SYSTEMS THINKING, ARCHETYPES, AND MANAGEMENT: AN EXPLORATORY STUDY

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ABSTRACT

As time goes by, organizations are becoming more and more complex. One tool that can be used to make sense of this complexity is systems thinking. In particular, Herasymowych and Senko (2007) suggested that there are negative and positive systems archetypes in every management situation. If managers learn to use these archetypes, it will help them make better decisions. In this light, this study explores how a group of MBA students responded to positive and negative systems archetypes. The study concludes that such knowledge will help Muslim managers in the future.

Keywords: Complexity, Systems thinking, Archetypes

INTROUCTION

Systems thinking is a school of management that emerged in the 1950s. The premise underpinning this school is that modern organizations are complex and that conventional approaches to management ignore that complexity (Senge, 1990, Sterman, 2000). Complexity refers to interdependencies between components of a system (Senge, 1990, Sterman, 2000). When individuals ignore the complexity of a situation, they often make decisions that have unintended consequences (Senge, 1990, Sterman, 2000). This often leads to policy resistance (Sterman, 2000).

The author started teaching systems thinking in the classroom since 2004. In particular, he has been using the "Distribution Game" to introduce systems thinking to Muslim management students (Senge, 1990, Sterman, 2000, Fontaine, Ahmad, & Oziev, 2017). For the last 20 years, the behavior of Muslim students has reflected the predictions of systems theories. This led the author to conclude that, in the 21st century, it is imperative that experts in Islamic management developed a working knowledge of systems thinking. More recently, the author used the methodology pioneered by Henry Senko, a Canadian systems thinker. This approach has the merit to be easier to grasp and yet quite efficient in solving complex problems as it relies on systems archetypes. In light of these facts, the author wanted to test whether or not Muslim MBA students can use systems thinking to more effectively make sense of management situations.

THE LITERATURE

The management literature is vast but a convenient place to start is Koontz's (1980) description of the various schools of management (see Table 1).

Table 1: Schools of Management

	Management School	*Background*
1	Interpersonal behaviour approach	Psychology
2	Group behaviour approach	Social psychology, sociology
3	Cooperative social systems approach	Political science
4	Sociotechnical systems	Industrial engineering
5	Systems approach	General systems theory
6	Rational choice approach	Decision theory, economic theory
7	Management science approach	Mathematics
8	Operational management approach	Mathematics
9	Managerial roles approach	Clinical experiences of practitioners
10	Case study approach	Clinical experiences of practitioners
11	Contingency or situational approach	Independent of any theory - based on experience

Source: Adapted from Koontz (1980)

Each school has its own origin, terminology, its own methodology, and its own data that supports the school's position. Koontz (1980) called this the 'management theory jungle'. He

concluded that as time passes, the jungle becomes thicker and even more impenetrable. Within sub-topics, there exist a multitude of schools as well. For example, in strategic management, Mintzberg, Lampel and Ahlstrand (2009) suggest that there are at least 10 schools.

Table 2: Schools of Strategic Management

	School	*Strategy is a .....*
1	Design	Process of conception
2	Planning	Formal process
3	Positioning	Analytical process
4	Entrepreneurial	Visionary process
5	Cognitive	Mental process
6	Learning	Emerging process
7	Power	Process of negotiation
8	Cultural	Collective process
9	Environmental	Reactive process
10	Configuration	Process of transformation

Source: Adapted from Mintzberg, Lampel and Ahlstrand (2009)

The multiplicity of schools of management creates a potential problem for scholars of Islamic management. This problem is that each scholar of Islamic management has an affinity for a particular school of management and they will develop a theory of Islamic management with one particular school in mind. Potentially, this means that scholars of Islamic management could potentially develop 10 parallel versions of Islamic management.

The author cannot solve this problem. However, in his experience, the school that seems to hold the most promises for a modern understanding of Islamic management is the systems thinking schools. He discovered the systems thinking school in the early 2000s. In particular, he asked his students to play systems thinking games. These experiments persuaded him that the systems thinking school offers the best explanation of human behavior inside organizations (Fontaine, Ahmad & Oziev, 2017, Fontaine, 2020).

Systems thinking assumes that most managers operate within complex social systems (Senge, 1990, Sterman, 2000). Complexity is defined as system in which two elements are interdependent and create a third element with unique properties. A pile of sand is not a complex system. Water is a combination of hydrogen and oxygen. It is therefore a complex system. The properties of water are quite different from those of oxygen or hydrogen.

Systems thinkers argue that many experts in management have taken a reductionist approach to understand their discipline. This reductionist approach relies on simple linear cause and effect relationships (Senge, 1990, Sterman, 2000). However, such linear relationships do not capture the complexity of most management situations. In particular, almost every decision in a system will have unintended consequences. Systems thinkers spend a lot of time anticipating the unintended consequences and neutralizing them before they occur. Non-systems thinkers tend to not be aware of these unintended consequences and are therefore almost always taken by surprise when things do not go as they planned. From these observations, table 3 can be derived.

