LEAN OFFICE VS. LEAN MANUFACTURING: TWELVE LESSONS TO THINK ABOUT

A White Paper by Ken Eakin – June 2020

Almost every Lean sensei/guru/advisor/consultant/pundit/coach will tell you that, fundamentally, the core Lean principles of Continuous Improvement and Respect for People are relevant *in every job*, in every work environment, and in every industry, including non-profits and government, despite the fact that they have rarely, if ever, worked outside of manufacturing. The fundamental argument for Lean's universality is that all work, in essence, is all the same: it is simply a bunch of people creating or delivering value to a customer. If we also accept that there will always be problems affecting our work, Lean principles are always relevant and applicable.

This is all true. None of this is remarkable or controversial. But so is saying that the sky is blue.

Most organizations taking an interest in Lean for the first time have real problems (often quite serious and urgent) and are seeking helpful, practical solutions. Theoretical principles, while true, don't offer them much help. Leaders in the vast majority of organizations trying to get started at "doing" or "implementing" Lean (or whatever oversimplified toolbox they perceive it to be) are at a very low level of understanding of the deeper principles. Many within an organization where Lean is being introduced are still very skeptical— and justifiably so, given all the terrible things business leaders have done in the name of "Lean". At this nascent stage, many are saying to themselves, if not aloud, "we're different", "our work is too complex", "we're not an assembly line", "this won't work here". Every Lean practitioner has heard these lines of resistance and avoidance a million times.

Instead of trying to fight this with a tone-deaf appeal to universal principles to get them to "buy-in", why not keep the principles to ourselves and admit that the skeptics aren't entirely wrong? Their work *is* different. After all, it's a matter of perspective. As human beings we're all different *and* we're all the same—both viewpoints are technically correct and wrong. The utility of taking one perspective over another depends on the context and the outcomes we're seeking. So, too, with how one view's work environments when trying to improve the operations that happen within them. At an abstract level, all workplaces are the same and the Lean principles that apply to the factory also apply equally well to the office. In a practical context, however, there are some significant differences that deserve to be taken seriously.

Taking these differences into account will enable Lean practitioners, the vast majority of whom have gained their Lean experience in manufacturing environments, to adjust their approach (*without* sacrificing their guiding principles), gain more trust, be more effective, and raise one's chances of converting the skeptics in the office.

THE OBVIOUS STUFF

The obvious differences between an office and a factory are physical. Office jobs are sedentary jobs, consisting of sitting at a desk and tapping away at a keyboard while looking at a screen. The work is not physically demanding. When not at their desks, office people are usually sitting in conference rooms, watching or giving presentations, and having discussions and debates. In a word: meetings. Typically, the ratio of time spent doing solitary desk work compared to attending meetings is higher for frontline staff, and lower for executives. Middle-management is, generally speaking, somewhere in between.

Another obvious distinction is that there are far fewer physical safety risks in an office environment than there are in factories. Offices are cleaner and typically a lot less noisy, and there is no heavy machinery, nor raw materials, scrap, finished goods, spare parts or tools (other than computers and photocopiers) lying around. No personal protective equipment (PPE) is required to do your work safely.

Lesson #1 Stop Talking about Safety: Lean manufacturing consultants should stop talking about physical safety in an office. Psychological safety, maybe. But not physical safety. Well-intentioned Lean manufacturing consultants believe that by illustrating how Lean companies put employee safety first they are highlighting the principle of Respect for People in action. This is true. But, as mentioned, don't expect the uninitiated in the office to understand the principles—or to have any interest in learning about principles in their first encounter with Lean. Remember, they are looking for solutions to their immediate problems, heavily suspect Lean will only make their work harder or more complicated, and will find any excuse to discredit you and find a reason why Lean "won't work here". Telling stories about reducing OSHA (Occupational Safety and Health Administration[1]) incidents in an office context is not going to help. At the very least, drop the "S" from the SQPC (Safety Quality Productivity Cost) measures. If you don't, the office employees will judge you instantly as someone who "simply doesn't get it", who doesn't speak their language, and who is trying to sledgehammer an industrial-sized square peg called "Lean" into the round hole of their "different" office work.

A DIFFERENT VOCABULARY

Every industry and every company has its own lingo and long list of TLAs (three-letter acronyms). Office work is no different. Office workers don't relate to descriptions of work with verbs like cutting, stamping, painting, bending, forming, welding, assembling, and so on. Most people who work in offices have *never* worked in a factory, so they don't relate to such descriptions of physical labor. For better or for worse, words like update, transfer, analyze, prepare, correct, create, validate, copy, upload, preview, decide, etc. make much more sense to them and their digital environment.

Similarly, stop talking about quality! In most contexts, "quality" means "without defects" and "durable and reliable", and both meanings connote physical—not digital-- goods. If you buy a toaster and it will not toast, or toasts well for three days and then ceases to toast, it is fair to call it

[1] OSHA is the US version. Every country has its own regulatory government department in charge of workplace safety.

defective. Return it to the store for a full refund. When it comes to offices and services, most people think "quality" simply means "good", rather than "within engineering specs 99.9% of the time". The service at a five-star hotel could easily be described as "high quality" without anyone needing to measure if it produces fewer than 3.4 defects per million opportunities. Similarly, have you ever referred to a research report, insurance policy, sales contract, marketing campaign, loan, permit, piece of legislation, or any kind of service as "defective" or "durable"?

The consumers of the products and services that make up the "output" of office work, when found to be lacking or not living up to expectations somehow, use the language of errors, insufficiencies, bugs, flaws, deficits, bias, and so on, but never defects. It is also rare that one would refer to an "good" office work output as one of "high quality". People might use instead words like comprehensive, of good value, fair, effective, flawless, error-free, well-balanced, insightful, useful, or helpful.

UNIVERSAL OFFICE ACTIVITIES:

Author William F. Heitman claims that all "knowledge work" activities can be classified into 20 universal activities using only 15 verbs:

Receive	Update
Review	Correct
Prepare	Create
Preview	Enter
Validate	Move
Decide	Attend
Terminate	Send
Perform	

Adapted from William F. Heitman, *The Knowledge Work Factory* (New York: McGraw Hill Education, 2019)

Lesson #2: Go to the *gemba*[2] to learn the lingo that pertains to the context you are trying to influence. Spend some time in an office and then try, as best you can, to speak your customers' language. You will be more effective and persuasive.

WORK IS INVISIBLE

Perhaps the most important distinction between an office and a factory is what you *can't* see. Office work is both *intangible* (you can't touch it) and *invisible* (you can't see it). Even in many aspects of professional or service work the work is at least visible: you can see and count patients, equipment and medications in a hospital; you can see and count ingredients in a restaurant. The "raw material" of office work is simply information, and this is mostly hidden in computer systems and in the heads of office workers. This is not a minor difference. Lean manufacturing specialists will talk frequently about "material and information flow" (aka value streams), but there is no physical material in an office. It's *all* information flow. So, stop talking about "material" (see Lesson #2)

The invisibility of office work has consequences to Lean practice. For instance, it presents an immediate barrier to the Lean management practice of going to the shop floor, the *gemba*, where the value-creating work happens. When factory leaders do a floor walk, they can apprehend important facts about value creation through keen observation and asking the right questions: Is there standard work and, if so, is it being followed? Are there visible production charts being updated with actuals against targets? How were the targets chosen? Is there excessive inventory? Is there overburden or underutilization (of both machines and people)? Does the machine break

[2] *Gemba* (also spelled *genba*) is Japanese for "the real place". I prefer to use the anglicized term "floor walk" instead of *gemba* walk.

down frequently? Do workers have all the tools and parts they need to their job effectively? Do they have the required skills and training? Is there evidence of problem solving, collaboration, teamwork and improvement? These are some of the things that a Lean leader would be looking for out on the shop floor because they represent waste to be removed or opportunities to improve. I'm not saying it is easy or quick for traditional-minded leaders to become good at this, but if they go out to the factory floor, at least they can practice it.

