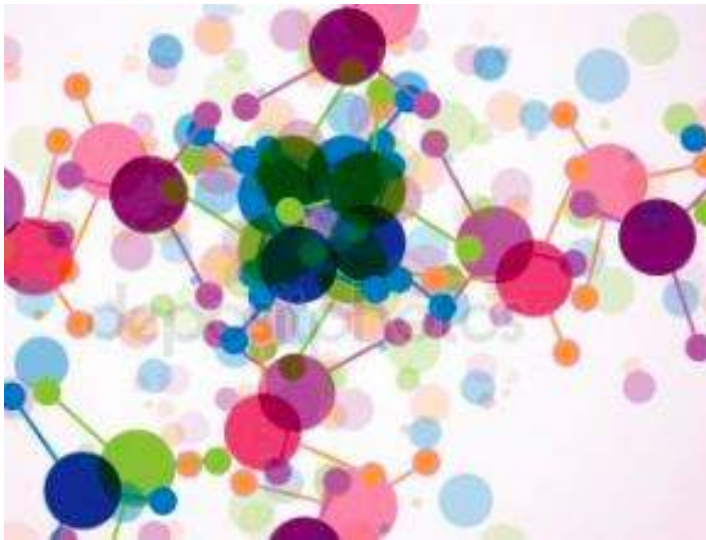# Building Organizations Fit for the Digital Age

7 articles for successful transformation

by Dr. Domenico Lepore
Founder, Intelligent Management Inc.

Building Organizations Fit for the Digital Age

Unrelenting and unlimited: two words that spring to mind about the Digital Age. The advance of Digital Transformation is unrelenting and it creates unlimited new opportunities. Technology unlocks possibilities for innovation by removing previously existing limitations. However, the digital age is also leaving household names to struggle and even disappear. Why is it becoming so hard to survive for established players?

Everything positive about the Digital Age connects with speeding up the flow of delivery of goods and services to the end user. Speed of flow determines success. Digital Transformation exposes the inadequacy of poorly designed interactions. Why? Because speeding up flow involves stripping out everything that does not add value to the process of producing goods or delivering a service. *Only tasks that add value to the process of delivery have a place in the chain of value*. Everything else is redundant.

The lesson to be learned through digitization is to always add value for the customer. Any business that is not designed to perform with speed of flow and customer-centric thinking at its core will fall behind. The focus has shifted radically and that is why established businesses can struggle. Technology can certainly help, but failure to adopt this speed-of-flow mindset is causing casualties.

Silos – the number one enemy of Digital Transformation

The number one reason that organizations stumble in the process of Digital Transformation is the way they are "organized". Digitization is teaching us that speed of flow must be the focus, but for many organizations the main concern has been one of control. How do you control the work of many employees working for one organization? For decades, it was sufficient to 'divide and conquer' by placing a few individuals at the head of 'divisions' or 'functions' and one individual at the top to control the division heads. The problem with this traditional hierarchy is that these divisions quickly become silos, blocking the ability of processes and communication to flow as they should towards achieving the goal of the organization. The most dangerous failing is that the customer is not part of this 'pyramid' picture. So it makes little sense to simply digitize an existing organizational model and hope for the best. Digitization requires deep re-thinking of how we do what we do.
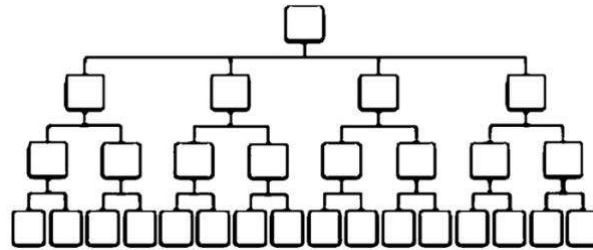
Overcoming silos

As far back as the 1950s, Dr. W. Edwards Deming, the father of the Quality movement, explained relentlessly that organizations must be understood as one whole system. This whole system receives external inputs that are transformed into output for the customer and a feedback cycle from the customer informs a cycle of continuous improvement. It is a flow-based and customer-centric understanding of what an organization is and how it can deliver its purpose most effectively. Today, any organization that ignores this fundamental wisdom severely under-optimizes their efforts and misses an unprecedented opportunity to shape their organization towards achieving their goal. Digital Transformation is bringing with it the lesson, and the opportunity, that Dr. Deming taught so passionately many years ago.
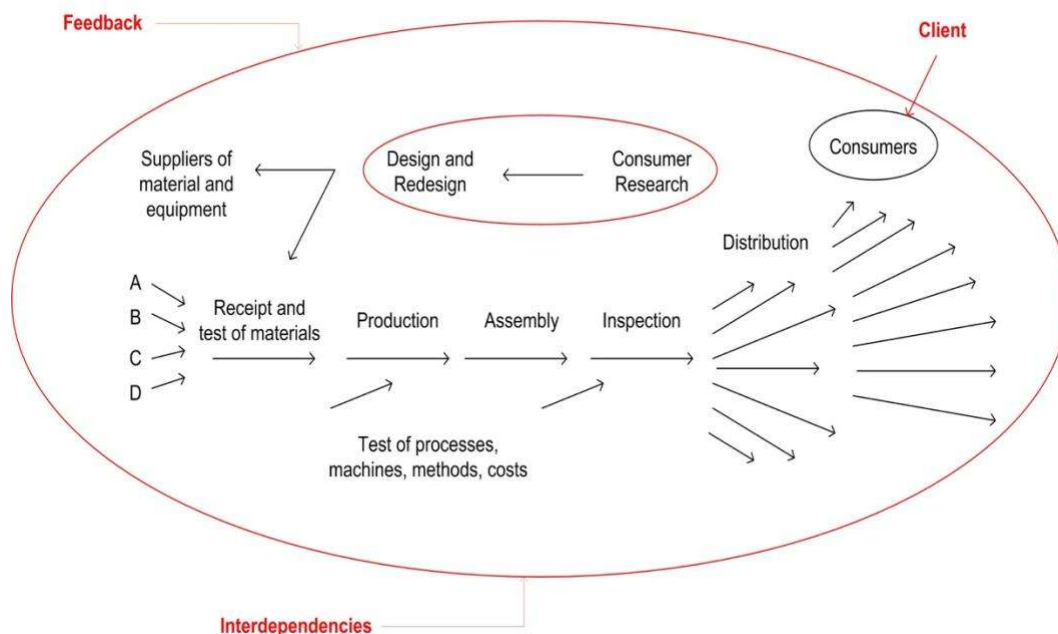

Meaningful work

The opportunities that Digital Transformation can bring include more meaningful work. When we design an organization effectively for the Digital Age we eliminate waste and redundant tasks. This improves the quality of what we produce and the experience of work for the people that carry it out. By correctly designing interdependencies (who does what, when and why) end-to-end *systemically,* people interact in a way that makes sense and adds value and this inherently creates more meaningful work, the end purpose of which is clear. Moreover, a systemic perspective allows organizations to step back and see the bigger picture – that they are part of a larger value chain.

