisational Culture* (Cameron & Quinn, 2011).

Fig. 5.7. OCAI Graph for Senior Management Group.

Table 5.7. OCAI Scores for Senior Management Group.

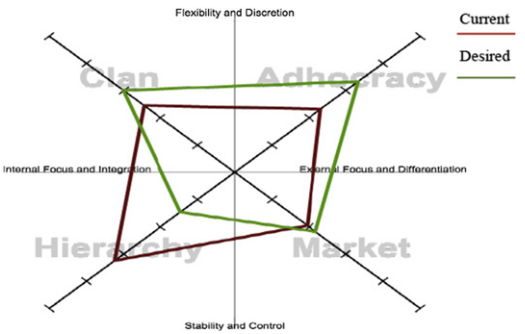
	Current Mean	Desired Mean
Clan	24.51	30.09
Adhocracy	23.19	33.33
Market	19.54	21.81
Hierarchy	32.45	14.63
Dominant culture type	Hierarchy	Adhocracy
Secondary dominance	Clan	Clan
Key organisation focus	Internal focus and integration	Flexibility and discretion

The preferred dominant culture as desired by senior management was adhocracy followed by clan. The senior managers would prefer significantly lower hierarchical and control scores for the organisation (Fig. 5.7 and Table 5.7).

5.8.1.2. Staff

The current dominant current culture as perceived by staff is both market and hierarchy. The scores between Clan and Adhocracy are almost the same.

The preferred culture as desired by staff groups was Clan followed by Adhocracy. Staff groups somehow preferred a much less market-driven culture (Fig. 5.8 and Table 5.8).

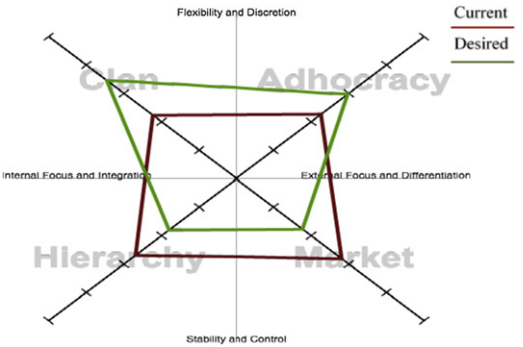


Source: Model adapted from *Diagnosing and Changing Organisational Culture* (Cameron & Quinn, 2011).

Fig. 5.8. Results of OCAI Graph for Staff Group.

Table 5.8. OCAI Results for Staff Group.

	Current Mean	Desired Mean
Clan	23.61	31.83
Adhocracy	23.04	25.18
Market	26.68	20.35
Hierarchy	26.67	22.64
Dominant culture type	Market	Clan
Secondary dominance	Hierarchy	Adhocracy
Key organisation focus	Stability and control	Flexibility and discretion



Source: Model adapted from Diagnosing and Changing Organisational Culture (Cameron & Quinn, 2011).

Fig. 5.9. Results of the OCAI Survey for Faculty.

5.8.1.3. Faculty

The current culture as perceived by faculty is market, while the secondary dominant perceived culture was hierarchy. These two scores suggest that faculty perceive the current SUTD organisational culture as one that is both market and control orientated.

The preferred culture as desired by faculty was clan followed by adhocracy. There was a strong dominance of a preferred Clan culture indicating that faculty would like to see an increase in collegiality and innovation, even at the expense of control and market orientation, at SUTD (Fig. 5.9 and Table 5.9).

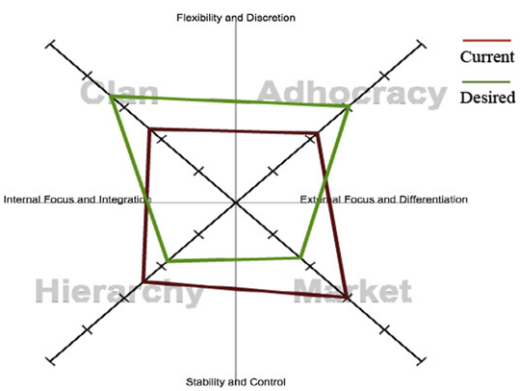
5.8.1.4. Students

The current dominant culture as perceived by students was market, while the second dominant perceived culture was hierarchy. Adhocracy scored the lowest although the score does not have a big gap between Clan.

Table 5.9. OCAI Results for Faculty.

	Current Mean	Desired Mean
Clan	22.36	34.56
Adhocracy	22.60	29.68
Market	28.13	17.74
Hierarchy	26.92	18.03
Dominant culture type	Market	Clan
Secondary dominance	Hierarchy	Adhocracy
Key organisation focus	Stability and control	Flexibility and discretion

The preferred culture as desired by students was clan followed by adhocracy. Students indicated a preference for a less Market and Hierarchical Culture (Fig. 5.10 and Table 5.10).



Source: Model adapted from *Diagnosing and Changing Organisational Culture* (Cameron & Quinn, 2011).

Fig. 5.10. Results of the OCAI Survey for Students.

Table 5.10. OCAI Scores for Students.

	Current Mean	Desired Mean
Clan	23.28	33.62
Adhocracy	21.97	30.48
Market	29.85	17.48
Hierarchy	24.91	18.42
Dominant culture type	Market	Clan
Secondary dominance	Hierarchy	Adhocracy
Key organisation focus	Stability and control	Flexibility and discretion

5.8.2 Diagrammatic View of Perceived Current Culture by All Stakeholder Groups

As can be seen from the graph, there was quite a wide variation in the way senior management and the rest of the groups perceived the current culture, particularly in the market and hierarchy quadrants. Senior management and students have the most differing views about the existence of market and hierarchical cultures at SUTD (Fig. 5.11).

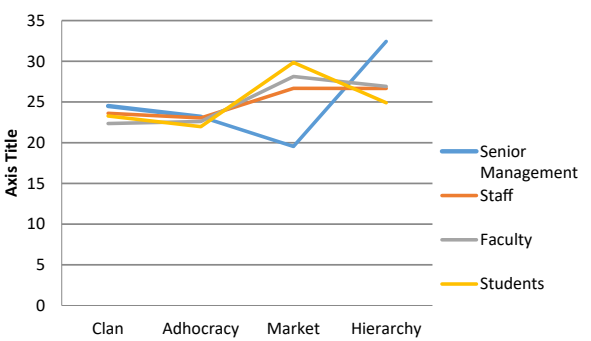


Fig. 5.11. Estimated Mean Scores of Each Category on Current Culture.

5.8.3 Diagrammatic View of Desired Culture by All Stakeholder Groups

As for the desired culture, we saw an extremely good alignment of all four major stakeholder groups, the preferred culture type, which is clan. This strongly indicates that all stakeholder groups are seeking a more collegial culture at SUTD (Fig. 5.12).

On the other hand, there were somewhat differing views on the desirability of adhocracy and hierarchy cultures. While the senior management team prefers to attach greater desirability and importance to an innovation culture, the staff prefer greater levels of control. This is to be intuitively expected. Greater levels of adhocracy that lower the preference for hierarchy and control are likely to make the work lives of staff more difficult; they would prefer a greater level of hierarchical control. In designing mechanisms for culture change, these opposing preferences of staff vs. senior administration, faculty and students need to be kept in mind and be balanced if success at change efforts were to be sustained.