Table 3: Schools of Management and Types of Thinking

	Management School	*Type of Thinking*
1	Interpersonal behaviour approach	Linear thinking
2	Group behaviour approach	Linear thinking
3	Cooperative social systems approach	Linear thinking
4	Sociotechnical systems	Not sure
5	Systems approach	Non-linear thinking
6	Rational choice approach	Linear thinking
7	Management science approach	Linear / non-linear thinking
8	Operational management approach	Linear / non-linear thinking
9	Managerial roles approach	Linear thinking
10	Case study approach	Linear thinking
11	Contingency or situational approach	Linear thinking

Source: Fontaine (2020)

It should be noted that the terminology varies in the literature. Sometimes "holistic thinking" and "analytical thinking" are used (Brauch & Grobler, 2022).The purpose of this paper is not to settle the debate as to which school is the best. However, it will explore one approach to systems thinking. Historically, systems thinking was developed at MIT in the 1960s under the influence of Jay Forrester (Lane, 2022). However, it was Senge (1990) who wrote a landmark book that popularized systems thinking inside industry. He pioneered the use of systems archetypes (these will be discussed later). System archetypes allow managers who are not familiar with systems thinking to start solving systems problems. On the downside, systems archetypes are simplifications of reality so that many subtle insights are missed.

A key assumption of systems thinking is that there is a relationship between the shared mental models of top management, the structure, systems and policies inside the organization, and the behavior of employees inside the organization (Senge, 1990). The relationship is shown in Figure 1.

Figure 1: Mental models, Systems and Behaviour
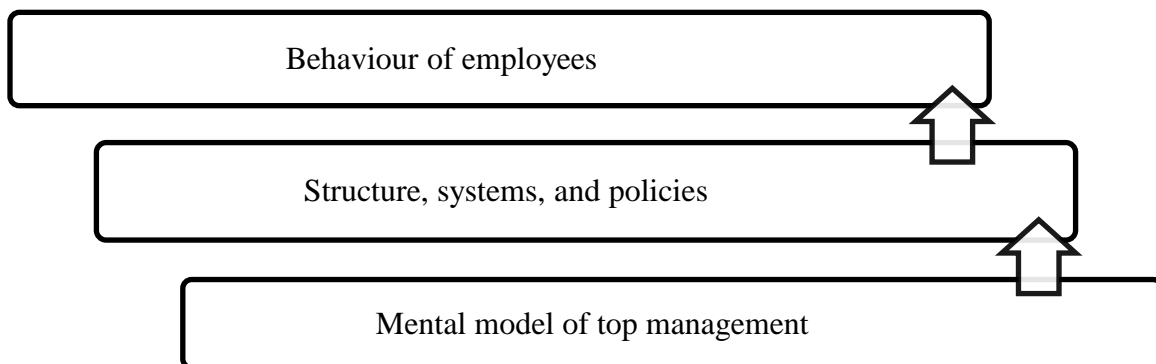
Source: Adapted from Senge (1990)

To a large extent, individuals inside organizations are trapped. They can only behave in a manner that reflect the shared mental model inside the organization and the systems that have been put in place. Real change requires changing the shared mental model of the group.

A more sophisticated version was popularized by Sterman (2000), also at MIT. He proposed that systems problems can be modeled using computer simulations. These simulations allow decision makers to run through different scenarios and find out which is the policy for the company. Systems dynamics has become popular to solve technical problems. For example, macroeconomic modeling has relied on the principle of general equilibrium. However, this is not a realistic assumption. Scholars have recently developed macroeconomic models that are based on system dynamics (Cavana, Dangerfield, Pavlov, Ragzicki and Wheat, 2021). Such models are closer to reality and the policy recommendations are therefore more useful.

Central to systems dynamics is that the structure of the system influences human behaviour behavior. Schoenberg, Davidsen, and Eberling (2020) argue that a systems thinker generally follows the following process: create a structure on the computer that simulates the problem under consideration, understand how the structures works to produce the problem, and figure out how to improve the structure so as to address the problem

In other words, if one wants to change human behavior inside an organization, one must first identify the structure that causes the problem and then modify the structure. This view is similar to that of Senge (1990). The problem with systems dynamics is that it is so technical that many decision makers are simply frightened off (Sterman, 2000).

It should be noted that there are other approaches to systems thinking that are not covered in this study as it would simply clutter the literature review. In particular, Eli Goldratt, a consultant in systems thinking, has published a number of works that offers logical solutions to solve complex problems. These logical solutions depend on what he called the "theory of constraints" (TOC). TOC was pioneered with the work of Goldratt and Cox (1984). TOC has gone through various improvements since then. The author has investigated TOC in some details and his preliminary assessment is that TOC is more complicated than traditional approaches to systems thinking but less complicated than systems dynamics.