A mindset of Quality, Involvement and Flow

The mindset that leaders and managers must equip themselves with for the Digital Age is a whole system understanding of work based on:

1. Delivering Quality goods and services - this can be assured through designing correct interdependencies, managing variation to build reliable processes, listening to the customer through feedback and continuous improvement;
2. Meaningful involvement of staff based on well-designed interdependencies and managing variation in human interactions through "intelligent emotions", transparency and win-win agreements;
3. Speed of flow - this can be achieved through an effective systemic design of the organization that allows processes and communication to flow unimpeded by artificial barriers. We propose a 'Network of Projects' model where Flow can be accelerated by identifying a "leverage point" (constraint) in the organization.
4. Continuous innovation - this means continuously challenging assumptions to understand how to satisfy best the needs of the customer. This is a process that can be learned.
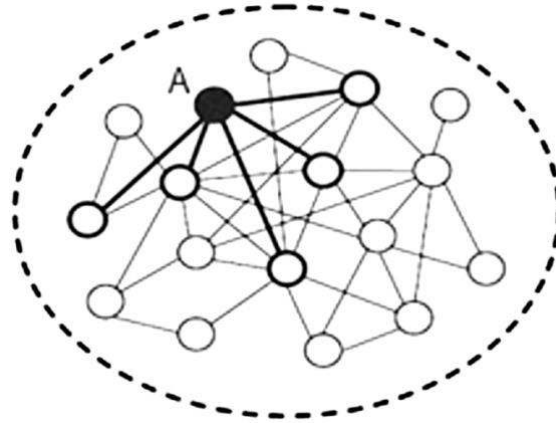
Fight fear with knowledge

The speed at which the business world is changing can be exhilarating but also creates fear and anxiety. The changes required are radical and deeply challenging for leaders whose thinking is stuck in outdated models. It is, above all, a cognitive challenge. The pace of adapting and thriving is dictated by what we call the 'human constraint', in other words, our ability to challenge assumptions and conceive and operate new solutions.

Digital Transformation urgently invites us to shift away from the divisive, silo-ed and zero-sum game mentality that still pervades so many organizations towards a systemic way of working based on win-win collaboration and transparency. The good news is that the knowledge to guide organizations to become fit for 21st century does exist and has been with us for a while. Applying it requires some time and effort, but as Dr. Deming said, "Learning is not compulsory, neither is survival."

How Silo Sickness is Keeping Organizations Stuck

There are two major priorities to compete and thrive in today's market: build speed of flow (flow of production, capital, information, delivery etc.) and adopt a customer-centric approach. The greatest impediment to achieving both is the existence of silos. These artificial barriers create undesirable effects that result in what we might call "silo sickness".

Silo sickness

When organizations are created and organized in a matrix of vertical hierarchy and functions, an inevitable consequence is the existence of a series of "walls" or divisions. These barriers inhibit the resources involved in producing an optimal result toward the overall goal. Communication gets slowed down or completely blocked, innovation struggles to emerge through the ranks and bureaucratic practices, projects are delayed and go over budget, quality suffers, and reaction time to changing market demands is too slow.

Individuals suffer because they do not have the authority to carry out the tasks for which they are responsible. Careers are limited because people work for a boss who must improve their own performance in a vertical way. This means that competencies, both technical and managerial, do not find a natural way to develop. This lack of development creates frustration due to artificial "ceilings."

At the organizational level, departments carry out their work based on the local measurements and therefore focus on local optima, losing sight of the overall goal of the organization. Production planning, for instance, in the steel industry can be completely uncorrelated with sales. This is because there is no feedback mechanism within the organization (and poor interdependence with customers and suppliers).

Even more dramatically, silo sickness means that the larger implications of cause and effect relationships that exist in organizations are totally disguised. *It takes time for the effects of a cause to propagate through a system.* People have no means of understanding the implications of their local, siloed decisions for the big picture. Even the heads of functions are blind-sided to those implications.

For example, let's say that the VP of Operations decides to cut 5% of maintenance costs. A moment will come when the organization is unable to make a sale because it is unable to deliver what it has promised

due to breakdowns, and nobody will ever know that the problem originated in the cutting of maintenance costs.

These are just some of the ailments of a traditional organization. We can summarize the three worst faults in an organization that operates in silos as follows:

- No feedback mechanism
- No visibility of the customer (and suppliers) in the organization
- No learning cycle based on feedback

So why do silos exist?

Why do people work in silos in the first place? Surely people are trying to do their best, so why do they work in a way that sub-optimizes everything? What is the root cause? To understand that we must look at the two major needs that an organization tries to protect:

on the one hand, e*xercise control over costs and the individual responsibilities of staff*

and on the other hand, *increase cash generated from sales*.
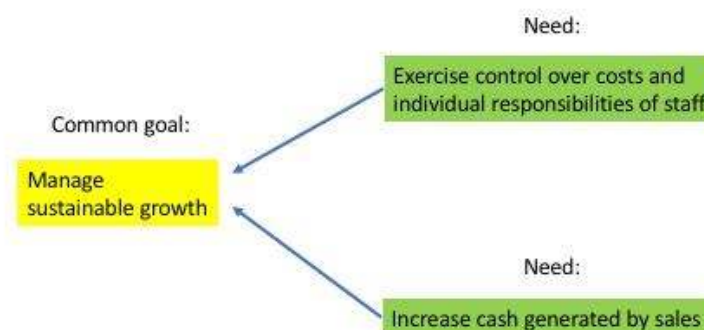
Both needs have the common goal of "Manage sustainable growth". However, there are a set of assumptions (mental models) that make people think that a traditional hierarchical/functional organization is a better way to control things.

Mechanistic thinking can't cope with complexity

The hierarchical/functional organization reflects a mechanistic, Newtonian worldview, where separation is feasible and dynamics are linear. This attitude lacks awareness and understanding of our new reality that is dominated by increasing *complexity,* meaning unprecedented levels of interdependencies.

To move forward, we must question the assumptions, i.e. mental models that account for the persistence of traditional hierarchies despite their shortcomings. Over the years of our on-the-field research and development, at Intelligent Management we have come to summarize the major assumptions of the conflict *adopt a hierarchical structure vs. not adopt a hierarchical structure* as:

- A hierarchy can only be vertical;
- Control must be exercised equally over all components of the organization;
- The global optimum is equal to the sum of the local optima.