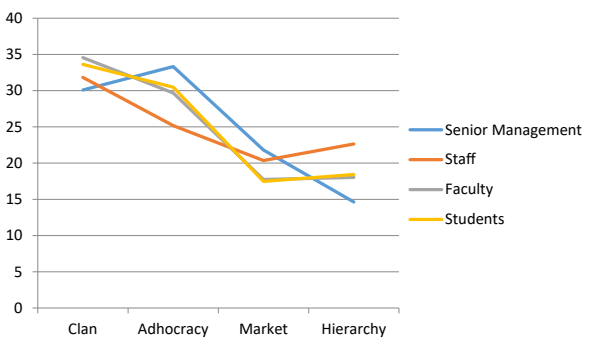


Fig. 5.12. Estimated Mean Scores of Each Category on Desired Culture.

5.8.4 Perception of Culture by Regions

Since SUTD has employees from over 40 countries, it was interesting to review perceptions of culture by region. For the purpose of this study, we segment the population by three regions, namely: Asia, Europe, and North America (Fig. 5.13).

Stakeholders in Asia viewed the current SUTD culture as market oriented followed by North Americans. Stakeholders in Europe, however, viewed the current SUTD culture as dominantly hierarchical (Fig. 5.14).

Stakeholders in both Europe and Asia desire to have greater levels of the collegial clan culture, while stakeholders in North America desired a greater adhocracy culture, although the difference between clan and adhocracy is minimal. These results too are intuitive, as North Americans are considered to be more innovative than Europeans and Asians, whereas the Asians and Europeans are supposedly more collectivist and clan oriented.

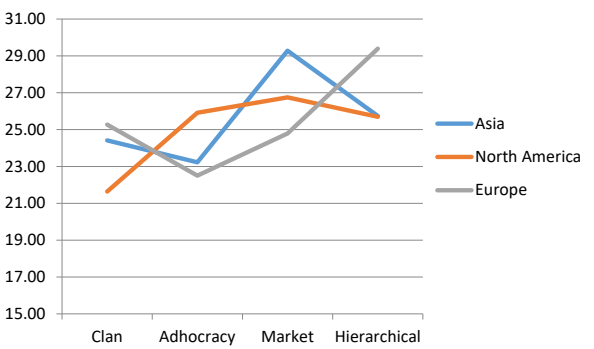


Fig. 5.13. Estimated Means Score of Each Region on Current Culture.

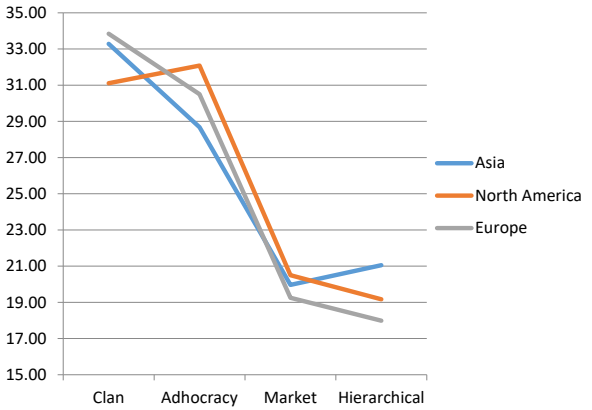


Fig. 5.14. Estimated Means Scores of Each Region on Desired Culture.

5.8.5 Results on Four Orthogonal Cultural Dimensions

The senior management team view internal focus and integration as the current culture, whereas the rest of the

Table 5.11. Summary of Current Cultural Dimension as Perceived by Different Stakeholder Groups.

	Perceptions of Dimensions of Current Culture			
	Senior Management	**Faculty**	**Staff**	**Students**
Flexibility and discretion				
Internal focus and integration	X			
External focus and differentiation				
Stability and control		X	X	X

stakeholder groups viewed stability and control as the current culture (Table 5.11).

All stakeholder groups were aligned in terms of a desired culture of flexibility and discretion (Table 5.12).

Table 5.12. Summary Table Outlining the Desired Cultural Dimension for Different Stakeholder Groups.

	Perceptions of Dimensions of Desired Culture			
	Senior Management	**Faculty**	**Staff**	**Students**
Flexibility and discretion	X	X	X	X
Internal focus and integration				
External focus and differentiation				
Stability and control				

5.8.6 Perceptions of Each of the Six Dimensions of Culture

The next set of results is derived from the six cultural dimensions of the OCAI survey. We reviewed the degree in which all four stakeholder groups were aligned (or not) in terms of their dimensions of cultural values. See Table 5.13. The behavioral perceptions of the six dimensions of current culture were:

1. Dominant Characteristics. The overall characteristics of the organisation.

Table 5.13. The Six Dimensions of Culture.

	Organisational Leadership	Management of Employees	Organisational Glue	Dominant Characteristics	Strategic Emphases	Criteria for Success
Current	Clan (26.78)	Hierarchy (27.37)	Hierarchy (29.17)	Hierarchy (28.45)	Hierarchy (28.69)	Market (26.6)
Desired	Clan (33.83)	Clan (34.22)	Clan (33.83)	Clan (32.16)	Clan (31.55)	Clan (31.85)

2. Organisational Leader. Perception of the leadership style that currently dominates the organisation.
3. Management of Employees. How employees are managed and how they view the working environment.
4. Organisational Glue. The mechanisms that hold an organisation together.
5. Strategic Emphasis. This defines the key strategic areas and emphasis on which an organisation places its key goals and priorities.
6. Criteria of Success. The factors that determine success for an organisation and which are greatly valued.

There are mixed views for perceptions of each of the dimensions of current culture. While hierarchy and control were perceived to be currently dominant in three of the six dimensions, all stakeholders perceived SUTD as not being particularly dominant in innovation and adhocracy. However, there was a concurrence in the desired culture state for each cultural dimension, which was clan culture. All stakeholder groups are seeking clan and collegiality along all six behavioral dimensions.

The results for the six dimensions of culture as viewed from Table 5.14 tell us that:

1. Senior management viewed most existing dimensions of culture as hierarchical. However, the scores between hierarchy and adhocracy were only differentiated by 0.2 for the behavioral dimension on criteria of success. It was rated at 27.5 for adhocracy and 27.72 for hierarchy.
2. Senior management would like to see more adhocracy in the desired culture for most dimensions except for organisational glue and management of employees. This may set up opposing expectations among faculty, staff, and

Table 5.14. Perceptions of the Six Dimensions of Culture by Different Stakeholder Groups.

