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# The Importance of Soft Systems in Managing Disruptive Technologies: An Organization Development View

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## Abstract

The Disruptive Technology (DT) literature is predominantly linear in nature which is challenged in this research. By shifting the focus from a resource view to an Organization Development (OD) approach, the qualitative case study is aimed at shifting the paradigm. Data was collected from founders and owners of small to medium-sized DT businesses through semi-structured interviews and observations. Three key themes were found to demonstrate the Normative Re-educative OD (NROD) aspects essential for successful DT outcomes, which are reported here: *keeping small and nimble*, *creating a positive purpose*, and *focusing on a single problem*. These findings reflect the soft systems thinking found in NROD. As a result, the value-adding of NROD for the creation of DT in small to medium-sized enterprises (SMEs) is found to be dynamic and key to supporting the DT process.

*Keywords:* Disruptive technology, normative re-educative organization development, small to medium-sized enterprises

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The literature on Disruptive Technology (DT) presents strategies focused on the resource view of the business (Gobble, 2016) with little understanding of the human dynamics required to nurture learning and innovation (Dick, 2019). Current literature presents minimal discussion of how to manage the soft systems within the DT process. To understand this under-researched area, the “how” and “why” of managing soft systems are used to explore the Normative Re-educative Organization Development (NROD) strategies within Australian DT small to medium-sized enterprises (SMEs) (Yin, 2017). In the literature review, the definition and discussion of the linear view of DT are presented. Organization Development (OD) is then introduced to justify the importance of human dynamics in the DT process. The method section outlines the use of the hermeneutic phenomenological case study to investigate the human dynamics within the DT process. The findings suggest the importance of creating a *positive purpose, keeping small and nimble*, and *focusing* on a single problem.

### **Soft Systems and Disruptive Technology**

DT explains the process when new entrants disrupt the market through the introduction of cheaper, simpler, smaller, and more convenient products (Dumestre, 2012). This process starts with the creation of a product or service that satisfies a segment of the market looking for a new value proposition (Klenner et al., 2013). Improved performance attracts the leading edge of customers (Henderson, 2006). The DT process occurs when new entrants move into a position of replacing the sustaining technologies of larger organizations (Adner, 2006).

The DT process presents a strong linear focus. Business unit spin-off and acquisition strategies are examples of resource allocation approaches to developing new technologies which are linear in nature (Sheep et al., 2017). Other linear strategies include agility, resiliency (Mukerjee, 2014), and scenario-planning (Marchais-Roubelat & Roubelat, 2011), where the importance of soft systems requirements for an effective outcome are not discussed. Bower and Christensen (1996) explained that to create DT inside large organizations, managers need to be consistent with

the principle of resource dependence. This linear focus is limited and can be challenged within the context of people's needs and behaviors (Stewart & Gapp, 2018). The resource base model misses the human component where involvement, learning, and adaptive processes are required to create, manage and innovate (French et al., 2005).

Managing challenging circumstances requires considering people while increasing their ability to learn and adapt (Utterback, 1994). A focus on human aspects is needed to understand the DT process better (Holweg, 2018). OD embraces the human aspects of the organization to understand the involvement, learning, and adaptive strategies that promote the development of effective group outcomes (Stewart & Gapp, 2018). With OD, there is an emphasis on education, values, beliefs, and attitudes of individuals and groups of people through the development of social relations where people can adapt to new technologies, markets, and challenges (Stewart & Gapp, 2017).

### **Soft Systems: Normative Re-educative**

OD is broadly divided into empirical-rational, normative re-educative, and power-coercive (Bennis et al., 1985). This research follows the Normative Re-educative OD (NROD) strategy, which assumes that people are social beings who adhere to sociocultural norms managed through intervention techniques (Boone, 2015; Chin et al., 1969). This process should be system-wide and follow behavioral science activities; it should be reflexive, educational, self-examining and foster learning (French et al., 2005). Improvement is achieved by redefining and reinterpreting norms and values while developing a commitment to these new norms and values (Mann-Feder & Litner, 2004). The values and beliefs of people can be educated through motivation and continual learning that result in positive factors.