To challenge these assumptions *operationally* we need a plan of action that can transform an organization into a whole system. The question then becomes, if a traditional hierarchical/functional organization creates silos when what we need, instead, is to work as a whole system, how can we best manage the interdependencies? If we don't have functions and traditional hierarchy, then, you may be wondering, where is that command coming from and how do we "control" this kind of an organization?

Standing on the shoulders of giants

The good news is that we don't have to reinvent the wheel. The model for organizations to follow has been around for decades. Dr. W. Edwards Deming, the founding father of Quality, looked at the big

picture of how elements of a system interdepend, as we mentioned in our previous article 'Building Organizations Fit for the Digital Age'. Deming has shown us that it is of fundamental importance to recognize that an organization is a system, i.e. a network of interdependencies that work together to achieve a shared goal.

After Deming, another management giant who was also a physicist, Dr. Eliyahu Goldratt, introduced the concept of accelerating flow through a strategically chosen leverage point, or "constraint". Taken together, the contributions of Dr. Deming and Dr. Goldratt provide us with a meaningful and effective way to overcome silos, well beyond various techniques that may be appropriate for software teams but not for shifting entire organizations.

We are talking about nothing less than transformation (to quote Dr. Deming). Transformation of the prevailing management style based on hierarchy and artificially created silos towards one of system optimization. In our next article, we will be looking at ten steps for transformation.

Ten Steps for Transformation

Digital is accelerating the ever-present quest that sustainably successful organizations must pursue: Quality of processes achieved through active Involvement of people that maximize the Flow of products, services, information and money. Quality, Involvement, Flow.

Attempting any form of Digital Transformation without first addressing how organizations need to change to accommodate for the acceleration required can only impede its success.

Organizations are whole systems

Transformation for acceleration is not something for the faint hearted, nor is it something that should be attempted without *real knowledge*, certainly not through 'techniques'. The knowledge we need is connected with how to achieve Quality, Involvement and Flow and with finding the design of an organization fit for Complexity.

Some visuals can help.

Dr. W. Edwards Deming, long before anybody else, understood that organizations are systems, networks of components that work together towards a common goal. To achieve this in practice, the components must operate in a state of *statistical predictability,* otherwise chaos will ensue. Statistical Predictability is the result of processes, methods and technologies operated by people sharing a precise framework of knowledge and who are intrinsically motivated, hence cognitively involved, in achieving a goal that betters their lives and the world around them.

(This is my quick take on the overarching vision for Quality that Dr. Deming put forth and, of course, I take full responsibility for what I write.)

Such a system was first designed for the benefit of Japanese industrialists in 1952 and it was fueled over the decades by a continuously growing body of knowledge, eventually formalized in two pillars of management Theory published by MIT, Deming's *Out of the Crisis* and *The New Economics*.
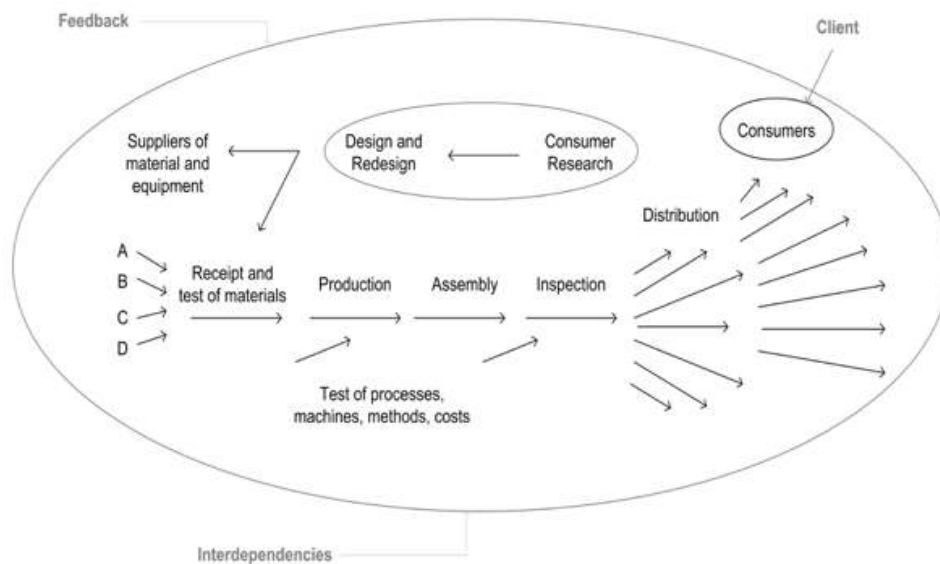
The organization as a system, based on Deming's original 1952 'Production Viewed as a System'.

The arrows represent the systems' components (processes and projects the company is made up of) and in the circles I have highlighted its main features: focus on the client, feedback loops, emphasis on interdependencies.

Deming's 'Production viewed as a system' was the starting point for the Quality movement and ushers in precisely those elements of integration, collaboration and transparency that are the hallmark of digital technologies.

Dr. Eliyahu Goldratt, a physicist like Deming, looked at how to emphasize and capitalize on the systemic nature of the work of organizations from a different angle. Any organizational system, he argued, can be designed to have only one (or very, very few) elements that determine the pace at which it pursues its goal. When this element is strategically chosen, i.e. capable of offering the highest value, it becomes the leverage point that maximizes what the whole system can produce. He called it the "constraint".

By maximizing the performance of the constraint and *synchronizing* the organization around it, we maximize the overall performance of the system and there is a precise protocol for this that Goldratt called the Five Focusing Steps.

While their teachings are generally used separately, we began working from the intuition that combining the whole system practices advocated by Deming and Goldratt would produce a powerful approach. Over

twenty years of international implementations have shown the effectiveness of combining their approaches into ten macro steps that we called 'The Decalogue' (first published in 1999 by Goldratt's publisher North River Press as 'Deming and Goldratt: The Decalogue', Lepore & Cohen). The ten steps of the Decalogue combine the systemic thinking underpinning the work of Deming and Goldratt into an operational method and tools for transforming an organization into a whole system. They provide the solid foundations for an organization built for speed, integration, collaboration and transparency and these are the *prerequisites for embracing and capitalizing on the advantages that digital transformation can bring.*

Here is a brief summary of the ten steps of the Decalogue:

STEP ONE

Establish the goal of the system, the units of measurement and the operating measurement (Without a goal there is no system and without clarity on what to measure in the system and how to measure it, talking about a goal becomes lip service.)

STEP TWO

Understand the system (draw the interdependencies – If we do not know who does what, what the inputs and outputs are, and how everybody's work is connected, then we are not managing.)

STEP THREE

Make the system stable (understand variation and its impact on the network).

STEP FOUR

Build the system around the constraint (subordinate the organization to the constraint).

STEP FIVE

Manage the constraint (protect and control the system through buffer management).

STEP SIX

Reduce variation of the constraint and the main processes.

STEP SEVEN

Create a suitable management/organizational structure.