	Senior Management		Faculty		Staff		Students	
Dimension	**Current**	**Desired**	**Current**	**Desired**	**Current**	**Desired**	**Current**	**Desired**
Dominant characteristics	Hierarchy	Adhocracy	Hierarchy	Clan	Market	Clan	Market	Clan
Organisational leadership	Hierarchy	Adhocracy	Clan	Clan	Clan	Clan	Market	Clan
Organisational glue	Hierarchy	Clan	Hierarchy	Clan	Market	Clan	Hierarchy	Clan
Management of employees	Hierarchy	Clan	Clan	Clan	Clan	Clan	NA	NA
Strategic emphases	Hierarchy	Adhocracy	Market	Clan	Hierarchy	Clan	Market	Clan
Criteria of success	Hierarchy	Adhocracy	Market	Clan	Hierarchy	Clan	Market	Clan

students. While they see senior management asking for adhocracy along four behavioral dimensions, they see them as opposing adhocracy along the two dimensions that may threaten their managerial control.

3. Faculty viewed the dominant characteristics and organisational glue of the current culture as hierarchical, while the leadership style and management of people were viewed as clan. They did see elements of the university being market driven when it came to its strategic emphases and success factors. Faculty would desire a clan approach toward all dimensions of culture. This desire emphasizes faculty desire for collegiality in all behaviors.
4. Staff viewed the current dominant characteristics and organisational glue to be that of a market-driven culture and agreed with the faculty that the management of employees and the leadership organisation were that of a clan type. Interestingly they viewed the current strategic emphases and criteria of success to be that of hierarchical.
5. Similar to faculty, staff would prefer a clan approach toward all dimensions of culture.
6. Students viewed most elements of the current culture to be that of a market-driven culture. However, similarly to both staff and faculty, they preferred a clan approach to all behavioral dimensions of culture.

5.9 DESCRIPTION OF CULTURE CHANGE USING CATM

There were initially three sessions of culture change discussions that were facilitated using the CATM to create a decision room where stakeholders were invited to share their ideas for

culture change, poll and rank the ideas, and critique them. Following are the results collected from conducting three sessions of such focus groups in the first of such sessions.

5.9.1 Session 1: Pilot Testing with the Senior Management Team (22 Participants)

A digital brainstorming session was conducted with the senior management team on March 2014, in which CATM was used for brainstorming of culture change initiatives. Whereas the first computer-unassisted session for cultural alignment took half a day, this session took about one hour to complete and participants used the tool to suggest ideas for culture change.

A total of 50 ideas were generated with this session, of which 10 ideas were prioritized for culture change. Ideas for promoting a clan culture included:

- Introduce a "Be Happy" hour every last Friday of the month, where staff, faculty, and senior management can interact with each other on neutral terms.
- Create an intellectually vibrant and open campus for students and faculty.
- Promote flexible working hours.
- Streamline work processes to reduce bureaucracy.
- Organise a family day to promote a clan culture.

Ideas for promoting an adhocracy culture included:

- Introduce SUTD awards to recognize adhocracy and innovation.
- Review and consolidate work activities to remain focused on what we want to achieve.

- Develop innovative processes and re-engineer existing ones to build an innovative culture.
- Organise an annual innovation festival.
- Encourage revenue and resource generation as part of entrepreneurship culture.

5.9.2 Session 2: Pilot Testing with Staff Members

CATM was used to facilitate culture change with a group of staff members who contributed the following ideas for culture change (Table 5.15).

Table 5.15. Table of Change Ideas from Staff (In Verbatim).

	Ideas for Culture Change
Clan culture	Provide mentoring sessions at work
	Create an environment where people feel safe to voice their ideas regardless of seniority or position
	Organise social activities for interaction in an informal setting
	Organise more events like movie nights
	SUTD corporate affairs should be fun
Adhocracy culture	Train employees to think out of the box
	Organise design thinking workshops between students and faculty to crowdsource suggestions and ideas for growing SUTD
	Conduct quarterly online surveys to gather ideas
	Provide thinking space to inspire creativity and innovation

5.9.3 Session 3: Pilot Testing with Faculty

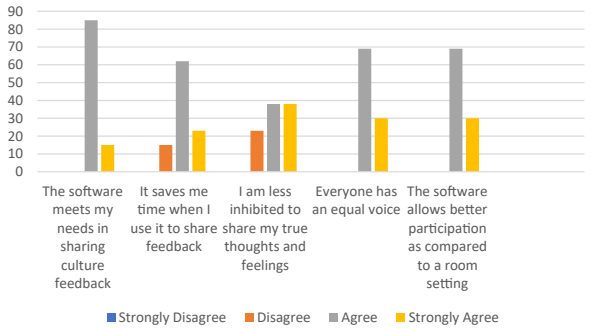
CATM was used to facilitate culture change with a group of faculty who contributed the following ideas for culture change (Table 5.16).

Table 5.16. Table of Change Ideas from Faculty.

	Ideas for Culture Change
Clan culture	Blur boundaries between administration and faculty. There is currently an "us" versus "them" perception
	Organise more bonding sessions outside campus
	Don't make us compete for limited resources.
Adhocracy	Need to have more negotiating powers and opportunities for growth. More directorships could be offered to faculty and allow them to apply
	Rewards and recognition should be based on clear, transparent criteria and carried out consistently. Need more rewards and recognition for people who work hard and work smart
	Right people for the right task?

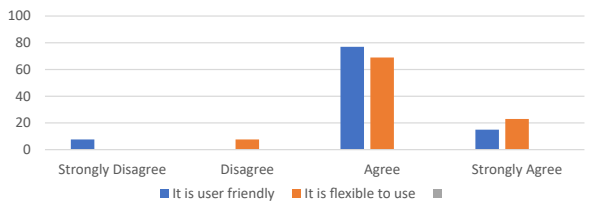
5.10 VALIDATION OF CATM

A user survey was conducted with this group of 13 staff and faculty who piloted the use of CATM for culture change. We collated the following responses regarding the usability of the software (Figs. 5.15, 5.16, 5.17, and 5.18).



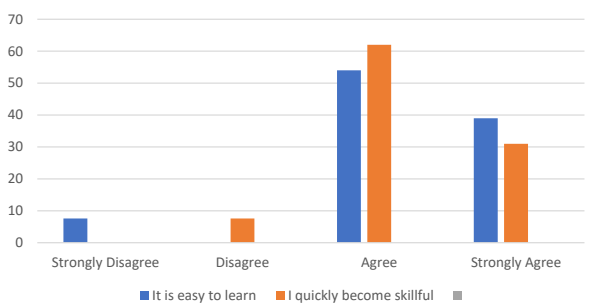
Note: 91% of respondents rated the artifact at useful.

Fig. 5.15. Usefulness of CATM.



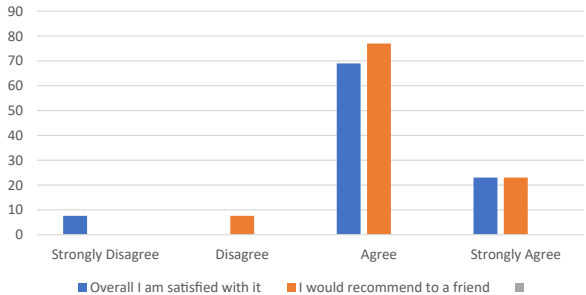
Note: 91% of respondents rated the artifact as easy to use.