Try walking around in an office and you'll see…well, nothing but expanses of grey-beige cubicles and people sitting at their workstations tapping on keyboards (or phones) and staring at screens. You can't see the work! You'll see carpeting, offices, meeting rooms, desks or work benches, chairs, filing cabinets, and windows. Maybe some plants and cliché posters on the walls that are meant to be inspirational. Maybe it's a converted warehouse space with espresso machines and dogs welcome. Whatever the case, floor walks or "go sees" in an office are, if they are to yield the same depth of information about the daily work as in a factory setting, more aptly called "sit withs". The floor walking leader has to pull up a chair and sit beside the employee and look over his or her shoulder at the same screen[3]. This is somewhat more invasive to an employee's personal space than a typical factory floor walk, and it is even more awkward when accompanied by a Lean coach/sensei of some sort, so it has to be managed carefully. Because of the deep humility required, leaders find floor walks difficult for to do in any work environment, but office environments present even higher barriers to this activity.

Lesson #3 Make the Work Visible First: Asking leaders to do floor walks right away, as a foundational building block to changing the leader's mindset, as is often done in Lean manufacturing settings, may well backfire if introduced too soon in an office. It is better to simply focus on making the office work visible first, and then introduce floor walks afterwards.

NO COSTLY INVENTORY

Since the "material" of office work is digital (or, sometimes, still paper), the direct cost of carrying inventory is not really pertinent (the *indirect* costs are huge—but more on that below). Yes, there are direct IT costs associated with storing terabytes of data on servers, as well as securing, maintaining, repairing and upgrading these servers (or paying a 3rd party to do so), but effectively data storage is cheap (and so are filing cabinets). It's not comparable to the cost of purchasing and then carrying physical raw materials, work-in-process, and finished goods inventory that you'd find in a business that makes physical goods.

Lean purists will argue that Lean is not really about reducing inventory costs, but about creating more value for customers by engaging all employees every day. They are absolutely right, but to say cost is not a factor is nonsense. Does Toyota think about and care about cost? Of course it

[3] The use of screensharing technology like Zoom are actually a boon in this regard. People find it easier to share a screen with people who are physically distant. A CEO could, technically, call up a frontline employee and say, "I'm trying to understand how we update the CRM when the customer tells us about their new address, do you mind sharing your screen and showing me how it's done?" all from the comfort of his or her desk. Another technique is to listen-in (with permission of course) on customer phone calls, although fewer and fewer people do business over the phone.

does! Lean is about far *more* than cost-cutting, for sure, but manufacturing companies that have implemented Lean successfully have almost always had a financial "burning platform", often in the form of existential threats from overseas competitors with far cheaper labor rates. And I have never heard of a Lean manufacturing initiative that did not use inventory turns as a measure of success (not the *only* measure of success, of course, but one of the more important ones). Lean is, in large part, about reducing inventory.

In an office, the vast majority of the business' costs are salaries. That is, employees. Unlike a plant manager, the leader of an office-based Lean transformation cannot try to reassure her employees by saying "it's not about reducing *labor* costs, it's about reducing *inventory* costs". I'm not saying that factory employees will immediately believe that, from a cost-reduction perspective, Lean is only concerned with inventory. Lean will always provoke the fear of job loss and this is a big hurdle to get over in every company. But at least the plant manager can repeatedly point to some non-human costs to be reduced that most will agree would be worth reducing. An office leader does not have this option. No one believes that saving a money on office supplies and coffee is going to turn the company's financial fate around. And they are right.

Lesson #4. Lean Should Be About Growth, Not Inventory Reduction: Make the narrative about Lean in the office to be about growth, not cost-cutting. Don't make it about *financial* growth (i.e. growth in profits), although that will also be a result. The Lean story should be primarily about making it *easier* for employees to do their jobs: growing their capacity to serve customers better, faster, with less effort and more enjoyment. Make the growth also be about growing people: giving them more skills and more opportunities to use the creative ideas and skills they already have. As Shigeo Shingo said, "There are four purposes of improvement: easier, better, faster, and cheaper. These four goals appear in the order of priority." Shingo was a wise man. Make "easier for employees" the first priority. While this should equally apply in manufacturing, it is all the more important in office environments because of the lack of costly inventory.

CHANGEOVERS ARE TOO EASY

Quick changeovers of individual machines or even entire production lines are a common Lean improvement goal for manufacturing facilities. If you've been in a Lean factory, you'll know that frequent changeovers allow manufacturers to produce in smaller batches, enabling them to produce a wider variety of products (or, at least, a variety of different models), much more in line with real customer demand (as opposed to the inaccurate "guestimates" in sales forecasts). This means the firm only makes what it can sell—and can make it on short-notice—rather than overproducing and being stuck with a lot of unsold inventory. Such unsold inventory costs money to warehouse and transport, and often has to be sold at deep discounts. One or more parties in the supply chain, including the end-consumer, are going to have to absorb that cost. Most people can easily understand why it is not good for business.

Yet changing over heavy machinery in a factory is often a dauntingly complicated and time-consuming task. And that means it is expensive, because, as the saying goes, time is money: the

line cannot produce anything of value to a customer when undergoing a changeover. A lot of manufacturers opt to make large batches of the same product-- and risk the cost of carrying excess inventory (overproduction) later-- to avoid the immediate cost of changing over the line. To make the cost of changeovers go down requires the highly orchestrated efforts of many people at once to make them happen quickly. Lean manufacturers manage to reduce their changeover times and, as a result, respond faster and more flexibly to customer demand, while reducing their cost of carrying inventory. Win-win.

In contrast, in an office, I can flip between open windows or browser tabs in an instant. In fact, multi-tasking is the *biggest* productivity problem in office work today. Yes, you read that right. Despite the widespread belief that only newer technology can solve office problems, multi-tasking (aka "context switching" or "task-switching") is more pernicious to office productivity than even your DOS-based, green-screen legacy software applications.

Multi-tasking is the office equivalent of overproduction. This is because multi-tasking produces work in large batches—and this creates excess "inventory". This may sound contradictory, since I just said that direct inventory costs don't matter in offices, and, moreover, that quick changeovers (industrial multitasking) are employed to avoid overproduction. Allow me to clarify. The critical point to understand is the difference between *finished goods* inventory and *work-in-process* (WIP) inventory[4]. In a factory, the ability to do quick changeovers is *desirable* because it prevents the overproduction of *finished* goods (which cost money when they go unsold) and increases the ability of the business to respond to changes in customer demand.

In an office, the ability to do quick (cognitive) changeovers is *undesirable* because it creates an overproduction of started but *unfinished* work—the nefarious WIP—that ends up sitting around in email inboxes and dozens of other software applications while customers wait for it to be completed. Office work starts and then gets derailed by shifting priorities, unknown or unclear expectations, too many projects on the go, last-minute demands for presentations and reports, budgeting and re-budgeting, firefighting, and uncoordinated and ill-defined handoffs, to name just a few. Every aspect of office work requires information, and the more WIP there is, the more non-value-adding work there is in classifying, labeling, storing, finding, extracting, analyzing, visualizing and presenting information. So, although the direct cost of "carrying" heaps of digital inventory is immaterial from the point of view of accountants, excess WIP in an office is a huge indirect cost because WIP kills productivity (paid for in salaries) and delays delivery times (lost revenue from customer dissatisfaction)[5]. Offices really *do* have costly inventory—and its name is WIP.

Note that having the discipline to finish what you start does *not* mean you should stick to your behemoth five-year plan at all costs. It means working in small but meaningful increments (think days, not years) and finishing an increment (a small batch) before beginning a new one.

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[4] Note that quick changeovers do nothing to prevent overproduction of work-in-process (WIP) inventory in factories too. Without other Lean methods and techniques in place, quick changeovers could well create excess WIP. To prevent WIP bottlenecks from occurring, Lean manufacturing companies strive to optimize product mix, implement pull systems, and balance cycle times.

[5] Digital WIP does not show up on the balance sheet as non-cash working capital the way physical goods do, so those who manage by financial ratios alone rarely see it as a cost.