STEP EIGHT

Eliminate the external constraint (sell all the capacity the system has available).

STEP NINE

Where possible, bring the constraint inside the organization and fix it there.

STEP TEN

Set up a continuous learning program.

At the time of publication of the book *Deming and Goldratt: The Decalogue* (1999), step seven '*Create a suitable management/organizational structure*' was not specific. However, it was clear that, without a suitable structure, the realistic possibility to sell all the capacity of the constraint would be hindered by local optima considerations (silos). In other words, the design of a suitable structure was a prerequisite for enabling the true expansion of the system.
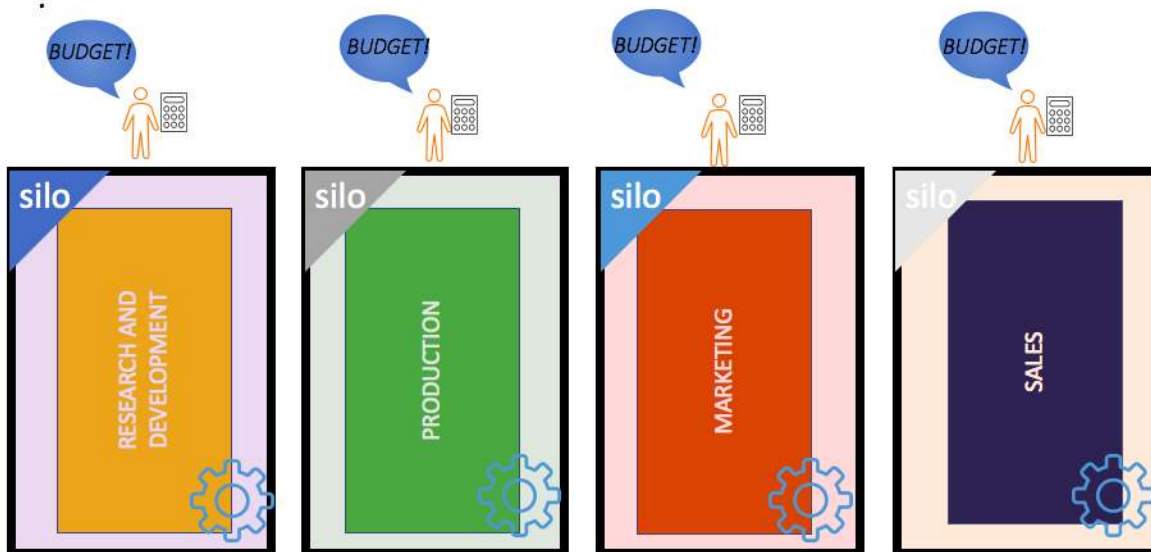
Today, it is much clearer that the natural way to see the work of an organization is in terms of process and projects. In the years that followed, further research and application led to the development of the

Network of Projects organizational design as a means to improve and optimize the performance of the whole system. We will look at this design on the next article in this series.

Network Thinking - Building Cooperation for the Digital Age through a Network of Projects

Every organization needs to know how to maximize the potential of all its resources and continuously improve. From the years of working with companies, from metal foundries to software houses, it was clear that silos and functional divisions were a major handicap to maximizing potential. They create artificial barriers when what is required is cooperation and flow, as we saw in the previous articles in this series. Silos create barriers that prevent the cross-functional cooperation that is vital for any organization, particularly in the Digital Age.

If silos *prevent* cooperation, what can facilitate it? When you think about the *essence* of an organization, you realize that it is a series of recurring and non-recurring activities, from new product development to book-keeping. All of these activities are interconnected in some way and they all require *competencies*. So what is needed is a way to manage sets of activities that are continuously created, coordinated, cross-functional, and that evolve in time. There is a precise name for this: *a project*. It became clear to our team in every environment just how foundational *projects* are for any organization.

A project is: *a network of interdependencies created to achieve a precise goal in a well-defined timeframe and budget.* A project is a *system* with a precise duration.

Optimizing resources through a network of projects

So what happens if we view the recurrent and non-recurring activities in an organization as "projects"? Whether we seek to improve the speed at which we manufacture products, install new equipment, organize shipments, or file quarterly closing, we need the *coordinated efforts* of many different competencies. If we want to truly optimize our resources then we need to make the best use of the competencies we have available. An organization can be managed much more effectively, then, when we see it not as a linear, functional matrix but as a *pool of competencies*. We can consider our engineers, accountants, scientists, and subject matter experts not as restricted to a "company function" but as valuable competencies that can be deployed for the goal of the whole company. These resources, ALL the resources, should be available for whatever "project" the company needs to accomplish.

When we adopt the view of the organization as a pool of competencies to be scheduled into projects, we

can truly unleash the potential of all the resources available. We acquire an unprecedented level of flexibility and we can accelerate the flow of project completion. This accelerates achieving the overall goal of the organization.

Controlling a network of projects

There are various "techniques" for managing projects, but few achieve the level of reliability offered by the Critical Chain algorithm developed by Dr. Eliyahu Goldratt. Long adopted by aerospace and military for its effectiveness, Critical Chain schedules projects based on real availability, i.e. finite capacity. It accelerates project completion through realistic estimates of task duration and by absorbing the variation that affects all the tasks into one mega project buffer at the end.

If projects are *horizontal* through the organization and not vertical within functions, how do we exercise control over them? When we operate a network of projects at finite capacity with Critical Chain, the project buffers provide protection for ongoing projects and they can be monitored using Statistical Process Control. It would even be possible to create a kind of "dashboard" that would give leaders real time information on exactly what is happening in the projects that make up the work of the organization.

If an organization is, essentially, an ongoing collection of unfolding projects, then the focus of leadership (Board, C-Suite, etc.) must be on how well and timely these projects are executed. Any form of meaningful control can only be exercised through managing the Buffer that is the real thermometer that measures the temperature of the organization. By constantly monitoring the state of the buffer for each of the ongoing projects, leadership can have a real insight, *not* numbers from a spreadsheet, into how well the flow of events is generating units of the goal the organization is pursuing. Critical Chain becomes, then, much more than simply an algorithm to accelerate project completion; it is the vehicle to integrate, control, and deploy the resources of the organization.

Cooperation beyond silos

Once we have freed ourselves from the notion of mechanistic, siloed enterprises by adopting the idea of the enterprise as a *system* and operating a *Network of Projects*, we unleash potential in a way that has not yet been possible. We give individuals the opportunity to develop their competencies beyond the confines of functions. We create space for emergent properties to exist. We can even go beyond the boundaries of single companies and create products and services through *networks of companies*, drawing on a much broader pool of competencies scheduled into finite capacity projects. We overcome the boundaries of geography and fiefdom to achieve a global goal.