Fig. 5.16. Ease of Use of CATM.



Note: 96% of respondents indicated it was easy to learn how to use the artifact.

Fig. 5.17. Ease of Learning CATM.



Note: 96% of respondents indicated that they are overall satisfied with the artifact.

Fig. 5.18. Overall Satisfaction With the CATM.

5.11 IMPLEMENTATION OUTCOMES OF IDEAS GENERATED FROM CATM

- **SUTD Awards**. This was introduced in 2014 to promote values, research innovation, teaching innovation, and cross-functional collaboration. The awards also review team spirit displayed by groups, and single out individuals who have gone out of the way to promote the desired culture.
- **Social Lubrication**. This initiative called for a slew of activities to be organised to promote a culture of teamwork cohesiveness. Some of the activities that have been organised include:
  - "Bring your Family to Work" day. This activity was organised in June 2015 and July 2019. It was very well received by employees and their family members.
  - Sports activities between staff, students, and faculty. A series of exercise classes were introduced in early 2015, with senior management taking a role in leading the programs. The programs are ongoing today.

  - Employee interest groups (EIGs). A ground up initiative, led by staff and faculty to organise various interest group activities so as to foster collaboration. The EIG has been very successful and saw its fifth run in the last few consecutive years.
  - Town hall gatherings. This was introduced in 2014 and is still ongoing today.
  - Staff newsletter. This was introduced in 2014 with the tagline "RENSHI," which comes from a Chinese word meaning "nurturing human relationships." It was very well received by the university community. Today, this has evolved into a digital platform and many of the SUTD happenings and activities are highlighted on our corporate social media account on LinkedIn.

- **Generating University Revenue**. A project team was formed to look at ways to generate revenue for the university as part of building an innovative culture. Two separate divisions were formed to look at business development as well as skills training. Today, this has evolved into two offices, namely, SUTD Academy for Ongoing Adult Education and Partnership and the Innovation and Enterprise Office.
- **New ideas for student admissions**. A task force was assembled to look at innovative ways of attracting potential students to join SUTD. Many new programs have been introduced, and student numbers have increased steadily throughout the year.
- **Reducing paperwork through elimination of unnecessary processes**. Several taskforces on lean six sigma have been formed and mainly led by myself, as CHRO, to workflow and unnecessary processes.

As can be seen, in the beginning part of the project, when a manual method was introduced for culture change, the results were dismal, with minimum participation and alignment. Actually, the results from this pilot project suggested that it would not be feasible to scale up the manual methodology to all the SUTD population, and if we did so, the outcomes may not be credible due to extensive process losses. In summary, CATM was able to:

- Measure and identify the perceived current and desired cultural profiles of each group. CATM was able to measure and identify the perceived and desired cultural profiles of each group effectively. It was also able to elicit an extremely high participation rate among staff, faculty, and students as compared to the manual method. Key reasons for this higher rate of participation may be the ease of access to the system by the participants, its easy-to-use screens, and the flow of the questionnaires in a sequential manner. The tool was able to secure a much higher participation rate at a faster speed compared to the manual method which took several weeks and with poor response.
- Represent these culture current and desired profiles explicitly and present the representations to all members in a group, for all to review and understand them. The tool was also able to collect all of the results from the surveys in a relatively short period of time. Once the results were tabulated, it was relatively easy for the screens to display the results to participants. We used a sequential method for the screens to be displayed, starting from the results of the culture survey and explaining to them the culture gap. The next screen explains to them the desired culture state that stakeholders have voted. This sequential flow proved

effective as participants were allowed to digest the information on each screen before going to the next screen.

- Provide a means for discussing these profiles to arrive at a consensus profile. Using a sequential flow, we were also able to use CATM for deriving on a common understanding for culture change. The results of the survey indicated that the tool has been a key driving instrument to help participants arrive at the desired clan culture, which was a unanimous selection for all stakeholder groups (students, faculty, senior management, and staff).
- Allow a large number of people participate in the discussion process (is scalable).
- Ameliorate the possibility of process losses.
- Provide a platform for discussion and agreement upon the change measures that are needed to move from the current to desired culture. In version RS2, we built the process for discussion on change measures using CATM. Participants were able to follow a sequential flow for decision making and agreement on the change measures needed to close the culture gap. Participants in the software testing group were first introduced to a start screen, followed by an introduction screen where results of the survey were shared with them. The next screen prompted them to input their ideas to close the culture gap, and participants were able to see each other's screens and critique the ideas. The top 10 ideas were then selected. Three pilot tests were being conducted using the software. The first pilot test with the senior management team produced 10 ideas for culture change.

For points 4 and 5, the results of the survey, as well as the participation rates have confirmed that the tool is scalable and able to reach large numbers of people. The CATM survey

indicated participants' comfort level and ability to contribute ideas which may be a direct result of the ability of the GDSS system to reduce process losses.

5.12 SUCCESS FROM 2014 TO 2019

Today, many of the ideas have been adapted for change projects and they have proven to be fairly successful. I would like to further highlight SUTD's key achievements in the following segments.

The SUTD topped a list of top 10 "emerging leaders" in engineering education, which identified a new generation of engineering programmes that include work-based learning, multidisciplinary programmes, and a dual emphasis on engineering design and student self-reflection.[2]

As for Generating Revenue, SUTD made it to the top 10 list of non-profit organisations in Singapore in generating revenue. See the extract below from the newspaper reports.

> *The NUS, NTU and SUTD made it to the top 10 in the list compiled by The Sunday Times. The others on the list included mega churches like New Creation Church, City Harvest Church and the Kwa Imn Thong Hood Cho temple.*[3]

We continue to generate revenue through a New SUTD Academy which offers SkillsFuture courses in cybersecurity, data science, artificial intelligence, tech-enabled services, entrepreneurship, digital media, urban solutions, and design thinking. On top of supporting the Singapore government's

2 https://www.straitstimes.com/singapore/education/nus-in-mits-top-10-list-of-engineering-education-leaders.

3 https://www.sutd.edu.sg/About-Us/News-and-Events/News/2019/7/Universities-billion-dollar-reserves-spark-qns/.

agenda to upgrade the skill set of adult learners, the Academy today is a profitable and self-generating unit, working alongside industry and key partners.

Building a Clan Culture continues to be a key focus for SUTD. We continued with the **Family Day 2019**. This is a special year for SUTD as we celebrated our 10th year anniversary in Singapore's higher education scene. We kick off a series of celebratory events for this special year by welcoming families of SUTD staff on our campus for a day of carnival fun at the SUTD Family Day 2019. SUTD was transformed into a carnival ground with balloons, games, roaming kiddy rides, bouncy castles, workshops, movie screenings, and even an SUTD-style Amazing Race for all to explore the beautiful campus in a fun and unique way. Meeting family members of extended family in SUTD have employees closer together, thus fostering the Clan Culture. Below are images from Family Day 2019 (Figs. 5.19 and 5.20).