Such a style of work is, perhaps paradoxically, more flexible and adaptable (some like to say "agile") because a new increment can be completely different and unrelated from the previous one if conditions indicate that this is what is currently most needed. Multi-taskers, on the other hand, will always be "too busy" to take on anything new.

Lesson #5 Quick Mental Changeovers are Bad for Productivity: Remember that office work is not made "to stock" but is rather an on-demand service ("to order"). Unlike in make-to-stock factory production, overproduction of *completed* products and services is almost impossible in service industries. Office workers don't make things like trade policies, mortgages or websites based on sales forecasts, but only in response to real customer demand. For nearly everything they do, a real customer (internal or external) has already requested it.

ELIMINATING MENTAL CHANGEOVERS:

- Try to minimize the possibility of mental "changeovers" caused by boredom, constant distraction, interruption or the whimsical shifting of priorities.
- Implement pull signals and limit WIP with visual management.
- Seek to balance workloads by moving people to the WIP, rather than continuously distributing incoming new work to the people.
- Live by the credo "stop starting and start finishing".

Quick changeovers (multi-tasking) and the excessive WIP produced are a hindrance to finishing work quickly in the office. The focus, therefore, should be on focus. The productivity benefits of such WIP reduction apply equally at the individual level (managing your daily tasks) and at the enterprise level (limiting the number of big projects on the go at once).

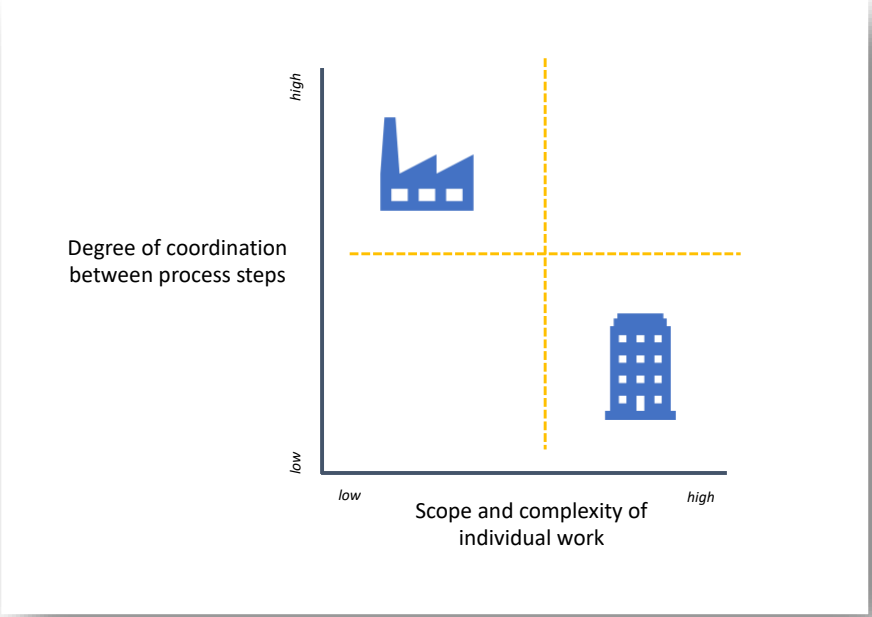
DIVISION OF LABOUR and HANDOFFS

As a general rule, dividing up any complicated piece of work into smaller tasks will make the individual tasks, while possibly still being quite complicated, relatively simpler. If you can simplify the work enough into repeatable patterns, you gain the ability to hire less specialized-skilled labor, train people faster, and have people increase their speed of working through repeated practice. But all this simplicity comes at a cost: the more you subdivide up all the tasks required to bring a product or service from request all the way through to delivery, the more handoffs that have to happen between the tasks. Handoffs, without highly specified and commonly understood standards around exactly what will be handed off when and to whom, are always problematic. Therefore, subdividing work creates a need to coordinate the handoffs between tasks handled by different teams.

The converse is also true: if you aggregate several related tasks into fewer processes, there are correspondingly fewer handoffs to worry about and less need for coordination between them. But gaining mastery over a range of tasks gets harder as the number of tasks in the range increases. And you need to find, train, and pay for labor that is capable of handling this wider and more complicated range of tasks.

There are, obviously, gains to be had from having highly skilled workers *and* a highly organized coordination of work, but because of the tension between them, it is hard to have both at once. Firms are forced to choose a one model of organizing its work system over another, and then try to optimize both the skills of its employees and the coordination of tasks as best they can.

Figure 1 The tension between the coordination of tasks and the scope of individual tasks



Office work tends to favor having a more specialized technical experts who can handle a wider variety of diverse tasks with fewer handoffs compared to factory scenarios which favor a narrower range of tasks and many handoffs. This is, in some respects, due to the complicated and variable nature of the work content (both its inputs and outputs) in office/knowledge work. At the same time, offices typically pay far less attention to the coordination of the handoffs between process steps. At the extreme end of this tendency is something akin to craft production, where skilled artisans carried out all the different tasks required to produce something. Craft production, the dominant mode for producing almost everything up to the end of the 18th century, is characterized by high quality, high costs, and slow lead times. A lot of complicated office work—sometimes called "knowledge work"—is performed in much the same way as craft production. The quality of the work is high, as are the salaries (relatively speaking), and it takes forever to get anything done. Think of the work of organizations or departments that are composed mostly of highly skilled workers like engineers, architects, IT specialists, professors, lawyers, financial analysts and so on.

Manufacturing, in contrast, tends to favor subdividing the totality of the work (which can be very complicated) into many small and more narrowly focused tasks that are simple, predictable and repeatable, and then investing a lot more into optimizing the handoffs that result. At the extreme end of this tendency is highly orchestrated mass production, characterized by high volumes, low

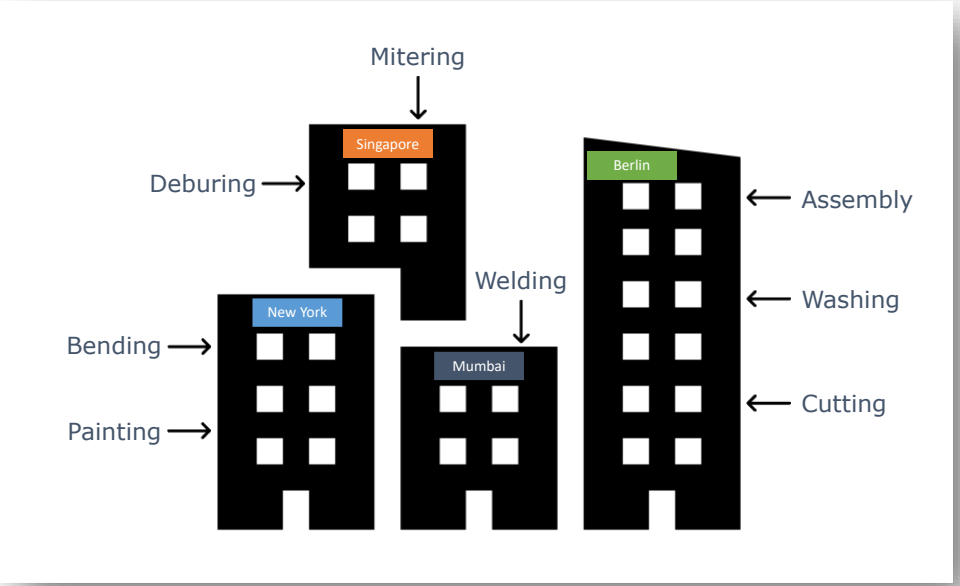
costs, and lesser quality (potentially in terms of durability and reliability, but definitely in the sense of it having hand-crafted, bespoke qualities).

If you've worked in a chaotic (non-Lean) factory operation, it may seem that factories don't invest much in coordinating the end-to-end work, but, at a basic level, they do. For any given process, it is not usually left to chance where or what the next process step is. Nor is it usually random who should work on what and when. Some sort of conveyance system dictates the routing of the work and these decisions are designed into the layout. (Factory workers don't simply email their widget-in-process to ten different people hoping one of them might be the person who needs to work on it next). Henry Ford's assembly line was born out of a desire to design a factory's production system in such a way that the various component parts of a finished product could all come together in a well-orchestrated sequence. For Ford, this delivered faster production rates with the same quality (or better) and with less per unit labor costs. He had such runaway success that nearly every factory started to copy his model. Such lines have become so commonplace nowadays that we take them for granted…at least in a factory.