In a project-based organization we can finally make sense of the all too vague idea of "Teamwork"; we can actually have people working in Teams without resorting to excruciating and hilariously off-putting "team-building" sessions. We can simply facilitate teamwork by *removing the barriers that prevent it*; we can do so by orchestrating people's talents and skills in a time sensitive and continuously evolving Network of Projects bearing in mind the overall goal of the organization, whether financial or otherwise. The guiding scheduling principle to build successful Networks of Critically Chained projects is, then, the availability of *Competencies* that each Resource brings to the table.

Addressing the multilayered issue of how to optimize finite resources to maximize throughput is critical if we are to generate wealth sustainably. We will see in our next article that it requires an upgrade in thinking skills.
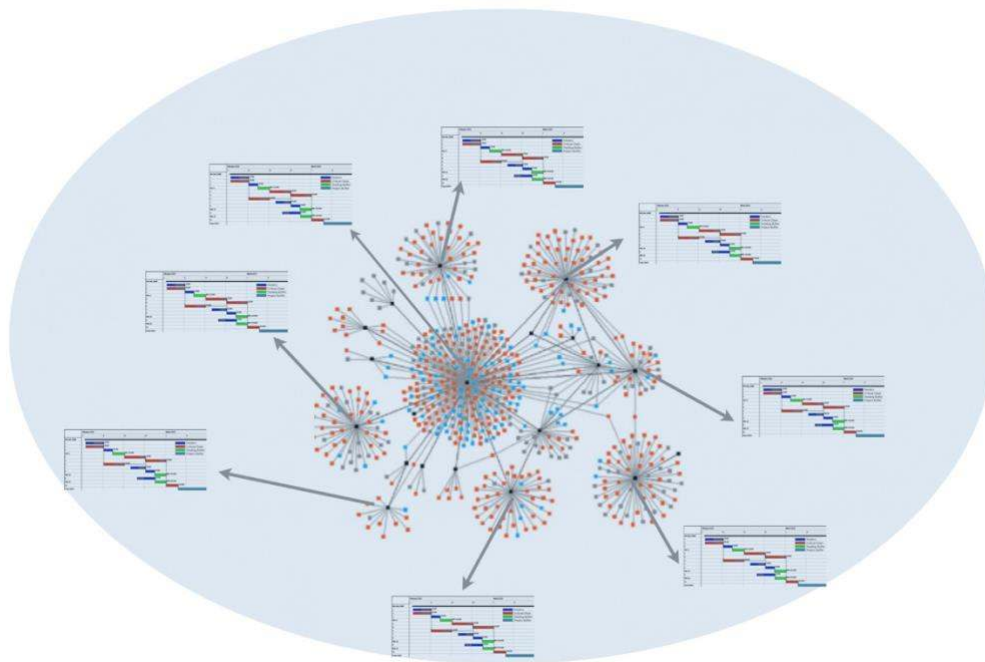
Continuous Innovation: Why Leaders Must Upgrade Their Thinking Skills

Every single thing that happens in a company, from how strategy is designed to how a widget or a software is made and sold is the *end result* of one specific human activity: thinking. In many companies, the thinking that originates the actions that follow is, at best, vague. Anyone who has sat in enough meetings knows this.

Why is so much thinking in organizations vague? It's not because people lack intelligence or qualifications. The fact is that the kind of thinking that can produce high quality results at a systemic level needs to be learned, but who is teaching it?

The faster our world and our markets change through technology, the faster we must acquire *systemic thinking skills* to think through the shifts and innovations required to lead, adapt or simply keep up. Before we take a look at a method for improving our systemic thinking skills, let's look at one of the major obstacles to improving our thinking.

The dangers of too much linear thinking

Linear thinking has served humanity well. Being rational allowed us to emerge from the dark ages and the realm of superstition. We can thank René Descartes for providing us with a whole system of knowledge and investigation, including the ability to locate a point in space by giving its relative distance from perpendicular intersecting lines. By reference to the two coordinate axes, any point, line, or figure may be precisely located.

This logic brings us directly to the notion of a matrix. Once again, matrices have allowed us to deepen our understanding of many phenomena. The excel spreadsheet exemplifies the idea of a matrix. The feeling of power and control that tackling problems using a Cartesian approach gives us is incomparable. The problem comes when we try to apply "rational" methods beyond their scope. The Excel spreadsheet is a case in point. It certainly has its merits and is a useful tool for many tasks. However, it becomes an issue when we elevate Excel (or Numbers or any other spreadsheet) to the ranks of a management tool and use it for efforts that require something quite different.

By relying heavily on matrices, we create a dangerously limited view of our reality as organizations. Given the complexity of managing and controlling the combined efforts of many people, it can be

tempting to resort to something that gives us the impression of control, such as an organization structured as a matrix. This is linear thinking and it is too limited to encompass the full complexity of human organizations as we understand them today. It leads you to think, erroneously, that if you optimize all the parts the whole will do better. Linear thinking focuses on addressing "symptoms" instead of looking for what is causing the symptoms to happen. It fails to recognize that it takes time for a signal to propagate through a system and so the result of an action can only be seen much later, making it harder to understand where the result came from in the first place. It induces us to concentrate on costs and not on how to maximize throughput and it confuses price with value.

Linear thinking imposes old patterns; it expects more of the same because it sees a past that continues in a linear way into the future and is therefore blindsided to disruption.

We can't keep managing organizations thinking that everything is linear and that a hierarchical functional organization with silos is adequate for today's complexity. What we know today that we could not know fifty years ago is that organizations are made up of networks, and they exist within other networks, and all of these networks are made up of multiple interconnections that increase their complexity. The relations within a network evolve in a nonlinear way. We may even consider the conflicts that inevitably arise as explosions of nonlinearity. We may state that nonlinearity is the key to interpreting all complex phenomena that arise spontaneously when several entities interact, be they biological or human.

Digitization is accelerating the need to reshape organizations to function beyond silos. Leaders and managers urgently need to get a grasp of knowledge of nonlinearity and learn how to manage organizations in a completely new light. In other words, the evolution that takes us from silos towards a network requires not just a shift in how we organize our work but in *how we think*.

How can we boost our systemic intelligence and learn to think in a non-linear way?

Learning how to change is perhaps the greatest challenge we face and the most urgent one. Technology demands it and to fully embrace and leverage new technologies to our benefit we need to learn to think *systemically*. However, this is not usually something that we are taught at school. Indeed, thinking skills in general are not taught, beyond the ability to analyze something logically in terms of grammar or high school math. Thinking, however, is never a purely logical activity. It is always informed by our emotions, fears and desires. Above all, our thinking is 'clouded' by our assumptions and the mental models we inevitable bring with us as part of how our brains have developed. These assumptions are intimately connected with our personal experiences and the environments where we learned to interact with the

world. It is perfectly understandable that people from different backgrounds have different worldviews. However, when people need to interact to achieve a goal, these differing worldviews often lead to conflict.