Action science, a component of NROD, explains how people learn through education and behavioral processes (Argyris, 1995). Latent beliefs are examined to motivate personal and interpersonal relationships to improve individual, interpersonal and organizational effectiveness through the analysis of real-life situations (Coghlan & Jacobs, 2005). Group participation is often used as a medium of learning. Change in behavior is

achieved through awareness (Bulkley & McCotter, 2017). Through education, individuals create an ambiance of mutual collaboration and trust, which changes their behaviors to one of continual improvement (Stewart & Gapp, 2017). Through action, people are capable of learning to solve problems and without action, learning is absent (James & Augustin, 2018). Action science requires people who accept the responsibility for action, problems, or tasks that are acted on (Dick, 2019). Interpersonal relations are enhanced by building goodwill and negotiating in good faith with others (Gapp & Fisher, 2005). The culture inside the organization is critical for organizational productivity and effectiveness. Internal cooperation, loyalty to mission and constancy of purpose are the basis for internal unity (Morales, 2019).

Within action science, systems thinking explains how actions create learning at a group level (Offor & Cleveland, 2018; Senge, 1994). A holistic understanding of the system provides an understanding of how all of its parts are interconnected (Örtenblad, 2018). Systems thinking shifts away from narrowing the focus to one particular department, and instead, sees the organization as a dynamics process (Mupepi et al., 2019). Through synthesis, the vision of the company is expanded to many parts that have an impact on one another (Checkland, 1981; Senge, 1990). Through systems thinking, a deeper understanding of the relationships and the processes which makes up the organization's context is achieved.

Action science and systems thinking provide understanding of the values needed to promote creativity and innovation through a lens that understands people, learning, collaboration and continual improvement. In contrast, DT evidences a resource based focus in the literature (Sheep et al., 2017). This linear view is limited and lacks understanding of the human dynamics required for the development of DT, which can be challenged within the context of people's needs, values and behaviors (Stewart & Gapp, 2018). Using hermeneutic phenomenology and case study methodology the "how" and "why" of managing the nonlinear side of DT is investigated.

### **Method**

The following research questions aim to

expand understanding of soft systems and the impact on DT: *How do DT businesses create an environment of innovation within SMEs?* and *Why is NROD important in SMEs' successful development of DT?* NROD provides a humanistic link to understand how and why DT businesses create an environment of innovation amongst the individuals that make up that business environment.

A phenomenological case study was used to make sense of how participants understand NROD within DT businesses. The qualitative hermeneutic phenomenological case study provided the ontological exploratory mode to abductively answer the research questions (Blaikie, 2007). Participants were selected from businesses presented in the

government report: Austrade Report of Disruptive Technologies in Australia (Austrade, 2017) and additional internationally recognized DT SME leaders where recognition was seen in providing a DT to leading innovative businesses or are individual DT leaders in their own right. A total of 19 CEOs and founders of Australian small to medium-sized DT businesses from 15 different industries aged between 20 and 60 (4 women, 15 men) participated in semi-structured interviews and observations (Table 1). To maintain anonymity of participants, each participant has been coded as P1-19. Participation was voluntary, and every participant provided written and verbal consent for this study. Rigor was increased through participants

**Table 1**  
*Participants' Role and Industry*

|     | Role    | Industry  |
|-----|---------|---|
| P1  | Founder | Transport / Agriculture                         |
| P2  | Founder | Health care / Manufacturing                     |
| P3  | Founder | Telecommunications                              |
| P4  | Founder | Entertainment                                   |
| P5  | Founder | Construction / Computer                         |
| P6  | Founder | Computer / Manufacturing                        |
| P7  | Founder | Aerospace                                       |
| P8  | Founder | Aerospace / Manufacturing / Mining              |
| P9  | Founder | Mining / Computer                               |
| P10 | CEO     | Computer / Electronics                          |
| P11 | Founder | Agriculture / Manufacturing                     |
| P12 | Founder | Food / Telecommunication                        |
| P13 | Founder | Manufacturing                                   |
| P14 | Founder | Agriculture / Food industry                     |
| P15 | Founder | Telecommunication / Electronics                 |
| P16 | CEO     | Health care / Computer                          |
| P17 | CEO     | Telecommunication / Electronics / Manufacturing |
| P18 | Founder | Energy / Manufacturing                          |
| P19 | Founder | Energy  |

and data triangulation. The data gathered included observations through the researcher's journal and semi-structured interviews. The researcher's journal was used to engage the researcher in self-reflection by actively experiencing the phenomenon in all its aspects through observations during and after the face-to-face interviews (van Manen, 2016).