Although systems thinking has become popular, some scholars noted that there is disagreement about what constitutes systems thinking. Its meaning is ambiguous, and systems scholars have made diverse and divergent attempts to describe it. Some scholars describe it as synonymous with systems sciences (i.e., nonlinear dynamics, complexity, chaos). Others view it as taxonomy—a laundry list of systems approaches (Cabrera, Colosi, & Lobdell, 2008). Monat and Gannon (2015) said that Systems Thinking is a perspective, a language, and a set of tools. Specifically, Systems Thinking is the opposite of linear thinking; holistic (integrative) versus analytic (dissective) thinking; recognizing that repeated events or patterns derive from systemic structures which, in turn, derive from mental models; recognizing that behaviors derive from structure; a focus on relationships versus components; and an appreciation of self-organization and emergence. Specific Systems Thinking tools include systemigrams, system archetypes, main chain infrastructures, causal loops with feedback and delays; stock and flow diagrams; behavior-over-time graphs, computer modeling of system dynamics, Interpretive Structural Modeling (ISM), and systemic root cause analysis

In 2005, the author taught systems thinking to a class of MBA students. One of them decided to start up a company and sell systems thinking solutions around the world. He started by using systems dynamics but found that the technical aspect scared non-systems thinkers. He discovered the work of Herasymowych and Senko (2007) had the merit of being comprehensive and user-friendly. Herasymowych and Senko (2007) focused on systems archetypes. Systems archetypes are patterns of behavior (Herasymowych & Senko, 2007, p. 13).. Each archetype focuses on a different aspect of behavior within an organization – sometimes at the strategic level, other times at the operational level. Collectively, these archetypes should be able to cover most of the problems and opportunities inside a complex organization. The methodology is quite simply. It includes: defining the opportunity, mapping the negative archetypes (the current situation), mapping the positive archetypes (the desired situation), and identifying the actions that would shift a negative archetype into a positive archetype

In practice, most problems inside organizations occur because each department is focusing on their own narrow area of concern. Managers often make decisions that unintentionally affect other departments. Systems thinking becomes a tool that enable managers to see the bigger picture, anticipate unintended consequences, and generally communicate better. To work effectively, the systems thinking methodology requires individuals from different departments – and possibly different levels of the organization – to work collaboratively. It is like a sophisticated brainstorming exercise where everyone identifies the archetypes in play. The archetypes are found in Tables 4 and 5.

Table 4: Negative Archetypes

Negative Archetype	*Description*	*Mental Model*
Limits to success	What worked yesterday is now longer working. As a result, you try harder	I will continue what has always worked
Success to the successful	You are competing with another party for resources. As they succeed, it is getting harder for you to succeed	Someone else success means I lose
Tragedy of the Commons	Many users sharing a common resource. As everyone is trying to maximize their own benefit, the shared resource is being depleted	This common resource belongs to me
Growth & Underinvestment	In period of success, I am too busy to invest in new capacity. In periods of decline, I cannot invest in new capacity	This common resource belongs to me
Attractiveness Principle	You are trying to meet everyone's expectations and can no longer meet your own standards	I need to help everybody all the time
Fixes that Fail	Fixes that have worked in the past are no longer working. They have undesirable consequences. The problem is getting worse	I have to fix this right away

Shifting the Burden	There is a long-term solution but you select a quick fix. You feel it is someone else's problem	It is someone else's problem
Drifting Goals	You are experiencing poor results. In order to get better results, you lower your standards	I can lower my standard right now. Later, I will raise them again
Accidental Adversaries	You are working with another party but something is obstructing that partnership. You are feeling increasing level of conflict	Someone is undermining me
Escalation	A sense of competition means that you and another party are increasingly being more aggressive towards one another	I must defend myself

Table 5 Positive Archetypes

Positive Archetype	*Description*	*Mental Model*
Plan for Limits	You identify limits to success. You re-evaluate what you mean by success	I will experience more success by dealing with its limits
Strut your Stuff	You are working collaboratively with others so that you each focus on your area of uniqueness	My success depends on me
Collective Agreement	Everyone shares a common resource and knows the potential for abuse. They work together to make this common resource sustainable	This common resource belongs to everyone
Invest for Success	You build capacity to meet future needs	Deal with future growth by investing in capacity
Be Your Best	You know what to do and you know how to manage other people's expectations	Be realistic about what I can and cannot do
Fixes that Work	You are solving the root causes of problems by avoiding quick fixes. You are involving as many people as possible so that everyone knows what the root cause of the problem is	I need to spend time to find the long-term solution
Bite the Bullet	You commit enough time and resources to fix the long-term problem. You involve as many people as possible	I know what needs to be done and I will do it

Stay on Track	You are maintaining your goals and your standards. To avoid drifting goals, you re-evaluate whether your goals are realistic	I am committed to maintaining my standards
Cooperative Partners	All parties are working together with a high degree of trust. At the same time, all parties accept that mistakes happen	Everyone is coming from the best of intention
Win win	You avoid escalation by communicating openly and trying to see things from their point of view.	I can behave differently to create a win win solution

Having reviewed the literature, it seemed best to explore the usefulness of systems archetypes with a group of Muslim MBA students.

METHODOLOGY

From early October 2022 to late December 2022, the author taught a small class of nine MBA students. The syllabus had some flexibility so that part of the course and two assignments had a system thinking component.