The creative nature of conflict

A conflict is a form of "constraint". The "conflict cloud" developed by Dr. Eliyahu Goldratt as part of the systemic Thinking Processes from the Theory of Constraints is a powerful, structured and highly effective way to leverage conflict as an opportunity for breakthrough and innovation. It frames conflict as an opportunity for creativity. (We will look at the Conflict Cloud in the next article in this series.)

Why is this Thinking Process so powerful? Because no matter the conflict addressed, it takes into consideration for all parties the two fundamental human drivers: *control* (this connects with fear) and *vision* (this connects with desire). In any conflict, these two needs exist in a variety of manifestations and any sustainable solution must respect and protect them. This is key to achieving success through conflict.

Without the creative friction that comes from conflict and the intrinsic limiting elements we experience in every situation we try to improve, we will never discover the elements that lead to a systemic solution and real innovation.
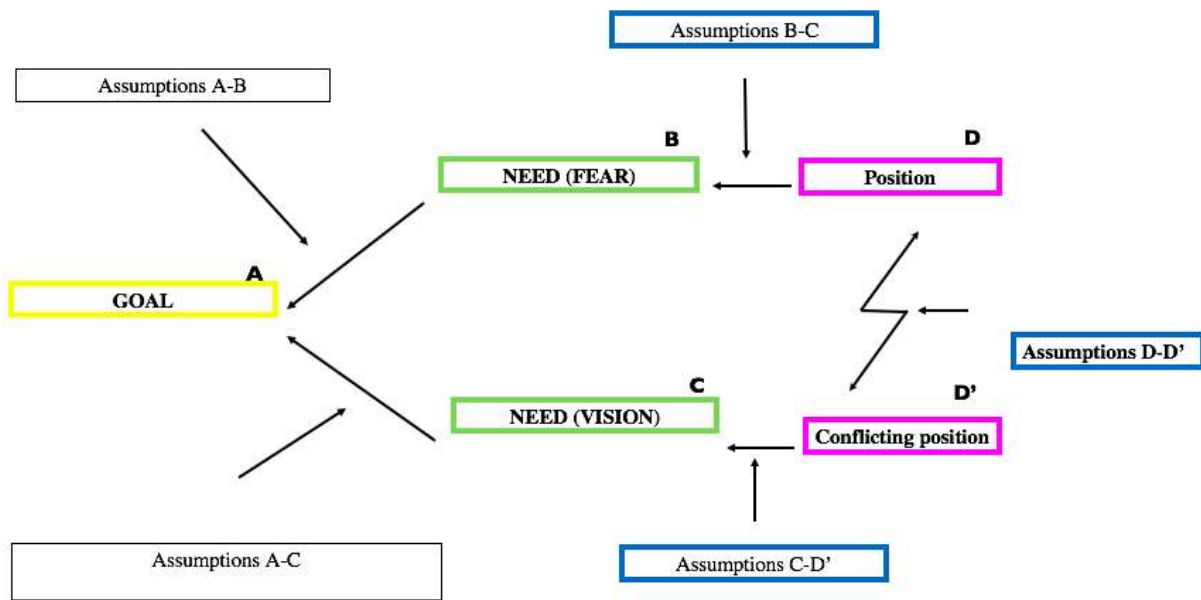
Why Do We Get Stuck on the Path to Change? The Human Constraint

"The only thing that does not require maintenance is obsolescence", as Dr. W. Edwards Deming used to say. This is a fundamental truth: if we do not evolve, we regress. What makes everything more complicated is the pace at which we must evolve to survive.

Technology speeds everything up, including the world of technology. Digital transformation involves **transformation** of business activities, processes, competencies and models to fully leverage the changes and opportunities of **digital** technologies. It's time to look at how to manage the process of change in a *systemic* way.

How can we achieve that? The Deming cycle of Plan, Do, Study, Act is an ongoing process of improvement and innovation that any organization needs to embrace to face complexity and remain competitive. The Thinking Processes from the [Theory of Constraints](#) provide a solid, systemic analysis and roadmap of what to change, what to change to, and how to make the change happen.

Why Change? Because our reality hurts and we need to something about it

When our reality is biting us, it's a signal that we need to do something. The cycle of Thinking Processes we use with the Decalogue approach to managing change starts by listing the things that are hurting. In the *Theory of Constraints* these 'symptoms' are called Undesirable Effects (UDEs). We may have no *desire* to change, but the UDEs are a prompt that make us aware of a *need* to change. The Undesirable Effects we experience are the result of the network of relations we are part of and that naturally evolve, whether we like it or not. In network theory, these would be referred to as 'emergent properties.'

Thinking Cause and Effect

Though some people may try, it is ineffective to adopt a 'whack-a-mole' attitude to cope with our Undesirable Effects one at a time. The reason for this is that each Undesirable Effect is *interconnected as a symptom of an underlying cause*. Whether we can do something about the cause or not, we need to change because that cause may in time severely limit our ability to achieve goals that are critical for us. That cause is what is blocking us from achieving more towards our goal. It becomes our constraint, and as

Dr. Goldratt used to say, you can ignore the constraint, but it won't ignore you. We need to learn to understand cause and effect, i.e. to recognize the effects we experience, and link them to their cause.

The need for systemic intelligence to cope with change

Goldratt created the Thinking Processes to fortify in people the ability to reason cause-and-effect. This is a daunting task because our mind simply does not work that way. In our daily lives, most of the time we "re-act" instead of acting and we very rarely understand the full spectrum of the consequences of our "re-actions". But change is something that can be achieved. We just need to understand that it is a process, and that process goes through various phases, or levels of resistance.

Level 1: Are we dealing with the right problem?

This is the deepest level of resistance. There is no common agreement about what the problem is that requires some form of change. To tackle this level we must identify the *cause* of the majority of negative or undesirable effects that are being experienced. This can be done very effectively and quite fast through the '*Core Conflict Cloud'*.

Level 2: Is the solution the right one?

Once there is agreement about *what* needs to be changed, there must be agreement about *how* the change will be implemented. The direction of the solution is found by identifying solutions (called "*injections*" in TOC) to the core conflict. This is done by invalidating the assumptions (mental models) that keep people stuck in the core conflict. It allows a shift towards a stage of agreement where it is no longer "you against me because of the problem" but "you and me against the problem".

Level 3: Have we really thought everything through?

This level reflects a disconnect between the understanding of change required and the logic that will bring the results. A fully fleshed out solution needs to be mapped out. For this reason we build a '*Future Reality Tree'*. This process gathers together all the "injections" with a supporting logic to prove that the proposed changes will bring results. It also leads to identifying further injections that complete the solution. The result is a clear map that becomes a living document shared among those involved in the change process.