Not so much in offices. Office workers, connected electronically, rather than by the spatial proximity demanded by the production of physical goods, often work at large distances from each other. They might be down the hall, on a different floor, in a different building, or in a different city or country. Even when two office workers are nominally "co-located" with desks near each other, one or both may be working from home (or the airport, or the coffee shop). Office workers enjoy much more freedom and flexibility in terms of deciding where, and when, and on what they work.

Relatedly, office workers, even when they are located within the same building, also tend to be physically clustered by functional team (leader-centric) rather than by value stream or product family (customer-centric). Factories do the same thing (cutting is in one area; welding is in another), but everybody in a factory is at least co-located on the same floor and under the same roof. In offices, the functional separation is exacerbated by the electronic conveyance of work. Therefore, all the accountants sit together in the accounting team and all the data analysts sit together in the data analytics team—on different floors, buildings or time zones—even though the data analytics team electronically hands-off the financial data to the accountants. Isolated in functional teams, distant from the process steps immediately upstream and downstream from them, office workers have to make a deliberate effort to connect and collaborate with their colleagues in different areas. Despite the widespread availability of software tools to collaborate remotely via Wi-Fi, it is not the normative culture to do this. Org structures and performance measures are typically designed to reinforce functional isolation, not collaboration. As a result, office workers often have only the vaguest idea of who sends them their work and, after they are done with their portion of it, where it goes, who consumes it, when it is needed and what purpose it serves.

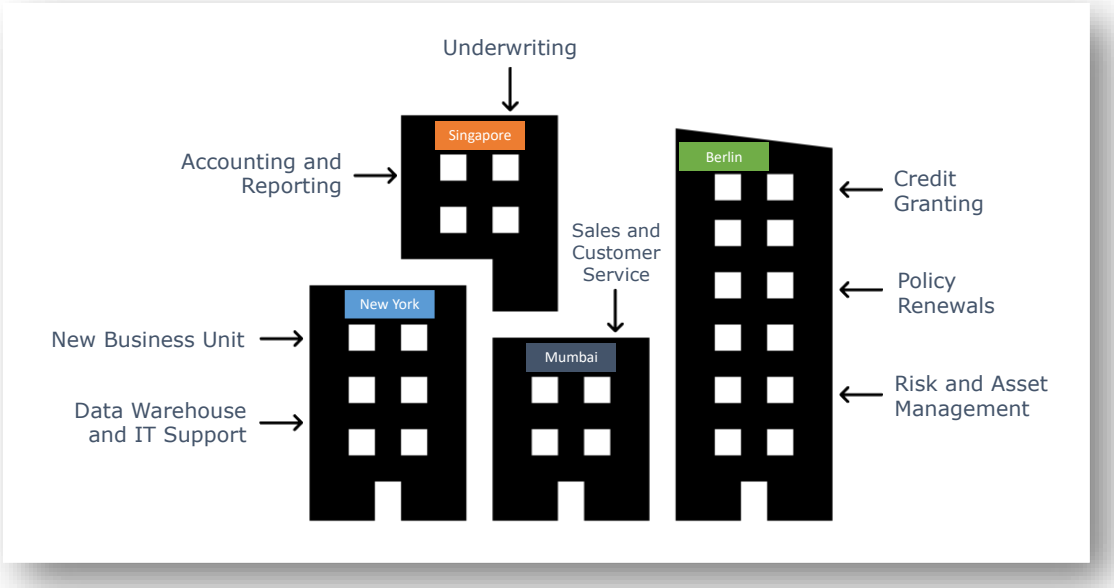
Figure 2: If a bicycle manufacturing process were physically distributed like an office process



This brings us back to the division of labor and the conventional breakdown of manufacturing processes into much smaller component tasks. This breakdown only functions effectively as a work system when the individual processes are tightly linked together, mitigating the problems inherent in handoffs.

Offices, trying to "rationalize" the work, tend to make the mistake of dividing up their work in the same way as factories do, thinking that it is the division of labor, instead of the coordination of the larger system, that is the key to the greater productivity found in factories. Office leaders will organize teams into narrower and narrower functional areas of expert specialization (e.g. environmental risk assessment for gold mines in Peru; contractual law between private and public sector entities in Southeast Asia; analysis of bond yield risk curves denominated in Euros). On the other hand, and unlike factories, offices usually overlook the necessity of a tightly coupled process design to make the completion of the work from beginning-to-end efficient. In other words, offices tend to industrialize their operations in terms of a division of labor, privileging individual specialists, but then neglect to organize it with anything close to the deliberate structure and coordinated timing found in almost any factory design for the last 100+ years. Office processes are hopelessly ill-defined. Hence all but the most urgent office work sits in invisible, digital queues for unholy amounts of time.

Figure 3: How a global insurance company might be organized



Since most office workers are highly educated and capable of learning and performing a diverse range of tasks, they would be far better off being more generalized in their skillsets, allowing them to do more of the end-to-end work as they can on their own, to minimize the number of handoffs. What they might give up in terms of mastery over a single specialization would be more than compensated for in the time savings gained (by them and their customers). It would also give them a wider breadth of experience, which creates more opportunities for career progression.

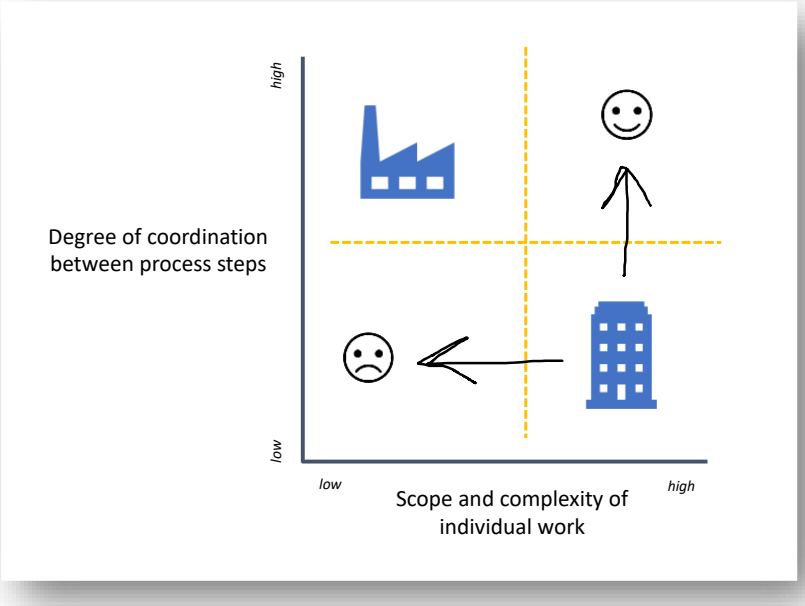
Consider how we organize IT helpdesks, for instance. We put relatively inexperienced, entry-level employees as the first point of contact. These people may excel at communicating well with customers but can't actually solve most of their customers' problems. For anything that requires more than a simple restart (the tried and true "unplug it and plug it back in" method), a ticket needs to be logged in the ticketing application, and it then disappears into a black hole of an electronic queue for the IT engineers to look at…someday, maybe. Replacing the point of contact people with "chat-bots" does nothing to improve this state of affairs and may actually drive up costs when dissatisfied and frustrated customers crash the other, non-bot channels to resolve their problems.