There are different ways to introduce systems thinking to students. One way is to use business simulations. There are softwares that enable students to make decisions and the software simulates the outcomes – intended and unintended - of these decisions. Having tried this approach in the past, the author's experience is that students often become more focused on winning the game rather than understanding systems thinking.

He opted for a more traditional approach. He gave students two case studies – one called "Fixing Ford" and the other called "Fixing the Paper Mill". Both cases describe organizations that almost went bankrupt and then top management turned them around. Both cases are "messy" – meaning that there are lots of details. The cases sometimes focus on organizational processes, group processes, or individual behavior. These cases can be overwhelming for students so that they latch upon selected details but they miss the bigger picture.
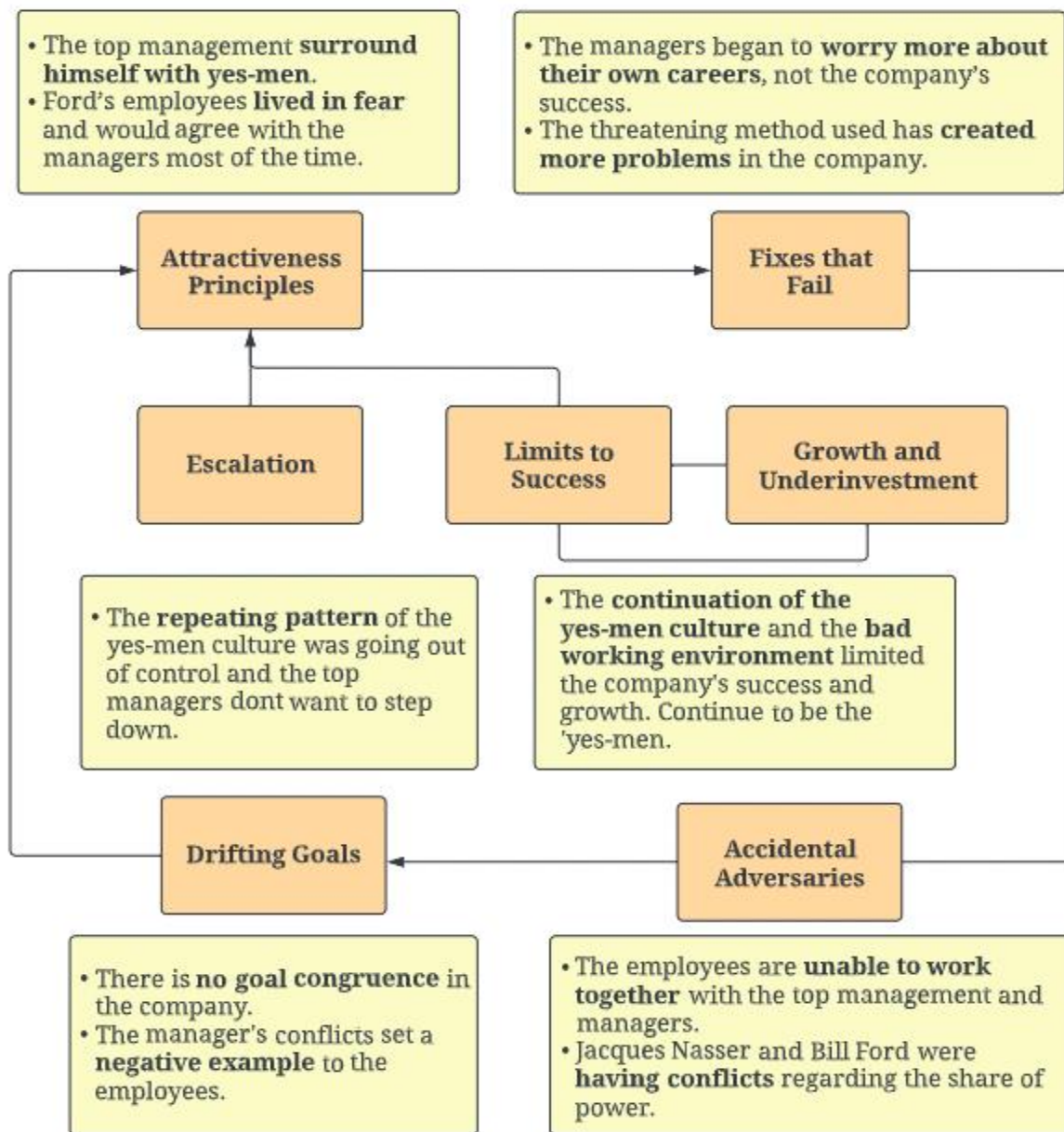
The question is whether learning about systems archetypes would help these MBA students see the bigger picture. Data collection would be done through class interaction, written assignments, and questions on the final exam.

Fixing ford

This case was developed by the author based on the work of a journalist, (Hoffman, 2012), who documented how Ford almost went bankrupt. For decades, Ford had developed a corporate culture based on fear. Employees were afraid of saying the wrong thing. They routinely hid information from top management. Worse, there was an intense rivalry between Ford North America and Ford Europe- to the point that one part of the organization was trying to sabotage the other. Everyday decisions reflected the internal politics of the organization. By 2005, the company was losing billions.