Student Employment: SUTD graduates secure an employment rate of more than 95% year on year and command the highest starting salaries as compared to other local universities. They secure a higher starting median salary of $3,850 as

Photo: Courtesy of Majella Studios.

Fig. 5.19. Balloons Adorning Family Day 2019.

Photo: Courtesy of Majella's Studios.

Fig. 5.20. Miss Evelin Tay – Associate at ASD Pillar.

compared to other local universities whose median salaries were $3,500.[4]

Other notable achievements for SUTD can be found in its ability to establish more than 10 major research centers and receiving notable research funding.

In its short 10 years of being established, SUTD has established itself as the top emerging engineering university in the MIT Study. It is also now fifth in the world for telecommunications in a recent Clarivate Analytics Survey.[5]

The report stated that, "In the 2017 State of Innovation Report released by Clarivate Analytics, SUTD was ranked the fifth-most influential scientific research institution in telecommunications, based on the citation impact of research papers."

4 Story can be found in: https://www.straitstimes.com/singapore/education/higher-starting-pay-employment-rates-for-fresh-graduates-from-sutd-in-2018.

5 https://brandinsider.straitstimes.com/sutd/a-young-university-among-top-in-world-for-research-in-various-fields/.

SUTD was the only non-US institution to make the top 10 list, ahead of Princeton University and Carnegie Mellon University in the United States. It is also the first time SUTD has made it to a top 10 list in the State of Innovation report.

In the culture transformation journey of SUTD, it was not an easy process. There were hurdles and challenges along the way as stakeholders came from different backgrounds and training. Continual reinforcement of the desired culture was a necessary step to ensure change. As new employees joined the organisation, the perpetuation of the desired culture has to be reinforced through constant communication and culture activities.

CATM has been an integral part of SUTD's culture journey as the methodology and digital tool help facilitate its growth to what it is today.

6

MANAGING CULTURE CHANGE IN A TECHNOLOGY SET-UP USING CATM

Photo: Courtesy of Mr Tan Tse Yong.

Fig. 6.1. Mr Tan Tse Yong.

6.1 INTRODUCTION OF MR TAN TSE YONG, THE ACCIDENTAL ENTREPRENEUR

In the second case study, we deployed CATM in a technology start-up in Singapore. I worked with Mr Tan Tse Yong, who was the co-founder and CEO of this sports supplements start-up. This is the story of Tan, a Singapore Technology

Entrepreneur, on how culture laid the foundation for accelerated growth in a competitive landscape for a tech start-up. The use of the CATM tool was employed as part of the company's culture transformation journey.

Mr Tan Tse Yong was an accidental entrepreneur. After graduating with a Diploma in Sports and Wellness in 2004, he decided to join his friend as a business partner. At that time, the company was called Fitness Culture. They started venturing into commercial bidding to operate mainly gyms that were located in the Polytechnics. These are tertiary educational institutions located in Singapore. After a fairly successful run of about 4–5 years, the business partners began to realize that the current business model was not scalable. It was at this point that, FITLION, an online health supplement and nutrition business was born. They started by building a web portal and an e-commerce engine to sell and distribute health supplements. The business started with a revenue of few thousand dollars and gradually grew to $10 million by 2019.

The business partners also started Gymmboxx in 2010. The business operated mainly fitness centers and their clientele were customers who worked out regularly at the gym. Gymmboxx was also set up to help give FITLION a leverage as the same clientele who works out in the gym were also customers who will potentially purchase health supplements.

During my interview with Tse Yong, he shared that three things were of utmost importance in the success of their organisation. They were:

1. Developing a strong organisational culture and integrating people and teamwork.
2. Conducting business in an honest manner.
3. Keeping the business profitable and practically sustainable.

He believes that culture is key and is the foundation of any organisation. Potential employees and current employees need to know the reason behind a company's existence. He does not believe in overcharging, but rather allowing his clients a chance to purchase supplements at affordable prices. He also believes in building the health of his employees and giving everyone a second chance. One of the methods that he employs to attract and retain talent is his method of grooming them from the time they join him as interns and over the years, provide them with an opportunity to own a small share in the business.

When Tse Yong was building FITLION and Gymmboxx, he built an environment where there was a great deal of teamwork, empowerment, and trust. He ensured that every employee felt that the company was behind them throughout their stay with the organisation. His two leadership principles were:

1. People do not care how much you know until you show them how much you care.
2. Your employees are your teammates and work with you and not for you.

When Tse Yong was CEO of FITLION and Gymmboxx, he was a very hands-on person who rolled up his sleeves and went to the ground often to meet his co-workers to understand the challenges they were facing. When I met him in 2017 and shared with him on the use of CATM to facilitate and transform organisational culture, he jumped onto the bandwagon and became really excited about the project. He was a CEO who really believed in building the right culture for FITLION and Gymmboxx to succeed. We began to use CATM to survey his senior management team members on the current and desired culture of the company and also deployed

the use of CATM to facilitate culture conversations to reach an alignment. The team worked on the ideas generated through CATM and for the next two years, the business continued to become successful before Tse Yong sold off his share of the company in 2019. I recently caught up with him and conducted an interview on the outcome of the work we did with FITLION and Gymmboxx through CATM.

6.2 INTERVIEW WITH MR TAN TSE YONG ON THE EFFECTIVENESS OF CATM

The following are extracts from the interview conducted with Mr. Tan Tse Yong.

> Q. How did the CATM tool helped facilitate the process of culture change for FITLION and Gymmboxx?
>
> *Tan: The CATM tool helped to solidfy their understanding of what the team truly valued in the organization. It also substantiated the clan culture and what the organization was trying to build. During the brainstorming session, the team came up with many ideas to bring the company forward. Some of the outcomes resulted in:*
>
> - *Clear vision for the group to build more systems and processes while maintaining a clan culture;*
> - *Clarification of individual roles within the company;*
> - *More cross orientation of job functions. As a result, employees had the opportunities to understand both the offline and online business. This*

allowed them to venture into other areas, thus allowing more learning opportunities;

- *A lot more feedback loops and collaboration across departments*
- *Internal career opportunities for high potentials which arose out of some of the brainstorming ideas*

Q. How did CATM help in culture transformation?

Tan: Culture is the basic foundation for success in an organization. The CATM solidified the management team's alignment to look at the digital transformation of the vitamin business. This resulted in a strong management team, who eventually possessed the digital and entrepreneurial, and operational abilities to scale the business.

Q. What enabled the success of this tech start-up?

Tan: The key is in building an organization where all your employees are aligned to the vision of the organization. Culture played a key role in solidifying this concept. We focused very much on the clan culture, where we built collaboration across all levels of employees. The workplace was like an extended family. The adhocracy quadrant of the OCAI tool confirmed our innovative spirit to develop a clear digital strategy for the business. This digital transformation resulted in a clean website which was easy to navigate for our customers. We also built a solid back end operational engine to ensure delivery

was as promised, even within the next day of delivery. Innovative technology was employed at that time to encapsulate live delivery updates to customers. This resulted in an uptake in our subscription and scaled the business.

Q. What is your leadership philosophy?

Tan: Servant leadership is important. It was a privilege for me to serve my employees and my customers.