Hermeneutic phenomenology was used to make sense of how innovators create an environment of innovation using the hermeneutic circle (van Manen, 2016). Case study was used to create the boundaries for the research (Yin, 2017), where DT was the unit of analysis and Australia was the geographical boundary. Founders and CEOs were selected and added to the pool of data until thematical saturation was reached based on the above selection criteria (Fusch & Ness, 2015). Observations were noted in the researcher's journal before, during and after the interviews to collect thoughts, emotions, and other relevant information to make sense of the participants' reality, which provided richness to the data while increasing rigor, which was gained through confirmability, transferability, and dependability.

### Findings

Interviews were recorded and transcribed verbatim. Thematic coding (Strauss & Corbin, 1994) and the hermeneutic circle (van Manen, 2016) were used to discover concepts through immersion into the transcripts and the researcher's journal, which allowed for potential patterns between the

participants' statements to emerge. From this analysis, ten concepts (Table 2) were discovered in answering the research question.

### Keeping small and nimble

*Keeping small and nimble* brings together the concepts of having small teams, the importance of people, the way they enjoy working together and the strong relationships built within these teams. The innovators in this study all started their businesses with a close, knowledgeable, and trusted group of people which often included family members, close friends, and previous co-workers. For example, P11, to engage their sister in the project, gave her the task of creating promotional videos. P17 explained how one of the graduates they hired years ago has now become partner of their most recent start-up. In addition to close friends and family, experienced people are often brought into the team. P5 brought a programming expert from Hong Kong to develop the software and P1 brought professional drone pilots to test and help develop technological developments. This evidences how participants bring both people with experience and people they can trust.

*P1: "When you choose your team, choose a team that actually is good at what they do, and you have the best of what they do, so you don't even have to look at it twice."*

*P19: "I try to get people who are the best that I can afford at the time, people who are as convinced of the concept and are willing to take a level of risk."*

**Table 2**  
*Themes and Concepts*

| Themes                       | Concepts   |
|------------------------------|--|
| <i>Keep small and nimble</i> | Light team, people are key, enjoy, build relationships.  |
| <i>Positive purpose</i>      | Positive purpose, passion.                               |
| <i>Focus</i>                 | Vision expander, focus, test in market, develop product. |

Keeping the team small creates a cohesive group of people, where the team is aware and involved in the multiple processes within the business. Building a cohesive team was further evidenced by the places where most innovators operate, including sheds (P7), garages (P4), and small offices where founders work in the same space as everyone in the team (P5). A cohesive team allows everyone to do more than one task. All participants consider individuals as their most important asset as only human beings can be creative and work towards creating an enjoyable working environment. P16 explains in the following quote the importance of having a close team: “your partners, the people who work for you, and the people you sell to, are all the key.” P16 and P9 provide further evidence of the importance of people and trust.

*P16: “Trust the people who work with you, for you, the people you supply to.”*

*P9: “It’s always about the people, because the people, if you don’t have the people, then you never get to those important clients.”*

Managing DT becomes easier when “you have a new super light team” (P1), as the effort of each member of the team directly impacts the attainment of the organization. Having a small group of people promotes relationship building, and, as explained by P19: “the speed that you have is real when you are smaller, and you have the ability of moving much more quickly towards a solution.” P5, who worked in the construction industry, explains: “here is very collaborative, and everyone has got a say in what we have got to get to and deliver and what have you” (P5). P16 explained that a team of 18 requires more structures and goals compared to a team of four people, who can be given a task, a focus, and they can manage themselves. According to P12, “the culture will be hard to hold together as we grow, and there is no doubt about it.” One great explanation of this phenomenon might be that “when you’ve got a small number of people working in a company, they’re sort of working for themselves, really” (P12).

Within the context of people, it was evident that relationships cannot be imposed but need to be nurtured and organically grown within the team. For example, P5 explained how their business organizes activities during the weekends. The team organizes these activities, and P5 only provides

monetary incentives to make them happen. “Next week, we are off to Laser Force, so that should be interesting” (P5). The following quotes from P11 and P16 demonstrate how understanding individuals build relationships.