After a lot of effort, the company appointed Alan Mulally. Mulally earned his reputation by saving Boeing from bankruptcy. He used the same approach at Ford. He instituted weekly meetings of senior managers. Each manager was expected to present facts, and only facts. These sessions were not intended to score political points but to solve problems by sharing knowledge and sharing resources. Mulally refused to encourage the political infighting of the past. Within a few weeks, the senior managers changed their behavior. They developed a more collaborative culture. They made critical decisions that allowed Ford to avoid bankruptcy. Senior managers were so motivated that they cascaded this new management style within their division. Students found it quite challenging to develop the negative systems archetypes map because there are so many interrelated problems. One group settled on the map presented in Figure 2

Figure 2: Group 1 Negative Systems Archetypes Map

- The top management **surround himself with yes-men.**
- Ford's employees **lived in fear** and would agree with the managers most of the time.

- The managers began to **worry more about their own careers**, not the company's success.
- The threatening method used has **created more problems** in the company.

Attractiveness Principles

Fixes that Fail

Escalation

Limits to Success

Growth and Underinvestment

- The **repeating pattern** of the yes-men culture was going out of control and the top managers dont want to step down.

- The **continuation of the yes-men culture** and the **bad working environment** limited the company's success and growth. Continue to be the 'yes-men.

Drifting Goals

Accidental Adversaries

- There is **no goal congruence** in the company.
- The manager's conflicts set a **negative example** to the employees.

- The employees are **unable to work together** with the top management and managers.
- Jacques Nasser and Bill Ford were **having conflicts** regarding the share of power.

By contrast, developing the positive map was a lot easier. The main reason is that Mulally fired nobody. The same people whose behavior led the company to the edge of bankruptcy were the same people who saved the company. There are few companies whose top management had such a complete transformation of their shared mental model in such a short period of time. Before Mulally, there were 100,000 Ford employees who were unable to work effectively because of the continuous infighting After Mually, there were 100,000 employees who were working collaboratively. Mulally's main initiative was to introduce a weekly top management meeting in which he developed "enforced cooperation" ("fixes that work" in figure 3). Initially, senior managers played politics. However, they soon discovered that when they admitted that there were problems in their divisions, they were not scolded. In the contrary, they got additional resources from Mulally to solve their problem ("plan for limits"). Gradually, the internal infighting was replaced with cooperation ("win/win" and "cooperative partners"). Inspired by this change, each senior manager cascaded the new approach within their own division ("be your best").

Figure 3: Group 1 Positive Systems Archetypes Map

Group 2 had a slightly different approach. They developed a timeline map that shows the negative system and the positive system on the same map. They identified 10 steps and step no 5 – Bill Ford recruiting Alan Mulally – was the initiative that shifted the operational system from negative to positive (see Figure 4).

Figure 4: Group 2 Systems Archetype Map
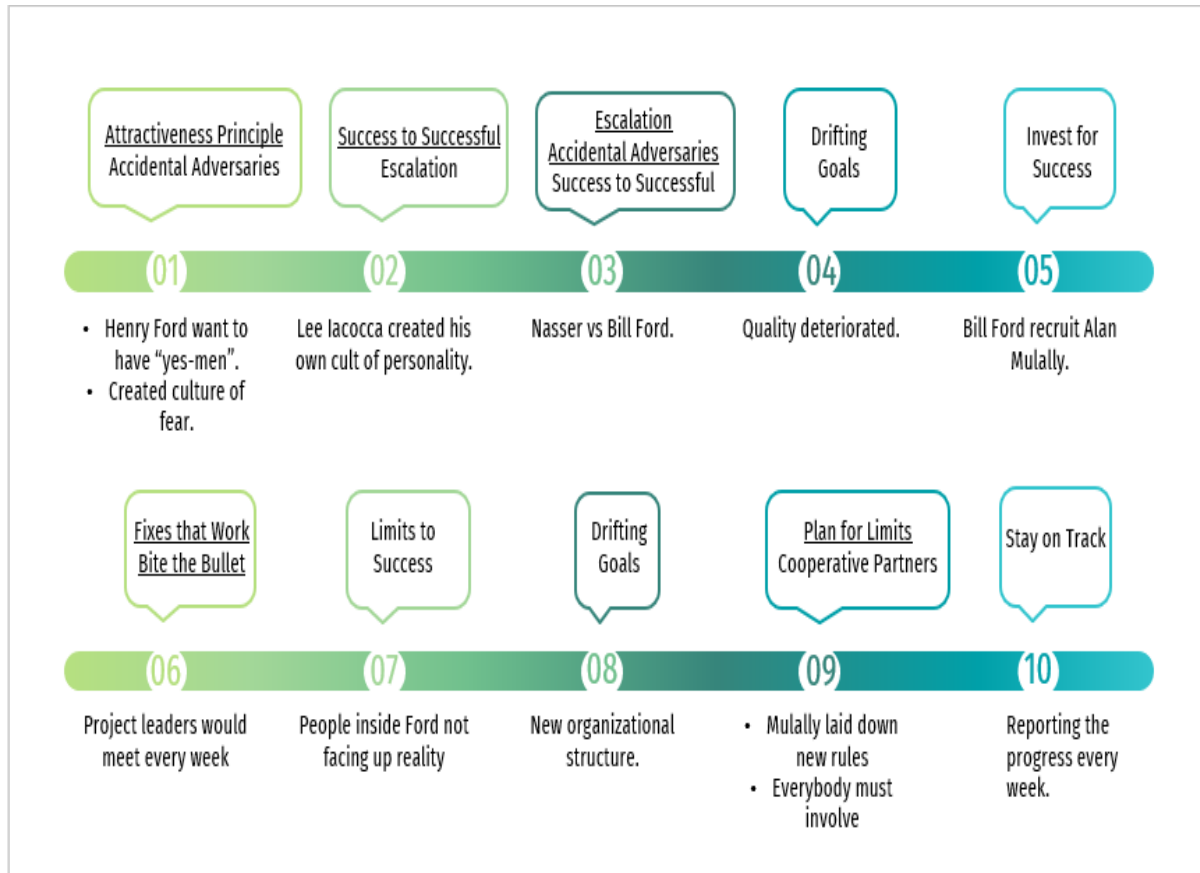
The next case that the students worked was called "fixing the paper mill".