These are some screenshots of the results from the CATM project conducted with the key management team of FITLION and Gymmboxx in 2017.

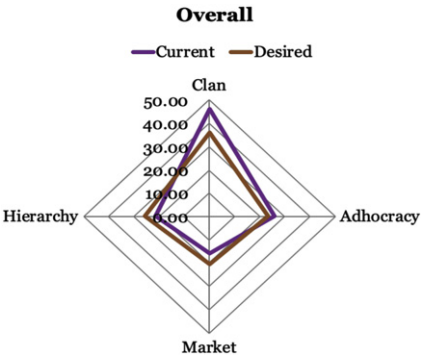
6.3 RESULTS OF USING THE CATM TOOL IN A TECH START-UP

Overall OCAI Survey. The overall OCAI survey showed a current culture type of clan. Key management staff wanted a little less of the clan culture and would prefer slightly more hierarchy as they felt that processes and systems needed to be in place to provide more structure to the growing business (Fig. 6.2 and Table 6.1).

In studying the dimensions of culture, it was interesting to note that this was a company that was so aligned in terms of its current and desired culture.

6.3.1 Digital Brainstorming Sessions

Feedback from the brainstorming sessions were in congruence with the results of the culture survey. Members wanted more



Source: Adapted from *Diagnosing and Changing Organisational Culture* (Cameron & Quinn, 2011).

Fig. 6.2. Results of Overall Culture Survey for FITLION.

Table 6.1. Dimensions of Culture.

	Current State		Desired State	
Dimension	**Mean**	**Culture Type**	**Mean**	**Culture Type**
Dominant characteristics	45.00	Clan	34.12	Clan
Organisational leadership	57.50	Clan	33.00	Clan
Management of employees	58.00	Clan	42.50	Clan
Organisational glue	54.80	Adhocracy	40.00	Adhocracy
Strategic emphases	46.70	Clan	34.18	Clan
Criteria for success	42.50	Clan	44.17	Clan

systems and processes in place and articulated the need to build capabilities of middle management. They also wanted clearer job scopes and descriptions (Figs. 6.3 and 6.4).

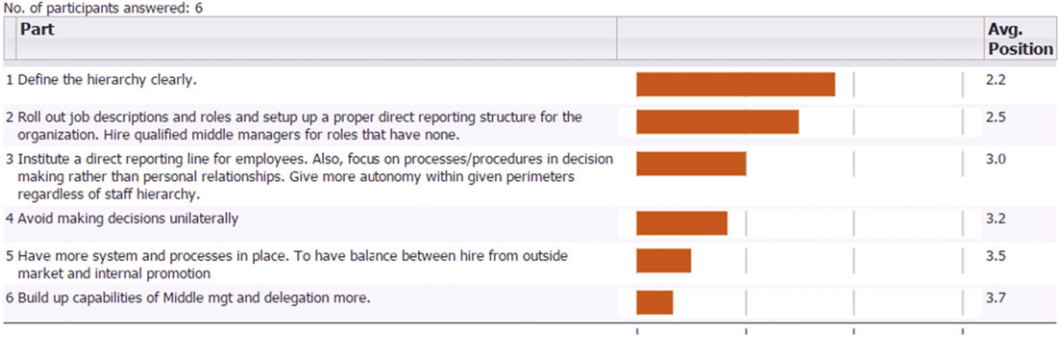


Fig. 6.3. Results of Digital Brainstorming Session 1.

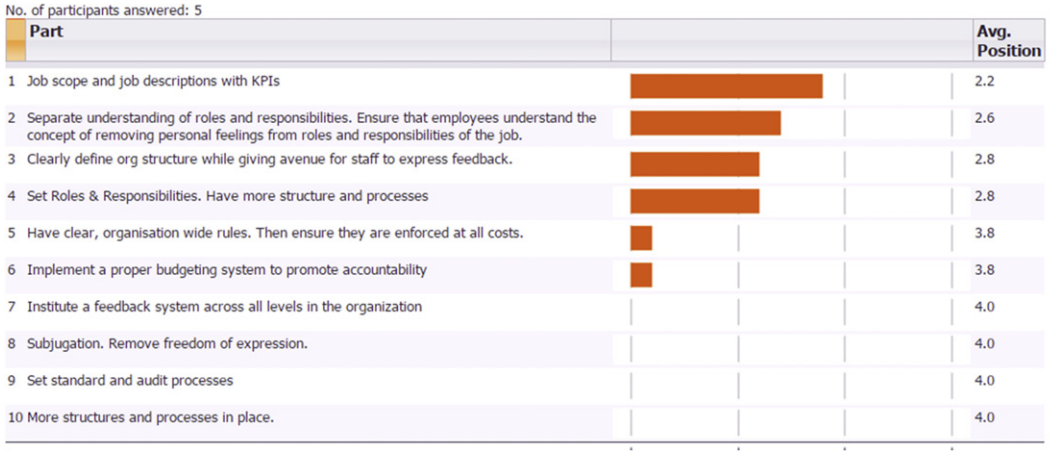


Fig. 6.4. Results of Digital Brainstorming Session 2.

CATM was an effective digital tool in facilitating the transformation of this tech start-up. It solidified the founding principles of culture as reinforced by Mr Tan Tse Yong. It also helped the management team to work on improvements needed in its systems and structures to help propel the organisation to the next phase of growth. At the same time, it helped confirm the already strong clan culture that was established by Tan.

7

FUTURE OF DIGITAL TOOLS IN CHANGE MANAGEMENT

7.1 DIGITAL PLATFORMS FOR CHANGE MANAGEMENT

As the world moves rapidly in the era of end-to-end digital systems, there is a need for rapid transformation in the digital economy. This reinforces the use of effective digital and collaborative platforms to help facilitate cultural transformation in organisations. Collaborative platforms foster collaboration across continents and facilitate important discussions.

As was stated in Chapter 1 of this book, *digitization* is the new buzzword in the new economy. We are living in a highly complex world that is more connected than before. Cross-border bandwidth has grown 45 times compared to 2005. Flows of information, searches, communication, video, transactions, and intracompany traffic continues to grow. There is now a staggering 5.2 billion users on global mobile phones today.

As a result of the growth of the internet, there is now an increasing use of digital platforms for managing international operations in a lean and more efficient way. Companies are selling in fast-growing markets while keeping their virtual teams connected. New jobs are also created by the internet. For every job lost, more jobs are being created on the net. This shift toward virtual work will be an important and growing trend for the future. By 2025, online talent platforms could boost global GDP by 2.7 trillion.

What does all of these mean for the future state of work?