*P11: “More important to maintain friendship than anything else.”*

*P16: “Spend some time outside the day-to-day work and delivery, understanding each other.”*

By understanding how *keeping small and nimble* creates a cohesive group where people share tasks and work together to accomplish the purpose of the organization, the following theme explains how participants bring people to help in the development of the DT through a *positive purpose*, which inspires passion and motivates people within the organization.

### **Positive purpose**

*Positive purpose* builds on *keeping small and nimble* to explain how these teams are composed of a passionate group of people driven by a common purpose. Innovators use phrases like: “Big Hairy Audacious Goal” (P5) and “Massive Transformative Purpose” (P6) to explain their long-term purpose. These purposes inspire people and step away from traditional vision statements. As P10 explains: “vision statements get written by people in a corporate world and get forced down like *foie gras* into the organization.” A long-term purpose builds the direction of the organization and creates an environment that is continually evolving. As explained by P7, “the ones with the longest visions and the grandest ambition are normally the ones that win.” P12 explains in the following quote how a clearly defined purpose transmits the long-term goals of the company and creates a focus on solving a specific problem.

*“You have to have a clear statement of what you are doing, beyond the elevator pitch. And then you’ve got to truly believe it. Because you got to go out and sell that to people that are going to fund it, or going to devote time to it, or leave other jobs and come work for you. So, you got to distill your ideas and boil it down and boil it down until you start to come up with something that holds together as a message” (P12).*

A *positive purpose* brings passionate individuals to help. For example, P7, who started developing front-line aeronautical technologies in 2016, gets “an average of 12 applications per week”. According to participants, people want to feel pride in their work and feel that their effort creates value for the customers. For instance, P2 helps “children who need loads of surgery,” which “obviously is a strong motivating force for people to help.” In addition, P1 suggest to “surround yourself with people that are conducive to that idea,” and P19 adds: “It is just another job, but it’s a job that you can get passionate about, follow your heart, develop things.”

A *positive purpose* goes beyond making profits and focuses on creating a positive impact. An example of creating a positive impact was evidenced by P11, who repurposed left-over materials to create a new product, from which profits were given to a charity. This evidences the participants’ motivation to “make the world a better place” (P4). As P12 explained: “life is too short to just worry about money.” A *positive purpose* drives passion and motivation within the team. “There is no point in spending years of your life building something if all it does is a pile of money and doesn’t achieve much else” (P12). A *positive purpose* brings passionate people and motivates people in the process.

*“What we are doing has a very positive impact. That’s the most important thing that people thought they were doing something useful. I think what motivated people the most is that we were helping children and people with quite severe problems. I think that probably was the single biggest factor in recruiting people” (P2).*

Through a *positive purpose*, innovators increase passion and motivation within the team. This purpose brings the attention of key stakeholders and creates a sense of direction for the company. For example, P11’s purpose is about caring for the environment: “caring about the environment and the habitat that we all completely depend on.” This sense of direction encourages team members to create shortcuts and improved solutions through awareness. “They may be working on many different inventions, but they are really clear about what class of business problems they’re trying to solve” (P10). P1 is reducing the number of

environmental scientists needed in dangerous field sites – “save lives.” P2 is saving thousands of lives through 3D printed implants - “Helping children who need loads of surgery” (P2). P12 is reducing the number of fake products - “Combat fake products” (P12). A *positive purpose* creates passion and intrinsic motivation within the team. To align these efforts towards the attainment of the organization, participants create a focus within the business. This focus channels all the efforts of the team towards one single purpose.

## **Focus**

*Focus* builds on the *positive purpose* to explain the ability of participants to hold and articulate a clear resolve that galvanizes everybody in the organization. “Founders need to be able to hold and articulate the product vision very, very clearly, and really that vision is just as important as sales strategy or customer acquisition and retention strategy. It’s really the thing that galvanizes everybody” (P14). Giving vague instructions to the team “end up in a different result than you wanted them to and now that time is wasted” (P13). According to P19: “you have to track people and rally people to that vision.” Or as P2 explained: “there’s a lot of noise and it’s very hard for people to focus and support something when there’s so much going on.” “You just need to just focus on that” (P3). As explained by P10, the team needs to have to be “really clear about what class of business problems they’re trying to solve.”