The management logic behind IT helpdesk design is "put the right work in front of the right people" (i.e. divide labor into narrow specializations for the sake of factory-like "efficiency"). The front-end has "customer service" skills (e.g. friendly, outgoing, pleasant tone of voice, patient listeners, positive "can-do" attitude, etc.), while the engineers have the deep technical skills but do not relate well to humans outside of their Dungeons and Dragons club. Yet, when you think about it, there is not much "service" in having to wait a geological age to have one of your most business-critical tools repaired. What customers of the IT helpdesk really want is a quick resolution to their IT problems (cheerful service is nice but not crucial). To accomplish this, you put the engineers on the frontlines and do away with the front-end customer service people (don't fire them: train them to be client-facing IT business analysts). The engineers fix

the problems right away, as soon as you contact them, start to finish, even if they lack a cheery tone of voice. No handoffs (i.e. tickets), smaller or non-existent queues, and massive productivity gains for everyone.

Of course, there are professional specializations that are not easy to combine. Database analysts cannot do the work of lawyers, and lawyers cannot do the work of actuaries, and actuaries cannot do the work of database analysts. At least not in the short-term. So, in these cases, when handoffs are absolutely, positively unavoidable, a tightly coupled structural design to the workflow—*just like a factory*-- is needed. Handoffs have to be scheduled and there has to be fluid, clear communication between a specific employee (the "supplier") who is responsible for producing the work by a certain deadline, and to a certain standard, and the next specific employee (the "customer") in the value stream who is responsible for receiving it.

Figure 4: Offices should focus on the coordination of their processes more than on the subdivision of tasks.



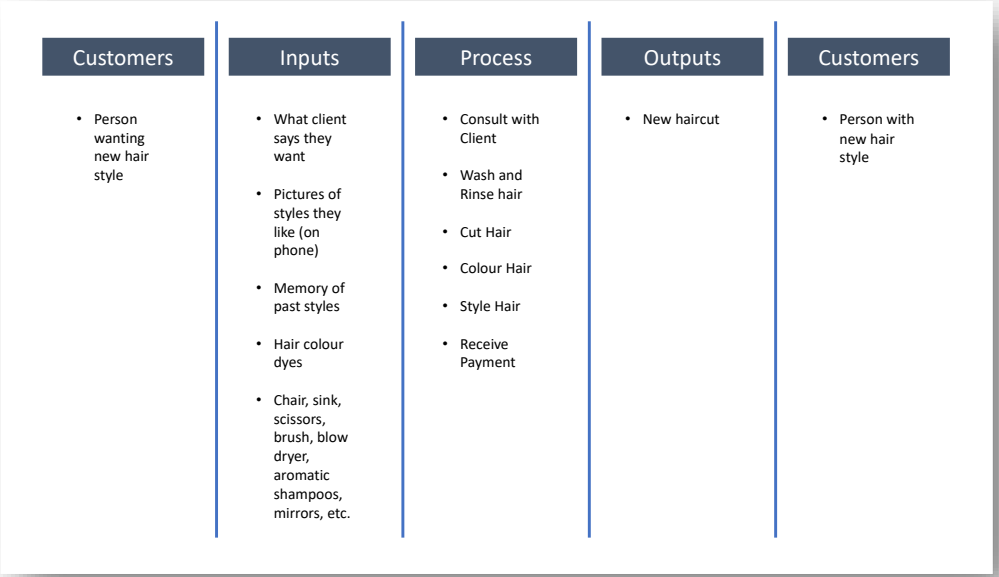
Lesson #6 Don't Divide Labor Unless Absolutely Necessary: In offices, don't encourage the division of labor into narrow and repeatable tasks, as would make sense in a factory. Eliminate the handoffs first. Secondarily, where handoffs are inevitable, strengthen the connections between process steps. This strengthening has both a social and a technical component to it: social in the sense that we have to increase the interpersonal collaboration between functional processes; technical in the sense of establishing a common timing and prioritization scheme across functional areas—and having the discipline to adhere to it. There are many, many opportunities in offices where people can be cross-trained to do a wider scope of tasks than what they are currently doing. This not only develops people's abilities and skills but also improves productivity and delivery times by reducing the delays inherent in those pernicious handoffs.

CUSTOMERS ARE SUPPLIERS

As mentioned in Lesson #5, services are made to order. Starbucks does not have a bunch of pre-made mocha-green-tea-caramel-half-sweet-extra-hot-no-whipped-soy-milk-chai-lattes sitting on a shelf, waiting for you to come in and order one. They make it for you, when you order it, and they endeavor to make it just the way you like it (and they can charge a premium for it). Similarly, when you need a mortgage, the bank creates one that is customized to your situation. There are a lot of standardized components in both mortgages and Starbucks' coffee concoctions, but ultimately these standard component parts are assembled and configured on demand to create a customized product for you, the consumer. Most work that is done in offices is service work. HR, Accounting, IT, Legal, Marketing and Sales are all services rendered to internal or external customers. A government's administration of social assistance benefits, tax refunds, and parking permit applications are all services too. Banking and Insurance, Media Relations, Project management are services. The list could go on and on.

In services, as with physical products, the quality of the output has a lot to do with the quality of the inputs (or, to put the more familiar angle on it: "garbage in, garbage out"). But unlike with make-to-stock physical products, services receive a lot of their inputs (aka information) from the end-customer. And customers, being humans, are highly variable: they often don't articulate what they want very clearly or directly; they change their minds; they get confused; and they can make honest mistakes when supplying firms with information. This variation causes additional complexity in service businesses. Conventional tools like a SIPOC (Suppliers-Inputs-Process-Outputs-Customers) and Value Stream Maps tend to reinforce this notion that work is linear and not circular. In office/service work, the former tool should be renamed CIPOC.

Figure 5: A "CIPOC" Diagram for Getting a New Haircut



When the customer is also the supplier, this changes the relationship to one of co-creation, and service firms are challenged to reduce the complexity of incoming information. This is because service firms cannot bluntly ask their supplier-customers to conform to their needs. Hair stylists cannot specify what style the client chooses, nor tell them when they might want to have their hair styled again. Manufacturers, in contrast, often have some degree of control over their suppliers, although how much control depends a lot on their "buyer power" within their industry. But at least there is a clear delineation on who is the customer and who is the supplier in the relationship. Most "customer" firms can at least try to negotiate more favourable changes in the timing, quality, quantity and/or price of purchased materials to suit their production needs and market demands.

Further, when you are producing customized work and have hybrid customer-suppliers, they often need to be consulted at various stages of the value creation process, not just at the beginning. These frequent customer feedback loops are vitally important, but also introduce uncertainty and variability. The work that happens in offices, because it is to order and customized (to a greater or lesser extent) is much more akin to the new product design and development stage of physical production, rather than manufacturing operations.

For instance, if you're an architect designing a house with a client, you not only need to have an initial consultation with a client to understand his or her aesthetic vision and practical requirements, but you also need to show the client the drawings at many points in the design process, to get feedback on what they like and don't like. You also need to consult with engineers, regulators and other stakeholders to ascertain if what the client is asking for is legal, feasible and within their budget. This is the same as when you are designing an airplane for a specific client or client segment—as the lead design engineer, you seek out what the client wants

and doesn't want through an iterative discovery process of sketching, prototyping and frequent feedback. This is the same reason there are lots of mirrors in hair salons.

Raw materials just don't change their minds the way the client is going to change his mind about certain elements of his house design. As the architect, you plan on the client changing his mind. You count on it. That's just how humans are. When the client first met with you to discuss the house project, he specified he wanted an indoor porch on the *side* of the house, but, now that he sees the drawing, he feels strongly that it should go at the *back* of the house. This now introduces a whole new series of problems for you to resolve, but since it is still in the design phase, you can redraw and reimagine the design without a lot of extra cost to the customer. Yes, your extra time will cost more, but it's far less expensive to change now than when the concrete foundation has already been poured. Frequent feedback is vital to ensuring client satisfaction and avoiding disastrous rework. This is why one of the key values listed in the agile manifesto is "Responding to change over following a plan." It could be rewritten as "responding to fickle human supplier-customers over following a plan" and retain the same meaning (although the word "change" sounds much nicer). When you're in the process of building the house-- or manufacturing the airplane-- the window installers are not calling up the client directly and asking, "would you like casement windows or double-hung?".