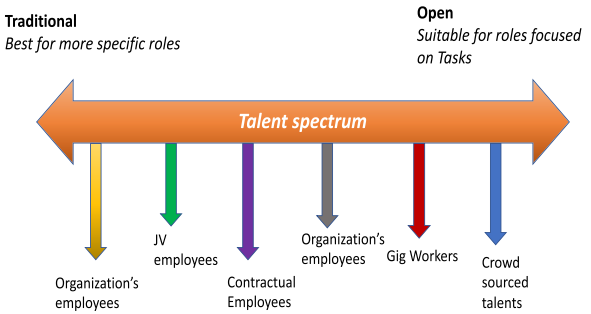
7.2 FUTURE STATE OF WORK

Gyan Nagpal (2013) in his book *Talent Economics* shares that there will be more democratization of work in the future. Workplaces will be more agile and responsive, and more purpose-built networks would be available. New employment relationships will evolve, and technological empowerment will transform the way we work and live. He shares that, for companies to succeed now and in the future, they will need to have innovative cultures where employee genius happens in the ordinary. The best ideas are the simple ideas and they can come from anywhere when we allow every ordinary employee to tap into their genius. For this to happen, it is about giving employees the flexibility and space to follow through an idea with resolute application.

In order to enable such a model, we will need to have a fundamental shift in how we manage our organisation work culture. To prepare ourselves for this shift, effective leadership practices and new ways of thinking and re-thinking about how we organise our teams and work processes will be

integral to organisational transformation. The new organisation will be different by design, and the new workplace will be one in which we use Digital Strategies, Design Thinking, and Culture Development to drive transformation.

Employers will need to learn and manage the "gig economy" where employees are engaged on projects and short-term contracts. They have to unlearn traditional ways of doing things to employing new methods and ideas to help their organisations transform. HR practitioners will need to harness the power of technology to tap into talent platforms like "Upwork" to find rare and specific skills, as well as new knowledge and capabilities to fill their existing talent gaps. Efficient systems and processes are the key to success, coupled with maximum operational flexibility, lean staffing models, collaborative partnerships, and minimum fixed costs. Leadership models will need to transform, and HR will need to embrace the use of advanced analytics to predict future talent demands and to anticipate performance and retention issues. Josh Bersin in his article, "The New Organisation: Different by Design" (2016), shares that, today, executives are no longer "kings" but are facilitators and team leaders who inspire their teams to succeed. We are in the era of the "network of teams" where the team and team leaders dominate an organisation. People now want to communicate, collaborate, and operate in small groups. Things are designed around digital information centers, shared goals, and mobile platforms that help employees communicate and share information instantaneously. Jeff Schwartz et al. in their article on "What is the future of work?" share that talent models will also change as with the change in the way we source for labor. Instead of looking at recruiting, rewarding, and retaining, the model is now on how to access, curate, and engage the workforces of all types. The talent model of the



Source: Adapted from Deloitte.com/insights.

Fig. 7.1. Talent Market and Work Arrangements.

future will be looking at all sorts of labor forms, from employees to JV partners, service providers, contractors, gig workers, to crowdsourcing talent such as those available on Upwork (Fig. 7.1).

The shift toward the digital economy is happening at lightning speed. Effective leaders who understand its impact will know how to begin to travel the road toward organisational transformation to prepare their employees and company for the future.

7.3 FUTURE OF COLLABORATIVE TOOLS

Jason James, CIO at Optima Healthcare Solutions, at CDW's Future of Work Summit 2019 shares how collaboration tools fostered culture change for Optima Healthcare Solutions.[1]

1 https://biztechmagazine.com/article/2019/04/how-collaboration-tools-fostered-culture-change-optima-healthcare-solutions.

Ever since adopting such tools, the company has seen significant improvements in workflow and collaboration, and more than half the company now works remotely two to three times per week. James shared that, "Most of my team and I see each other *four or five times a year*, but because of the collaborative nature of tools, I can interact with them on a daily basis. We have video chats and we share files in real time – we are no longer tied to just email. No matter where someone works, they can still do their job not only securely but also effectively." In order for such tools to be adopted well, you have to understand the business, be open, pay attention to employees, and create cheerleaders who can advocate such technology.

In an article by De Smet, Lund & Schaninger (2016)[2] on organisation, they defined the digital "platform" as software layers that gather and synthesize large volumes of data to make digital services available and accessible on various devices. They help define the rules and the way work gets done, while better coordinating activities and lowering inter-action costs. The best kind of platform invites the involvement of diverse participants, some of whom build their own offerings, tools, and applications on top of it. In practice, platforms typically take the form of a website, app, or other digital tool that connects different types of users. Like digital technology in general, digital platforms have been slow to penetrate the world of work. But after transforming consumer and industrial markets, these platforms – publicly accessible ones like LinkedIn or Monster.com as well as those inside companies – are now

2 https://www.mckinsey.com/business-functions/organization/our-insights/organizing-for-the-future.

poised to do the same thing across the full spectrum of human-capital management. Organisations must now fashion digital workforce platforms using customized mash-ups of tools from solutions providers. However, the investment required to put together digital workforce platforms is not small. They also call for superior technical capabilities, including sophisticated data management, advanced-analytics skills, and adaptable application development. Perhaps more importantly, they require a far more robust understanding of each employee's skills, experiences, attitudes, performance, potential, and, if you will, desires or dreams for the future. Even though many of the tools used in platforms are available from third-party solutions providers, integrating them into a smoothly functioning whole is no trivial endeavor. At least the utility of workforce platforms is not trivial, either. The McKinsey report summarizes collaborative tools with advice for organisations to have a detailed look at how workforce platforms can resolidify the way work gets done, even as they improve collaboration, retention, succession planning, and decision making.

7.4 PUTTING THE HUMAN BACK INTO EMPLOYEE COMMUNICATIONS

In terms of the people and marketing side of things, I also caught up with Dr Jovina Ang, a marketing veteran of more than 20 years, with experience spanning across several tech firms, to hear her perspectives on the use of digital tools for employee communications.

7.4.1 Interview with Dr Jovina Ang, Managing Director of Communications

Photo: Courtesy of Dr Jovina Ang.

Fig. 7.2. Dr Jovina Ang.

Below is an abstract of my interview with Dr Jovina Ang.

> Q. What do you think of the use of digital tools in employee communications?
>
> *Jovina: "We need to put the authentic element into digital tools. Jennifer Morgan, SVP for SAP Asia Pacific, has a program entitled, "Call to Lead." It's an interview podcast where she gets a guest to share lessons on leadership and tell their stories. The way you invite people to talk, to respond to you, the way you share stories, is important. You need to decide on a few tools as a medium rather than use too many. When you have focus, it would help with collaboration. You need to have a single platform for*

people to talk and connect rather than too many. We should focus on building communities.

Q. What are digital tools good at doing?

Jovina: Digital tools are great to build communities. You will need to have tools that can allow you to connect with everybody, e.g., Skype, Google Hangout, WhatsApp, and Yammer. You need to know how to successfully deploy such tools for mindset change and culture as well as to promote the tool as a channel for sharing. The tool needs to be embraced and the way to do it is to ensure that we have regular information feed in that channel. Consistency is important to drive adoption.

Q. What do you think about the use of such tools for communicating with the Millennial workforce?

Jovina: Millennials are not afraid to voice their opinion. We should find out what they like and one of the ways to do so is to have a meal together with them. Invite them to be part of the ecosystem and ask for their opinions. The trick is to harmonize the young and old and to get everyone to find a common purpose. If you want to drive more inclusion, then ensure every employee has an opportunity to speak and their voice be heard. You need to show you care and value them.