Fixing the paper mill

This case was published in the *Harvard Business Review* by Sirkin and Stalk (1990). The case describes the fall of a paper mill in the United States in the early 1980s. The paper mill produced poor quality paper products. It started losing millions and market share. Senior managers tried to address these problems but realized that they did not have the operational expertise to save the company.

In a poignant move, they admitted their inability and empowered all employees to get involved in solving these operational problems. The motivation was clear. This was a small town and almost every job in the town was tied to the paper mill. Bankruptcy would have destroyed everyone's livelihood. Middle managers allowed ordinary employees (like machine operators, clerks, and so forth) to spend time with customers and understand their issues. Certain practices – such a shipping defective product in order to meet shipping goals – were discontinued. Inspectors were tasked to make sure that everything shipped was of good quality. During these visits to customers, employees learned for the first time how their customers used. They suggested several improvements. As the months went by, customers noticed that the paper mill was now shipping

good quality paper. More interestingly, one machine operator suggested that the machines used by the paper mill could enable the mill to produce lighter paper. This would make it cheaper for customers. This idea seemed counter-intuitive because the mill would lose revenue. But one manager realized that competitors were not able to produce this lighter paper. This meant that customers would get a cheaper product and the paper mill would be selling in a market with no competitors. This insight enabled the company to turn the corner and become consistently profitable again.

This case – entitled "Fix the Process, not the Problem" – highlights the importance of continuous process improvement. There are really two changes in mental models that led to a return to profitability. Initially, the company operated on a "command and control" model, that is to say that top management decides and the employees simply implement. The first change in mental model is that senior managers needed to make everyone in the organization – including low-skilled employees like machine operators -. into a decision maker. The second change was that employees realized that they did not really understand their customers' needs. They obviously knew in general manner how their customers used their product. But they got permission to visit their customers' plants and see the minute details of their operations. Solving these operational problems was not solving one manager solving one big problem. It was more like dozens of frontline employees solving hundreds of small problems. But this continuous improvement allowed the company to develop a source of competitive advantage that secured its' future.