Creators of new products and services have benefitted immensely from this Lean practice of PDCA (plan-do-check-adjust) iterative development, which—perhaps ironically-- comes primarily from mass manufacturing context of designing and redesigning operational processes for the purposes of improving them[6]. One encounters this "rapid iteration" and "rapid prototyping" language now in the context of industrial R&D and design (Design Thinking), start-ups (Lean Start-Up), and in software development (Agile-Scrum). All these methodologies involve gathering feedback from customers early and frequently, to learn what works and does not work, or what adds value and what doesn't, while minimizing costs and risks.

Lesson #7 Don't Think of Soliciting Customer Feedback as Non-Value-Added Work: Frequent customer communication is a defining characteristic of service work. Don't consider seeking out additional customer information as necessarily being wasteful rework (it can be waste, however, if you don't know what you're doing). Soliciting and interpreting customer feedback is part of the value creation process. It's a feature, not a bug. The process maps of office processes have many back-and-forth arrows, representing frequent communication and feedback, connecting the customer to various stages of the "production" or service delivery process. If there is a need to get more information from customers mid-process to, say, clarify a special situation that *could not have been anticipated earlier*, this should not be considered non-value-adding rework to be eliminated, but effective communication (and good service) that is vital to the process.

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[6] It is generally ascribed to Walter Shewhart, who worked at Bell Telephone and Western Electric Company. While W. Edwards Deming popularized it (including within Japan in the 1950's and 60's), it is still known as the "Shewhart Cycle", although sometimes written as PDSA, where "Study" replaces "Check". See https://en.wikipedia.org/wiki/PDCA

Lesson #8 Don't Over-Standardize the Timing of Work: Imposing strict "takt time" metrics of serving a customer every so many minutes is not realistic nor desirable. Just as you would expect a doctor to spend more time with patients with more serious ailments, and less time with those who have only minor ones, services need to absorb the wide variety of customer demand, not conform to a standard or average "cycle time". People are not widgets and their needs cannot be determined in advance. And, further, unlike with "pure" suppliers (i.e. those who are not also customers), a service business cannot leverage the traditional customer-supplier relationship to insist that they (the customer) respond within a given time frame or it will ask a competing supplier to provide the information instead. You can nudge customers with polite reminders or subtle incentives. You can cultivate good relationships to promote better collaboration. But, ultimately, in competitive markets, the customer is king, and you just have to wait until they feel like getting back to you.

Lesson #9 Don't Over-Standardize the Content of Work: Related to both #7 and #8, don't try to standardize everything in minute detail. Standardization in services is not as simple as furnishing meticulous engineering specs to suppliers or workers and then saying, "produce to spec or else…". So long as there are customers involved in the co-creation of a product or service, you should expect that there will be much more variation in the process—in terms of timing, specifications (quality), and customer experiences. Not all of it can be remedied with a higher degree of standardization (although some of it certainly can—and the wisdom to know the difference makes a difference). Furthermore, office workers require and expect a greater deal of autonomy (see Lesson #12 below) in order to respond to varying customer needs. Knowledge workers do not derive any increase in job satisfaction from an overly prescriptive work environment, even if they are allowed to create and modify the standards themselves. The bottom line is that a lot of office work is far more variable than mass production and needs more flexible standards. The complexity that results from this variation can (and should) be managed, but it cannot be entirely eliminated through standardization or any other means.

COMPLEXITY

Complexity is, by definition, hard to define but David Snowden, a renowned complexity thinker, lists the following characteristics of complex systems[7]:

- They contain a large number of interacting elements.
- They manifest disproportionate ("non-linear") causes and effects, where small changes may have big impacts and vice-versa.
- They are dynamic, ever-changing, where the whole is always greater than the sum of its many parts.
- They are emergent: that is, they can only be fully comprehended in hindsight. Complex problems and their solutions emerge over time, meaning comprehensive solutions cannot be specified in advance and then imposed on a complex system (one can try, but it would be ineffective…and will always carry un).

[7] Snowden/Boone "A Leader's Framework for Decision Making" Havard Business Review, Nov 2007: https://hbr.org/2007/11/a-leaders-framework-for-decision-making

- Complex systems have a history and their past is intertwined with their present state. The present state is always evolving, and this evolution is irreversible.
- One cannot predict or forecast the future with any accuracy, since there is constant change. In hindsight, one may be fooled into thinking that the system appears to behave in an ordered and predictable way, but this is cannot be used as foresight (again: one can try, but it would be ineffective).

Yes, but so what? These characteristics can apply to *all* companies, to a greater or lesser extent, because all organizations are complex adaptive systems. The larger they get, in general, the more complex they become.

There are many things that drive complexity in workplaces, but at least one tends to stand out in offices: their IT systems. Of course, factories have IT systems too, but their primary tools of production are not IT systems. Factories use IT to move around information about the work, but not to do the work. In an office, information is the work and IT systems are the primary tools. And the volume and speed at which data travels throughout this network is not comparable to the volume and speed of movement of parts in even the most complex of factory settings. The network ties every computer to every other computer in the company in ways that only a few expert-specialists understand. In other words, it's very dynamic and there are a lot of interacting parts—far too many for any single human to grasp. (The same, it should be noted, is true for factory operations. The distinction is one of merely scale and volume).

If the network underpinning a large bureaucracy goes down, there are a lot of repercussions in many distant areas of the business. If, let's say, the finance and accounting system goes down within a given firm, it may impede, if not totally shut down, a whole variety of functional capabilities beyond the standard management accounting reporting: receivables (including customer payment systems), payables (and the related banking systems), sales reporting, ecommerce, point of sale terminals, payroll, inventory management, procurement, and potentially many other capabilities. It is the same with any of the big, multi-tentacled functional systems, from the HR system to the Sales system to the Project Management system.

Of course, in manufacturing, if one vital machine goes down it will bring the whole line to a stop too, so industrial machines are interdependent too (increasingly so as processes become more automated). What is different is that each piece of equipment has a distinct function (stamping, cutting, forming, etc.) and each is functionally and mechanically disconnected from the other (i.e. the stamping machine is not physically or electronically linked to the cutting machine). If one mechanical machine fails, it may take specialized engineers a lot time and expertise to fix it—industrial machinery can be complicated-- but it is relatively easy to pinpoint which machine it is (the one that doesn't work) and what impacts it is having to the business (labour and material are idle; the production of customer orders are being delayed).

In contrast, in office environments, large technology systems serving many end-users in different functional areas have so many far-reaching, invisible interconnections that problems can be very difficult to diagnose and fix. Of course, good IT organizations build in lots of redundancy and have governance, monitoring and maintenance routines to ensure big disasters do not happen very often. Nonetheless, small and easy-to-overlook events (e.g. one misplaced character in a

line of code; a customer upgrading their browser; a power surge in the electrical grid) can sometimes have large effects, and it may take small armies of technical experts to find and diagnose the problem, and then create, test and deploy an effective solution.

The highly interrelated nature of IT systems means that each time a major fix or enhancement has to be deployed, the IT engineers have to do extensive regression testing—to ensure that the changes they are making to fix the immediate problem, or enhance the existing system, do not inadvertently cause other problems in the many connected systems. They need to make sure that the cure is not worse than the disease. While this applies equally to Material Requirements Planning (MRP) software, this does not happen with mechanical equipment. If the drilling machine breaks and is then subsequently repaired, no one has to go see if the paint machine has been affected by the fix.

IT complexity, while to some extent a fact of life, is also, to some extent, within a firm's control. Office workplaces should not be proud of being imprisoned by an overly complex IT architecture of their own making[8]. If IT systems were not so entangled, it would be much easier to fix or enhance them faster. In the recent IT business novel, *The Unicorn Project*, author Gene Kim illustrates this with a story about a band of rogue software developers and testers who decouple a specialized piece of software (which helps Marketing bundle deals based on consumer behavior and inventory levels) from a larger enterprise system. This simplifies the IT landscape they must work in, allowing them to enhance the software faster and more effectively without all of the bureaucratic futility of having to solicit and gain approval from every functional area of the business. Marketing (spoiler alert) is then able to increase sales and diminish excess inventory at the same time, heroically saving the company from financial underperformance.