Q. What are some of the challenges of employee communication in the digital age?

Jovina: George Bernard Shaw says that the illusion of communication is that people assume that once you send something out, you have communicated. You have to reinforce it; talk about it all the time.

You need to be consistent in your messaging and choose a more prominent platform. You have to support their community. Enhance what the community wants. If the community is not active, the social media dies. If the community is strong, the social media following will grow. The mobile device will be the device for the future. Any digital platform needs to be seamless and easy to use. If there is good translation capability, then more people can participate in the conversation. Even though technology is allowing accessibility, people are overloaded as they are expected to do more with less. There are a lot more measurements in today's world. This goes back to the basic human need to be valued and cared for. Managers are busy making themselves look good and meeting the numbers, thus they need to spend time connecting and developing their employees. Stress can be alleviated if you have somebody to care for. We need to get to the heart even though there are a pervasive number of tools.

7.5 OTHER THOUGHTS FROM DIGITAL LEADERS

Echoing the same sentiment, Rajiv Jayaraman in his book, *Clearing the Digital Blur* shares that, in the digital age, leaders play an active role in building communities, promoting action, and ensuring sustenance of the community. In order to do this successfully, they need to understand how social media amplifies the biases we all carry. This understanding is important for leaders to design sustainable social systems within and outside the organisation. Michael Ringman, Chief Digital Officer, in his article, quoted from "Why digital and

culture go together,[3]" shares that, "Digital transformation" sometimes conjures images of metamorphoses in nature. A caterpillar becomes a butterfly, a tadpole becomes a frog, and so on. But as a technology leader, the truth about digital transformation is that it's much more complex and more nuanced. And it's never "complete" in quite the same way as it is in nature. Technology is changing so rapidly that many jobs – the tech tools they utilize, the modes of communication they employ – may be unrecognizable from what they were just months or years earlier. Now that's transformation. As I lead our global team through digital transformation and work with clients trying to do the same, it becomes clearer to me that the single biggest factor in a company's success or failure in the era of digital disruption is often culture. Another thought leader Louis V. Gerstner, former chairman of IBM, shares that "When it comes to digital transformation, I believe "culture isn't just one aspect of the game – it is the game." Lots of companies claim their culture encourages risk-taking, but how do we encourage our teams to take risks, to dare go "off-script" and to embrace change?

7.6 WHAT'S NEXT IN THE FUTURE OF CULTURE CHANGE

Culture change, for now and in the future, will be subject to the advent of digitization. Jayaraman (2019) shares that the future is in the area of building a boundaryless culture where teaming is the new way of doing work. He further shares that leaders will need to remove barriers to effective collaboration and empower employees to seek the best

3 https://www.forbes.com/sites/forbestechcouncil/2019/05/28/why-digital-a-cultural-transformation-go-hand-in-hand/#11865cf96416.

possible solutions irrespective of where it was created. In a sense, in the digital age, the instinct is to share resource widely to achieve the same results and to foster a culture of sharing ideas, products, methods, and best practices to build a thriving community of problem solvers that support the organisation.

BCG in their report (2018) on digital culture[4] shares that the case for fostering a digital culture is even more powerful if we look at sustained performance, nearly 80% of the companies that focused on culture sustained strong or breakthrough performance. Not one of the companies that neglected to focus on culture achieved such performance as compared. In order to clarify the characteristics of a digital culture, leaders should look to the tech industry. For example, the Manifesto for Agile Software Development is the proclamation of agile values and behaviors that launched the agile movement, and some companies use it to foster a digital culture. Executives at a European financial institution took field trips to leading tech companies and they were inspired by the practices they have witnessed in such tech companies. They returned back to their own organisations and began to develop a culture code of behaviors and practices necessary for success and held workshops and action plans to instill the new behaviors in employees. As with any transformation, leaders who guide a digital transformation need to focus on the people side of things rather than be preoccupied with structural and process side of things. It is thus a well-established fact that cultural change is a key determinant of a successful transformation, especially for digital transformations. The behaviors that embody a digital culture represent a major shift from longstanding norms – and this

4 https://www.bcg.com/publications/2018/not-digital-transformation-without-digital-culture.aspx.

IMPACT and Footprint	Speed to Market	Open Communication	Empowerment and Autonomy
Ability to change the world through innovation and cutting-edge practices	a. Ability to move fast and use design thinking to iterate rather than waiting for final product and answers b. Speed of product and services to market and continual improvement	a. Open Culture and willingness to embrace ideas b. Engage with all stakeholders to obtain diverse views, insights and information c. Willing to share ideas and collaborate	a. Empowerment of employees and stakeholders to do what needs to be done b. Do away with traditional structures, policies and processes that hinders progress

Source: Adapted from Building Digital-Ready Culture in Traditional Organizations.

Fig. 7.3. The Four Key Values of Digital Culture.

will particularly challenge traditional power structures, decision making authority, and fundamental views of competition and cooperation among employees (Fig. 7.3).

In a latest MIT-Sloan study (2019) they re-defined the four values of a digital culture as one that embraces innovation and encourages empowerment. Following is a model which is adapted from the study together with inputs from my experience managing teams.

The growth mindset: Satya Nadello, CEO of Microsoft, in his book, *Hit Reset* (2017) akins future culture to one of a growth mindset culture. A growth mindset enables you to better anticipate and react to uncertainties. Organisations need to be able to lean into uncertainty, to take risks, to move quickly when mistakes are made, recognizing failure happens along the way. The growth mindset needs to shift externally too, as with the highly competitive landscape, partnerships with friends and former enemies are needed. The three principles Satya exalted were:

1. To be obsessed with our customers. To meet customer's unarticulated and unmet needs with great technology. This

is about listening and being able to predict things that customers will love and to be insatiable in our desire to learn from the outside and bring that learning into Microsoft.

2. To seek diversity and inclusion. Diversity of the workforce must continue to improve, and we need to include a wide range of opinions and perspectives in our thinking and decision making. This is about tapping into the collective power of everyone in the company.

3. We are one family of individuals united by a single, shared mission. It is about getting outside our comfort zone, reaching out to do things that are most important for customers. We need to build upon the ideas of others and collaborate across boundaries. The growth mindset is one in which we are customer obsessed, embrace diversity, and are inclusive as one family. That is where we will live a mission and truly make a difference in the world.

In a sense, culture is likened to a continuing journey, unfolding and changing as the world moves at a rapid speed of technological disruptions. We must constantly unlearn, learn, and re-learn. This is likened to a Chinese saying that "The journey of a thousand miles begins with a single step."

I hope this book has provided insights for you in the area of culture and how, through the use of CATM and our design methodology, cultural transformation can be accelerated. I also hope that through the research and sharings that I have harnessed in this book, it will give you insights and ideas on how to start the culture transformation journey and to develop a strategy to transform your organisation into a digital company.

I wish you all the best in your culture journey.

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