Both groups had no problem using the systems archetypes to develop the negative map and then the positive map. Although the textbook gave several examples of how to draw systems maps, following the chronological order was the easiest and most insightful approach (figure 5).
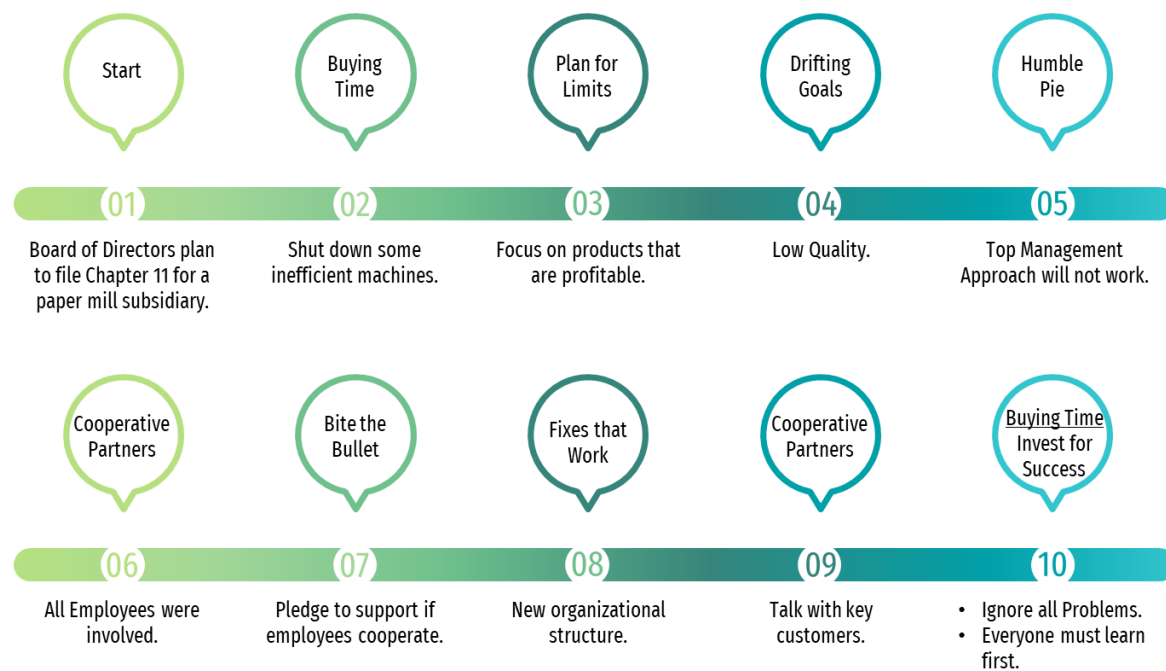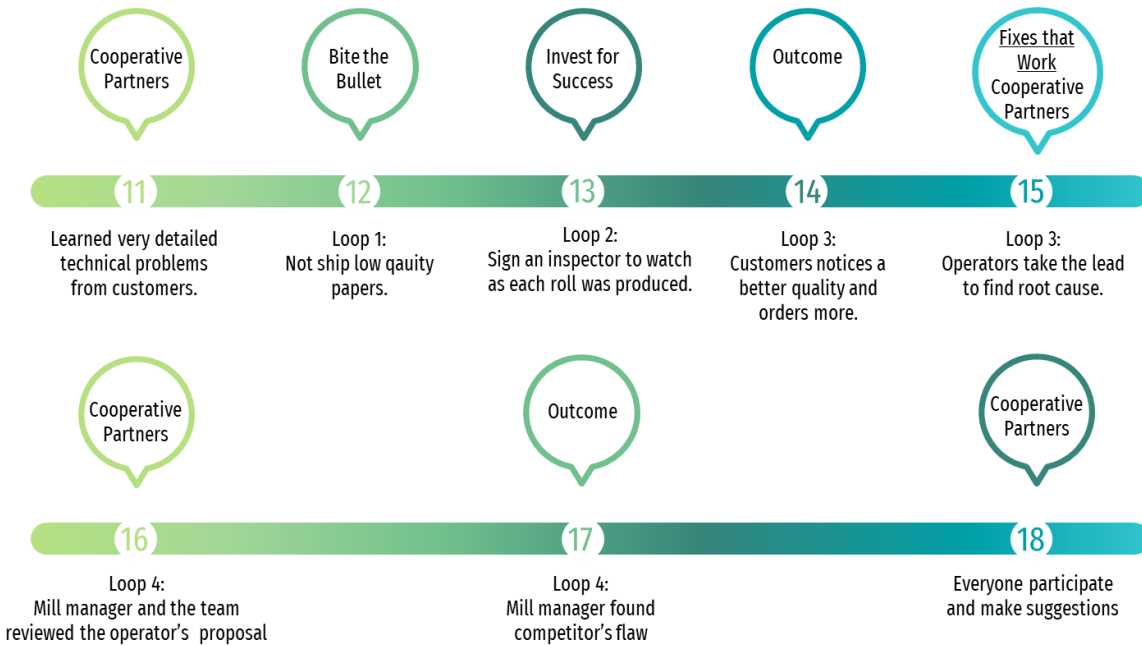
Figure 5: Group 1 Positive Archetypes Map
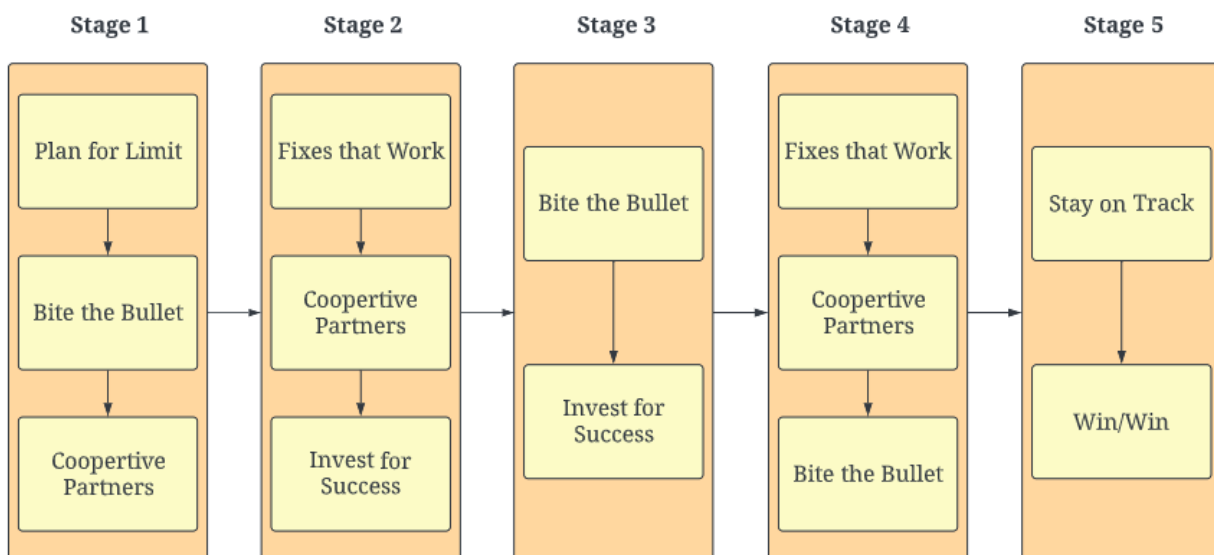
In the first stage, senior management had to simply admit that they could not solve the problem without the cooperation of all employees ("plan for limit"). Fixing the quality problems