Focusing on one specific problem channels the efforts of the team helps to further investigate the problem to discuss different ideas to solve the problem. Team members bring new ideas for the development of the products, which expands and brings new alternatives to accomplish the vision. “You are really building things that people need” (P9). For this to occur, a sense of drive and a common goal is created among the individuals in the team. “You’ve got to keep bringing things back to a focal point” (P12). In this process, participants constantly make sure their focus is in line with what is required in the market. “You have to understand the market” (P16). “Listening to the outside market, because sometimes you can get stuck in your own world” (P5).

As evidenced by the themes, people are essential in the process of creating DT. *Keeping*



*small and nimble* highlights how through small and cohesive teams, groups of people can increase creativity and innovation. Creating a *positive purpose* links to bringing passionate people and creating intrinsic motivation within the team. Finally, *focus* explains the importance of channeling the efforts of everyone in the team towards achieving long-term goals. Based on these findings, the following section discusses the importance of people through systems thinking and action science.

## Discussion

The findings demonstrate innovators' reliance on NROD to be creative and innovative. The three themes have a strong link to NROD to evidence the importance of soft systems in the management of DT. A positive purpose increases the passion and motivation within the individuals that form the business. *Keeping small and nimble* improves the relationships of the individuals within the team. *Focusing* on specific problems provides the direction. These themes link to the importance of soft systems and are now discussed in terms of NROD, specifically systems thinking and action science.

Learning at a group level requires a holistic understanding of the system and a synthesis of how all of its parts are interconnected (Örtenblad, 2018). A holistic understanding of the system is gained within DT businesses by bringing close groups of people to the team (Senge, 1990, 1999; Senge, 1994). As evidenced in the theme *keeping small and nimble*, a close and small team creates an environment where everyone knows each other well, increasing collaboration and communication to resolve problems (Stewart & Gapp, 2017). *Keeping small and nimble* creates the opportunity to build relationships, which is an important factor in managing DT. Action science is linked to the importance of building relationships, where dissonance occurs through collaboration and trust (Argyris, 2002).

Additionally, having small groups of people links to systems thinking following the increased dynamics within the organization (Coughlan & Coughlan, 2018; Reese, 2018). Having a *positive purpose* is further emphasized through the third

theme, *focus*, which galvanizes everyone's effort towards solving one problem. *Focus* links to learning and development, where people who are passionate about solving a specific problem work together in the different stages of the DT process.

Systems thinking (Ackoff, 1994; Jambekar, 2000) links to the theme *keeping small and nimble*, where deeper understanding is created of the relationships and the processes which makes up the organization's context through collaboration and trust. The involvement of everyone in the team allows solving different tasks, highlighting the importance of people in managing DT (Checkland & Poulter, 2006). Having a *positive purpose* and *focusing* on solving a specific problem is also linked to systems thinking as it explains the process of getting everyone involved in the development of the DT (Namada, 2018; Ranta, 2018; Senge, 1994). The DT process, therefore, can improve through systems thinking, which involves group dynamics, communication, joint control of tasks, and openness, where the team's ability to be creative and innovative is increased (Dick, 2019).

To further understand the DT process, transformation at an individual and group level need to be further discussed. Transformation starts through sharing knowledge (Argyris & Schön, 1978; Bartels & Wittmayer, 2018). *Keeping small and nimble* fosters the development of relationships between the members of the team, which increases communication, openness, and trust. Dissonance at a group level requires trust to share ideas and challenge the assumptions of the team to create an environment of continual learning to achieve effective change (Argyris, 1995, 2002; Edmondson, 2015). This relationship between dissonance and trust was further evidenced by how participants highlight that people, and their interaction, are essential in the process of developing DT (Dick, 2019). Participants, therefore, create an environment of openness and trust, which nurtures creativity and innovation within the team (Stewart & Gapp, 2017).