Level 4: Are bad things going to happen to me because of the change?

People will be sensitive to possible negative implications they perceive for themselves through the implementation of the solution. It is important to identify negative implications early to:

- protect the proposed changes from unexpected difficulties;
- get buy-in from people who may tend to be nay-sayers;
- demonstrate leadership through an ability to listen to relevant objections and incorporate that feedback.

The Thinking Process for this is called *Negative Branch Reservation*.

Level 5: Aren't there just too many obstacles to make this thing work?

At this level, the solution is much closer to being accepted as reality and people's objections are at a very concrete level of obstacles in the way, often in the shape of a lack of resources. The people who see the obstacles are often the very ones with the knowledge to tackle them. It is vital to be able to address and overcome these obstacles and the process for this is called an Intermediate Objective. All the necessary Intermediate Objectives (IO) can be mapped out on a '*Prerequisite Tree'* in a logical order of what needs to be done first before another IO can be achieved.

Level 6: Am I (and others) really able/willing to do this?

After level 5 has been overcome, we are in a situation where all we need to do is take the actions to achieve the Intermediate Objectives. Even so, at this stage people may freeze. This may be simply because there is not enough clarity on tasks or because not all the objections have been raised. This is a critical phase in terms of leadership and can be greatly facilitated by giving and sharing clear instructions through the use of the '*Transition Tree'*.

The Human Constraint

Change is not just about doing things differently. It's about *thinking differently* in order to make change possible. Many efforts to bring change fail because they do not address the cognitive challenge. This is what we have come to call the *Human Constraint*. When we educate ourselves to think and act

systemically, we become capable of so much more than we imagine. As Einstein put it, "Those who think it's not possible shouldn't disturb those who are doing it."
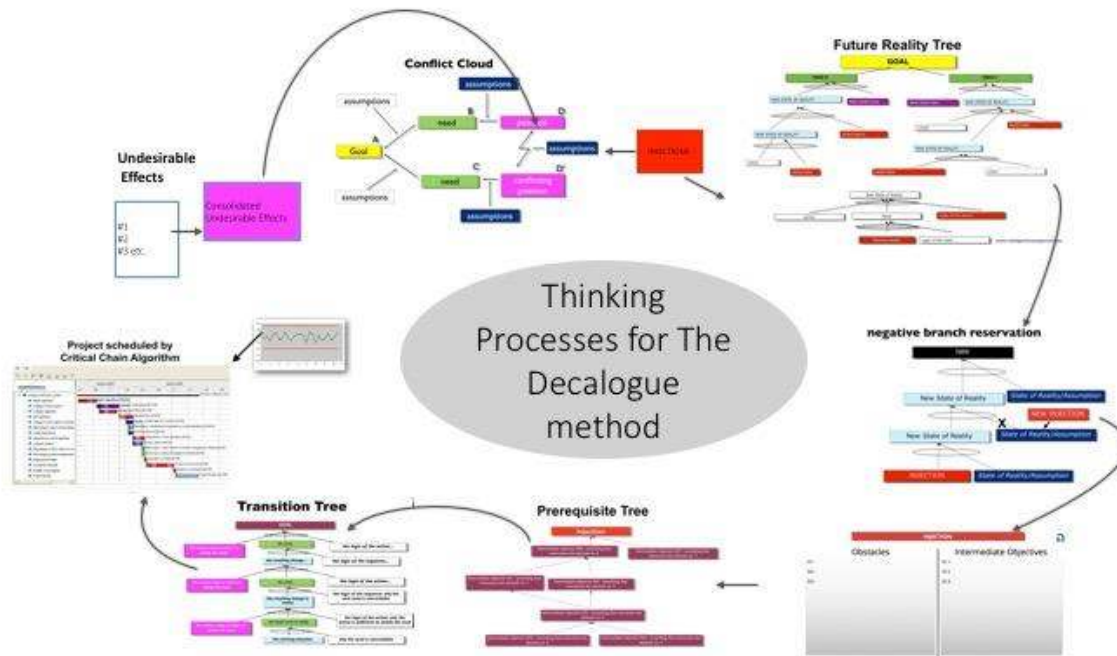
Deming and Goldratt: The Software

At the eve of the new millennium, following four years of intense collaboration, Oded Cohen, a highly regarded TOC scholar, and I published with Larry Gadd at North River Press [Deming and Goldratt – The Decalogue](#). It was a first step towards a cohesive, coherent and rigorous integration of two bodies of knowledge that at the time very few perceived as compatible, Theory of Constraints and The System of Profound Knowledge, Deming's legacy to the world of management. The book was very successful, it was translated in several languages and became recommended reading in dozens of universities around the world.

In the last 10 years, my team and I at Intelligent Management have come to believe that the only way to see the teachings of Dr. Deming and Dr. Goldratt bear fruit was to envisage an organizational structure capable of capitalizing on the scope and depth of their work. Such a structure, we argued, must be consistent with the systemic nature of their management approach; it must contain the seeds for the transformation from Silo to System.

Starting from 2010, in different books ('[Sechel: Logic, Language and Tools to Manage Any Organization as a Network'](#), Toronto, 2011, ['Quality, Involvement, Flow: The Systemic Organization'](#) CRC Press, NYC, 2016, ['The Human Constraint'](#), 2016), publications, blogs, seminars, podcasts and, indeed, in our work with organizations, we started to evolve the ten steps of The Decalogue into a full-blown roadmap to accomplish this transformation. The questions we asked ourselves were: How can we make operational the systems view of the organization first laid out by Deming in 1952? How can we factor in the leverage point called "Constraint"? How can we give the right emphasis to the role of "Flow" while preserving the need for "Control" in the management of the operations?

At an even more fundamental level: How can we overcome the inherent conflict between pursuing local vs. global optima, made evident by the ever-increasing level of interdependencies and interconnections that every organization is weaved into?

We called the result of our work on Organizational Design the "Network of Projects". We believe that the essence of the work that organizations carry out is project-like in its nature.

The success of every organization depends on the success of its projects. Every organization is, essentially, an *ongoing collection of unfolding projects*. For this reason, the focus of leadership, Boards and C-suites must be on how well and timely these projects are executed.

Projects require a pool of competencies and every person in the company brings a set of competencies at various levels. When we have a way to schedule those competencies into projects, we can truly *unlock the potential of all the resources available*. We can facilitate teamwork by removing the barriers that prevent it, orchestrating people's talents and skills in a time-sensitive and continuously evolving Network of Projects. By scheduling available competencies, we gain unprecedented flexibility and we accelerate project completion. This accelerates the achievement of the overall goal of the organization, financial or otherwise.