Lesson #10 Information Systems Are More Complex than Mechanical Systems: IT systems are the industrial machinery of office work. But these IT systems are inherently more complex than mechanical systems. Therefore, Lean manufacturing consultants should be careful not to assume that the tools and methods that worked in improving the performance of simpler (but still complicated) mechanical system will work in an IT environment. In a highly complex situation, an 8-step A3 problem-solving method or asking why five times in a row may not lead to the one singular underlying root cause, nor will it lead to a swift and permanent singular solution. Solutions to IT problems often emerge only after much trial and error to find the cause of the problem.

That said, IT can benefit a lot from taking simplicity lessons from Lean manufacturing. By simplifying its IT architecture and decoupling bloated software applications from other bloated software applications as much as possible, a firm can more easily implement maintenance, repairs and enhancements. Continuous improvement means continuous simplification. But don't assume this is going to be easy or even, in some cases, possible. Complexity is hard to disentangle.

[8] I once knew a CIO who, when I asked him why a particular data warehouse was frequently failing, would use complexity as a defense and an excuse for inaction: "There are 221 separate data-marts in the warehouse, so you never know which one is going to fail…and so it's virtually impossible to ensure none of them ever goes down."

EMERGENCE

Another salient aspect of complexity, emergence, accounts for a great deal of variation in office work. Specifically, and as mentioned above in Lesson #8, this applies to the duration of the work varying with the differing needs of customers: how long the job will take does not lend itself easily to prior estimation, but instead *emerges* over time as more information is discovered. Factory work, usually being repeatable, can be timed and predicted with a certain degree of accuracy. I can know approximately how long it takes an average worker to deburr a length of a cut metal pipe. I can then predict with reasonable accuracy how many pipes can be deburred per hour, day, week, month and so on, at least under normal conditions.

Much office work is far less predictable, even under normal, stable conditions (i.e. there is no war, market collapse, natural disaster or global viral pandemic disrupting business operations).

Consider a simple versus complex lending example. When taking out a loan, for instance, your banker needs to know what your financial situation is: what the total value of your assets is; how much income you have coming in; what your liabilities are; and how likely are these things going to change for the worse or better over the lifespan (tenure) of the loan. If all of this is straight-forward, within the pre-specified parameters, you can be approved for a loan fairly quickly. And this probably happens 80% of the time. If you have exceptional circumstances—say, you're technically unemployed and do not own a home, but live on a yacht and live off the investment income you derive from a personal portfolio of $10 million in international securities -- your banker will have to think a little more about it…but *for how long* should he think about it? Should there be a fixed standard for the 20% of exceptional cases?

Now imagine you are a banker trying to make a credit decision on a larger scale, such as issuing debt financing to a large, multinational corporation that has subsidiaries in various countries and there are rather opaque legal relationships between some of the various subsidiaries and the parent company. There are now myriad types of assets, liabilities, and cash flows to consider, as well as all the risk factors (commercial, macro-economic, political, legal, environmental, etc.) pertinent to where and how the company does business. The magnitude is in the hundreds of billions of dollars. The potential borrower wants to have the debt issued to its subsidiary in Indonesia, not the parent company (located in some other country). While the parent company is fairly solvent, the business in Indonesia, that mostly makes component parts for another subsidiary in Lithuania, is not. If the Indonesian entity defaults on the loan, would the courts decide that the parent company should be liable for the debt? In which legal jurisdiction? Given these considerations, how much time should the banker and legal advisors think about this deal? How much analysis is sufficient to make a decision?

It's hard, if not impossible, to standardize these kinds of analyses, judgments and decision-making. And this type of complex decision-making is not the exceptional 20% of cases, such as in the more prosaic personal loan scenario above, but is the normative case 80% or more of the time for many "white-collar" office roles. In our world of infinite information, there is never enough time to analyze all the available information thoroughly. In the more complex lending example above, there is a lot of money on the line, so one would not want to be too hasty—a client defaulting on this one loan could be career-ending for the underwriter. On the other hand,

the banker cannot spend forever in "analysis paralysis". The banker's time costs her employer money, and, more importantly, the client is impatiently waiting for an answer.

This unpredictability of job duration applies not only to banking, but to many types of business decision-making. Should your company open its own office in Australia or continue to work with an agent in that market? Does the success of your new toothpaste brand in Brazil mean you can start to market it equally well in Argentina? Should you retain control of your chain of restaurants at higher cost or should you franchise them? When writing a policy to subsidize the fishing industry because of the international moratorium on overfishing a certain species, should it apply equally to fishermen who have not previously paid any income tax in the last seven years or more? Should the university invest in modernizing the Biology labs or expanding classrooms for the MBA program? The world of office work is full of decisions that have to be made under conditions of uncertainty and ambiguity, where there is only incomplete and imperfect information to base one's decisions on. And even if there were complete information (a practical impossibility: how would you define "complete"?), there would never be enough time to analyze it all. And even if there were lots of time available to do a very comprehensive analysis, the future is not guaranteed to unfold in predictable ways based on your analysis of the past in any case. In fact, the conditions of the present are always in the process of changing while we are busy analyzing the past.

This is sort of emergent complexity is not limited to office work. Any sort of tradesperson may think that the problem he is facing is simple until he looks behind the wall (or under the hood, or sink) and discovers that the situation is not as straight-forward or obvious as first assumed. What's happened is that new information has *emerged* from the situation, helping him now understand the full scope of the problem, and delaying his ability to determine a course of action in which he can feel confident. Of course, the opposite can happen too, where something that looks very complicated turns out to be simpler than one first thought.

In these sorts of situations, where we lack the time to gather all the data and lack the mental computing power to calculate the probability of every possibility and permutation occurring, we have to resort to what cognitive scientists call heuristics—the use of "rules of thumb" as short-cuts in our thinking. We use heuristics when the situation is too complex to use algorithms—when we cannot just pick up the manual and follow the instructions (what Lean manufacturing would call "standard work"). Unfortunately, heuristics are prone to a lot of bias and error. To mitigate this, taking the time to seek out a diversity of opinions is not a waste of time but a valuable ritual. Don't make complex decisions alone!

Lesson # 11 Office Work Is More Variable In Terms Of Type And Duration: As much as leadership might dream of controlling the pace of work and being able to predict the duration of tasks as much as a Lean factory can, you cannot standardize all office work, nor should you try. This is an echo of Lesson #9. It is important to recognize and respect that some office work will be highly variable and require decision-making under conditions of ambiguity and uncertainty in which new information will emerge over time, every time. Simply put, some pieces of work take longer than others. Forcing such work into standardized time frames, such that employees are expected to complete a fixed number of decisions per day or week, will sub-optimize some decisions, due to their being rushed, and overly delay others.

That said, standardization should not be thrown out with the bathwater. In many complex situations, there are repeatable and routine elements that can and should be standardized. Like where one sources, stores and retrieves certain types of information, or using standard routines for decision-making such as convening a diverse group all together to give their thoughts in real-time, or having up-to-date risk policies that delineate lines that can and cannot be crossed. Lean manufacturing teaches us to break down large, complex pieces of work into smaller modules, and then standardize what we can. The trick is to find a balancing point between *enabling* standards, that help speed up better decisions, and *constricting* ones, which don't. This balancing point will be different in an office than in a factory. Fortunately, there is a standard method to find such a balancing point: humility, open-mindedness, and trial and error— i.e. relentless experimentation, learning and adjustment.

CULTURE

Offices typically have a *laissez-faire* management culture. That is, managers have a very hands-off approach. They do a bit of strategic planning with the team at the beginning of the fiscal year, set the annual targets, and then leave people alone. They check-in to do individual performance reviews once or twice a year—and usually they are so unpleasant for both parties that leaders do these only because HR demands that they do so. There is a sense of entitlement to professional autonomy on the part of employees, and this is honored by their leaders because it seems to suit both parties: you leave me alone and I'll leave you alone. The ruling philosophy is HSPALTA[9]: Hire Smart People and Leave Them Alone.