Dissonance is the process of creating awareness of the gap between people's theory-in-use and espoused-theory, where people and groups of people become conscious of their actions and can create change (Argyris, 1976; Hinojosa et al., 2017). Through a small and cohesive group (*keeping small*

*and nimble*), ideas can be shared (Argyris, 2002). As demonstrated by participants, working together in small groups builds the relationships within the people in the team which encourages joint control of tasks and openness in the process. Having a *positive purpose* and *focus* allows the team to continually measure the gap between their actions and where they need to go, which creates opportunities for shortcuts and ideas which can accelerate growth. Within this context, the dissonance is directly linked to the three themes presented, where a small group of people with a *positive purpose* and common goal can, through openness and collaboration, create dissonance, which helps in the DT process through continual improvement (awareness and constant development).

Action science requires people who accept responsibility for action, problems, or tasks that are acted on and a group of people who meet regularly to challenge and support each other to take action and learn (Dick, 2019). The first component of action science is “people who accept the responsibility for action” and is linked to the passion and intrinsic motivation resulting from a *positive purpose* (Sum et al., 2016). These people join the business to attain the purpose of the organization through engagement and joint control of tasks (Dick, 2019). The second component of action science is “problems that are acted on,” and this is evidenced through the *positive purpose* where innovators seek to solve a problem (Schön & Argyris, 1996). The third component, “having a group of people who meet regularly to challenge and support each other,” is evidenced in the theme of *keeping small and nimble* where people work together to accomplish a goal. Within this context, the three themes align to the three components of action science, providing more evidence of the importance of soft skills in managing DT.

The findings of this research highlight the importance of soft systems within the DT process, where people are essential in the process of creating and managing DT. Creating a *positive purpose* brings talented people and close friends. *Keeping small and nimble* builds an environment of co-creation, which allows every member of the team to be part of the different parts of the process (Ackoff, 1994; Checkland, 1981). This links to systems thinking, which explains the importance of having

a holistic view of the organization (Senge, 1994). A *positive purpose* not only brings passionate people but increases the motivation of the team, as the purpose is to create a positive impact. By understanding the importance of people and getting the right team, the theme *focus* highlights the importance of guidance and how boundaries are set within this process, where the efforts are centralized towards the development of a DT that solves a specific problem (*positive purpose*) (Senge, 1999).

This explorative research has provided new insight into an under-researched area of the literature by highlighting the importance of people in developing DT (Dick, 2019; Gobble, 2016; Sheep et al., 2017). As evidenced by the participants, a balance is required in managing these organizations between managing the process and resource aspects of the business and managing the human aspects of the business (soft systems). Both are important and need to be managed for the attainment of DT-based firms.

Included in the findings of this research was the significance of soft systems and how to manage DT through a positive purpose, which inspires passion, a clear focus, which centralizes the ideas towards a common goal, and the importance of keeping small and nimble, which highlight the importance of sharing tasks and creating environments of openness and trust (Argyris, 2002; Dick, 2019; Schön & Argyris, 1996; Senge, 1999; Stewart & Gapp, 2018).

## Conclusion

Action science and systems thinking improve and provide better ways to manage the development of disruptive technology (DT), as demonstrated by the participant’s experience. The resource view is discussed in the current literature; however, the soft systems, which are as important, are under-researched (Senge, 1999; Utterback, 1994). In this paper, the understanding of the NROD soft system within DT has been explored and developed to emphasize the importance of (a) *keeping small and nimble*, to building relationships, (b) having a *positive purpose*, to attract passionate people to the team, and (c) having a clear *focus*, to guide the efforts of everyone in the team.

This research can be expanded in the future

to investigate what *keeping small and nimble* looks like and how it can be developed to promote creativity and innovation (Senge, 1990, 1999; Senge, 1994). This future research can also consider how a *positive purpose* brings together a cohesive team while considering the *focus* of the business. The findings are in line with systems thinking, which requires creating a holistic view of the organization to accomplish a goal, and action science which explains learning processes at a personal and group level (Ackoff, 1994; Checkland, 1981; Mupepi et al., 2019). This exploratory hermeneutic phenomenological case study has demonstrated that managing soft systems links to the ability, creativity, and innovation of the people within the team. This aspect is as important as having the resources, as people are ultimately the ones who can develop the products and innovate, which aligns with Senge's (1999) learning organizations.



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