The Critical Chain algorithm, originally developed by Dr. Eliyahu Goldratt**,** has long been adopted by a myriad of sectors, including high tech, aerospace and military, for its effectiveness. Critical Chain schedules projects based on real availability, i.e. finite capacity, it accelerates project completion through realistic estimates of task duration and absorbs the variation that affects all the tasks into one Project Buffer at the end.

"Ess3ntial" is the result of an ongoing, joyous and life enriching collaboration with a team of scientists and software engineers; their ingenuity and commitment to support the quest of IM for a more evolved form of management never cease to amaze me. Thanks to them, [Ess3ntial](#) is also the first step towards a much more meaningful way of conceiving and developing software for true value creation.

Ess3ntial is a software platform that enables managers to work with a Network of Projects at finite capacity by scheduling competencies according to their availability. The engine of the software is the Critical Chain algorithm, appropriately modified by Intelligent Management to account for multiple projects and to manage levels of competencies. We started from the math; we wrote the algorithm, built the code and developed it into a software solution. Moreover, we have introduced a statistical understanding of Project Buffer variation that allows a true insight into project progress, far from the fallacies of the three-zone, spec-induced and tampering-prone management approach

Meaningful control and a better future of work

Ess3ntial provides managers with *meaningful control* through managing the Project Buffers that are the real thermometer that measures the temperature of an organization. By constantly monitoring the state of

the buffer for each of the ongoing projects, leadership can have a real insight, *not* numbers from a spreadsheet, into how well the flow of events is generating units of the goal the organization is pursuing.

Ess3ntial *enables a better future of work*. It addresses the multilayered issue of how to optimize finite resources to maximize throughput. This is critical if we are to generate wealth sustainably and in a way that maximizes Quality of products and services, meaningful Involvement of people and accelerated Flow of project completion.

Ess3ntial is the fruit of 25 years of work from Intelligent Management Inc., supporting organizations in a continuous feedback cycle between sound theoretical development and on-the-field validation. Ultimately, we are Applied Scientists and our realm of operation is organizations striving for better performance at every level: we are successful if they are. At the very core of all this work there is our **vision and drive** to provide a meaningful contribution to the advancement of Dr. Deming and Dr. Goldratt's teachings; our goal is, to use the words of Dr. Deming, "*the transformation of the prevailing style of management into one of (whole) systems optimization".*

The distinguishing features of Ess3ntial are:

a) It's a genuine multi-project platform using a proprietary finite-capacity scheduling based on the Critical Chain algorithm;

b) It enables you to schedule competencies, in other words it allows you to draw from a pool of available resources, each with a set of competencies, the competencies you truly need, hence multiplying the value that human resources can generate for the organization.

c) It enables a statistical understanding of the variation of the project buffer, hence providing real insight into the progress of the project.

These features allow:

1) Maximum leveraging of existing competencies in the projects at hand and early warning of any lack of them, hence maximizing speed of completion;

2) A realistic schedule of the multiplicity of concurrent projects that make up, in essence, the work of the organization; said in a different way, it is possible to simulate the potential maximum throughput that can be generated by embarking on and managing a multitude of projects;

3) Statistical insight into the oscillation of the buffer enables very early warning on potential disruption and/or a true insight on how coherent and successful are the actions that are taken to complete tasks. In other words, such understanding provides all the input for continuous improvement actions needed to improve the effectiveness of actions taken;

4) Last but not least, Ess3ntial was designed with in mind the idea of accelerating the flow of operations by overcoming the strictures and limitations naturally imposed by functional hierarchies. While this might

not be a pursuit that all companies are interested in, Ess3ntial would undeniably facilitate the understanding of how the available pool of resources/competencies can best serve the achievement of the goals of the company.

After you have saved the network you just created you can launch the **scheduling**
The program processes the data and then shows the project **with the Critical Chain in red and the project buffer at the end.**
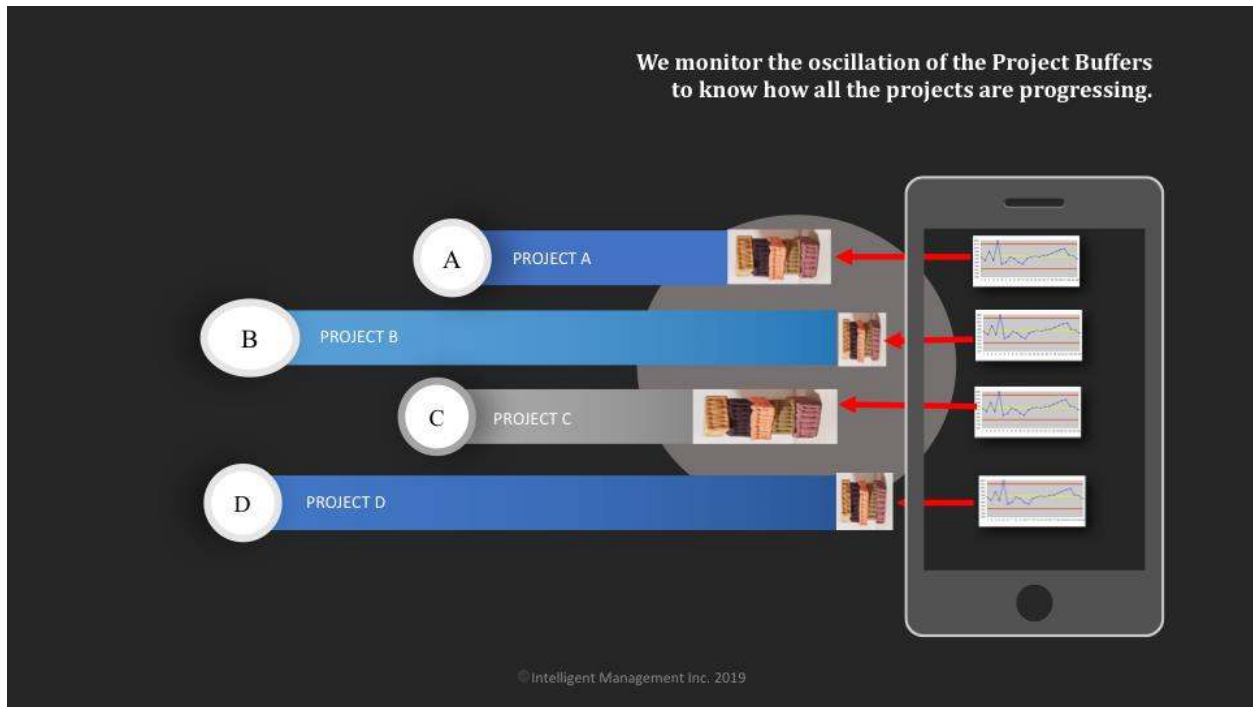
For further information about our Ess3ntial software and a systemic approach to transformation please visit:

www.ess3ntial.com

www.intelligentmanagement.ws