was the main issue and this would not be shipping defective product. This would lead to a drop-in sale ("bite the bullet"). Fixing these quality problems would require everyone's commitment ("cooperative partner"). In the second stage, employees introduced process improvements ("fixes that work") which required frontline employees seeing how their customers used their product ("cooperative partners"). Their customers opened their factories to the employees of the paper mill because having a reliable supplier of paper was critical for their own success.

Group 2's map was slightly different. It highlights that sometimes management needs to make decisions that simply buys time to implement a longer-lasting solution.

Figure 6: Group 2 Systems Archetypes

Start	Buying Time	Plan for Limits	Drifting Goals	Humble Pie
01	**02**	**03**	**04**	**05**
Board of Directors plan to file Chapter 11 for a paper mill subsidiary.	Shut down some inefficient machines.	Focus on products that are profitable.	Low Quality.	Top Management Approach will not work.

Cooperative Partners	Bite the Bullet	Fixes that Work	Cooperative Partners	Buying Time Invest for Success
06	**07**	**08**	**09**	**10**
All Employees were involved.	Pledge to support if employees cooperate.	New organizational structure.	Talk with key customers.	• Ignore all Problems. • Everyone must learn first.

Cooperative Partners	Bite the Bullet	Invest for Success	Outcome	Fixes that Work Cooperative Partners
11	**12**	**13**	**14**	**15**
Learned very detailed technical problems from customers.	Loop 1: Not ship low qaulity papers.	Loop 2: Sign an inspector to watch as each roll was produced.	Loop 3: Customers notices a better quality and orders more.	Loop 3: Operators take the lead to find root cause.

Cooperative Partners		Outcome		Cooperative Partners
16		**17**		**18**
Loop 4: Mill manager and the team reviewed the operator's proposal		Loop 4: Mill manager found competitor's flaw		Everyone participate and make suggestions

DISCUSSION

Hopefully, readers will be able to appreciate that all MBA students involved in the class developed a certain proficiency in using systems archetypes. The nature of archetypes is that students necessarily ignore details and focus on the bigger picture and the new mental model that is necessary to get a company out of a trouble.

It should be obvious that both groups developed different maps of the same cases. This is not a problem. These maps are not supposed to represent a precise depiction of what happened. They are supposed to make sense to the users of the map. Some groups preferred using a chronological approach. Others preferred to build their map around a dominant archetype. The key is that the map should help the group understand the case at a higher level of abstraction.

It should be noted that throughout the semester, students were asking questions relating the archetypes to problems they were experiencing at work. This reinforced the author's perception that students both understood the concepts taught in class and found it relevant to their workplace.

A key lesson that students learned from studying both cases and relating them to the archetypes is that, contrary to popular belief, companies do not get into trouble because of the actions of competitors. Their inability to deal with the competition is simply a symptom of a deeper problem, which is the senior management's inability to learn and adapt to a dynamic and complex environment. Although there are many tools, the systems archetypes have the merit of being both easy to grasp intuitively (contrary to systems dynamics) and encourages senior management to develop a systems perspective of the problems at hand. This of course does not guarantee that senior management will be able to solve the organization's problems but it will help senior management better understand what is going on and what ought to be done.

Throughout his writing, the author was argued that Islamic management, if it is to implement successfully inside organizations, should be based on systems thinking principles (Fontaine, Ahmad, and Oziev, 2017, Fontaine, 2020). The ease with which the Muslim MBA students adopted systems archetypes reinforced that opinion.

CONCLUSION

This study was an exploratory study to test the usefulness of positive and negative systems archetypes (Herasymowych & Senko, 2007). There are several limitations to this study. The main ones were that this was the first time that the author used this approach in the classroom so he was learning as he was teaching. The second was that the number of MBA students involved was quite small so that no definitive conclusions can be drawn.

Despite these limitations, the author believes that this study offers several rays of hope. The business environment will likely increase in complexity as time goes by. How will Muslim business leaders be able to manage this complexity? For historical reasons, not enough attention has been paid in the Muslim world on systems thinking. Yet, it seems possible that using the archetypes will enable Muslim leaders and managers to be better leaders and managers in the future.

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