Factories, in contrast, tend to be more overtly command-and-control. It is not out of place in many factory settings for a supervisor to inspect the work of subordinates and raise his voice on the shop floor. Supervisors can be more direct in telling workers what to do. In most offices this would break the decorum of stiff-upper-lip professionalism. Instead, there are closed door meetings where unambiguous directions (threats, orders, ultimatums) are given to employees, but rarely do voices get raised out in the open-concept beige savannah of the office workplace.

Of course, command-and-control is not conducive to a establishing a Lean culture any more than *laissez-faire* is. But if senior leadership of a manufacturing company genuinely decides to dedicate itself to a Lean transformation, it is much easier for management to transmit Lean thinking to shop floor workers through top-down coaching and mentoring, since there is far less expectation of personal autonomy on the part of most factory employees. They do not want to be told to think differently, but they will accept that their superiors may try. If their superiors approach it with respect and humility, they may open up to it.

Office workers in professional settings, on the other hand, all have post-graduate degrees from brand-name post-secondary institutions, and the idea of being coached into "thinking differently" is anathema to them. They have always been under the assumption that they were hired for their brains (not their hands), and that they must have already possessed all the thinking skills

[9] This term is taken from Thomas H. Davenport in his book *Thinking for a Living* (Boston: Harvard Business Review Press, 2005).

necessary to do their job effectively-- or *why else would they have been hired?* And *why else did they invest in so much expensive schooling?* This sense of entitlement to an insulated intellectual autonomy (i.e. an unwillingness to learn a new way of thinking) is even more acute when dealing with people in higher pay grades and with bigger titles.

There is also a snobbish rejection of anything that smacks of blue-collar culture in an office full of highly trained professionals. No one will admit it openly, but they look down upon factory workers. This could be because their grandparents (and perhaps their parents too) labored hard in factories so that they would not have to. It could be that they invested so much money and effort into post-secondary education that they feel entitled not to have to work in a factory—they feel they are smarter than a hired set of hands and deserve to work at more intellectually challenging work. It could be purely status-seeking snobbery. Whatever the cause, Lean is generally perceived as "a manufacturing thing". Even in Lean manufacturing businesses, those who work in the office will tell you that "Lean only applies to the shop floor". Even Toyota has been inconsistent in its application of its legendary management system to its office processes[10].

Lesson #12 Respect the Need for Greater Autonomy: Introducing a Lean transformation in an office requires an approach where the sense of professional autonomy that office employees desire is not violated. Leaders are better off setting a challenging direction or target and letting office employees figure out how to get there through experimentation and innovation and creativity. Leaders should proactively support the team—so no more *laissez-faire*-- but they should also allow them plenty of space to "self-organize" as Agilists would say. If the employees themselves determine that they need to make visible and standardize some aspects of their processes in order to meet the goal, then they will have arrived at this conclusion themselves and will not have had it imposed on them. The standards are thus more likely to be effective because they own them.

CONCLUSIONS:

Lean has both a social/human side and a technical side to it. On the technical side, one has to translate and adjust the methods and tools to be effective in an office environment. On the social side, the work environment plays a far less important differentiating role. People are people, wherever or however the work happens. One tends to find in all workplaces the following human needs in all employees:

- A sense of purpose: a reason to care about the work, supporting your colleagues, helping customers and making the world a better place through your labor
- Personal growth and development, which often means being challenged by a coach/mentor to stretch to become more than you think you can be and achieve more than you thought you could ever achieve.
- A sense that all individuals are treated fairly with a great deal of trust, respect and appreciation

[10] https://www.shmula.com/Lean-office/8044/

- A sense of daily incremental progress towards bigger, more meaningful goals
- Clear expectations and sense of direction.
- An ability to improve one's work using one's own creative and innovative ideas.

Lean is, in part, about the humanity that we all share in common, regardless which work environment we might work in. So, when you hear Lean manufacturing gurus say that Lean applies everywhere, they are, in some ways right…and also wrong!

To summarize the differences, offices are places where the work:

1. Does not have physical safety risks
2. Uses a different vocabulary
3. Is invisible
4. Has no direct inventory costs
5. Has huge indirect inventory costs brought about by multi-tasking
6. Is often sub-divided into functional islands without any corresponding coordination between them.
7. Involves a form of co-creation with the customer
8. Cannot be paced or scheduled with great precision
9. Cannot be overly rigid in its work content specifications
10. Relies more on highly interconnected IT systems, which add complexity
11. Varies more in type and duration, and which cannot always be predicted in advance
12. Takes place in a culture where professional autonomy is valued more by employees

In this paper I have emphasized the differences I've observed in office environments because office processes—plainly and simply—are a mess. I want to help harness the great potential of Lean manufacturing and apply it to office work.

In most offices, very little process improvement has ever even been attempted in any kind of serious way. Because of the *laissez-faire* office culture, there is no perceived need to even examine or scrutinize processes (after all, that's a "shop floor" kind of thing). As a result, processes grow organically, like mold, over time, rife with workarounds, chronic firefighting, shadow projects, asynchronous handoffs, dysfunctional technology and an excessive and convoluted need for approvals and controls. Typically, there are no basic standards, no shared priorities, no explicit pathways for routing work, few or no process measures, little awareness of who the customer of the process is, and even little knowledge of the purpose of performing the work in the first place. Processes are very loosely and haphazardly coupled together in an office. This, of course, creates great complexity…but much of the complexity is of its own making, simply due to ill-defined processes.

For instance, many office workers will say their work is "variable" (although they'll use different words) because they handle multiple processes from multiple business units. This is true. Management loves to think in "economies of scale" and consolidate functions, so that there is, say, one central "payment center" where all receivables and payables are processed. This applies equally with "centers of excellence" or "service hubs" or "shared service centers" that consolidate many functions of HR, IT or Procurement. There is nothing inherently wrong with

these central departments, but it's the office equivalent of having multiple product streams (or "lines") all feeding the same machine in the middle of the plant. The machine has a known, fixed capacity, and so decisions have to be made about how much of each product, and in what sequential order, the machine will process the different widgets.

A payment center, also, has fixed capacity, but no one knows what that capacity is or should be. And when multiple invoices or purchase orders come in from various departments or vendors, there are few, if any, rules about which takes precedence over the others, and for how long, or in what quantity. Usually the priorities are determined by the rule of "the squeakiest wheel gets the oil", and this, of course, promotes and encourages a lot of "squeaking": politics and hallway deal-making and sweet-talking and expediting and plain, old-fashioned yelling and coercion. Not the best use of resources. Each department or vendor has no idea how many other departments or vendors also placing demands on the same people, because the queues of work are hidden, and teams are physically separated from their upstream and downstream value stream partners. The employees in the payment center are so busy dealing with the abusive calls and status-chasing emails that they have less time to actually do their work—and they become demoralized. And the backlog gets worse. And then people start to quit…

There is a simple solution to this. Establish prioritization rules (which might be as simple as first-in-first-out), allow very few exceptions, continuously measure the volume of work (in and out) over time, make these priorities and measures 100% transparent and visible to the entire corporation, and stop paying attention to all those emails and phone calls. Also stop everyone from working overtime (which goes unpaid in most offices). This immediately defines the center's true productive capacity and allows for the estimation of lead times. If these lead times are unacceptable to the business, then everyone now knows something that they did not know before: more capacity has to be added (in the form of more people, automation, or—best of all—process improvements). But without knowing the capacity of the center, the demand volumes, or being able to see and measure the work, no one can know if and when capacity needs to increase or decrease, either temporarily or permanently. It's just a never-ending, vicious circle of backlogs and chaos that demoralizes employees, frustrates customers, and costs the company money.

Ironically, the chaos is then used as a shield against Lean: "Our work is too complex! You can't improve it!" This has all the logic of rolling in the mud and then saying, "no, we don't need your new laundry detergent, we're too dirty!". Such is the quirky and bizarre nature of humans. Lean truly *can* tame the self-imposed chaos, but it has to be presented in an office-friendly way, striking the right balance between autonomy and structure.

Done the right way, Lean offers a great opportunity to change office work for the better.

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