Improvement Triad:
Processes, Products, and Management Practices

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Abstract

Improving business performance occupies the attention of many executives. On their own, three common areas of focus for improvement - improving processes, product design, and management practices - provides for a good return on the investment. However, the solution is not one program or another. Each focus has a different scope of influence and a different time horizon for returns. When exploring these three areas for improvement together, what emerges is a better understanding of how they interact and work collectively for the betterment of the organization. Collaboration and communication between groups with special skills and interests is the start of a whole new level of improving business performance.

Introduction

Many business leaders search for ways to improve their organization through an internally focused improvement effort. Three general areas capture much of their attention. First is how a product or service is delivered; second is how the product or service is designed; and third is how management is practiced. Working together these three areas create an improvement triad.

Every organization must make a contribution to society in one form or another. Many businesses define their societal contribution as fulfill a customer's need, now and in the future; stay in business; and provide jobs. When done correctly an organization can succeed in the short term. However, long-term success requires a dedication to constantly scan the environment for new opportunities, predict future customer needs, and find new ways to provide products and services.

How does a company start making improvements? Intertwining product requirements, efficient processes, and human behavior into an approach for improvement is difficult. Popular thinking advocates two approaches for implementation inside the organization, *Bottom-Up* and *Top-Down*. Each approach has special commitments and produce results at different speeds.

Bottom-Up approach normally begins with improving production, creating quick results, both in the short-term financial health of the organization and to the operational efficiency. Financial returns can be verified relatively quickly and are quantifiable.

The caveat of focusing on the Bottom-up approach is that other inefficiencies in the organization remain hidden. Inefficiencies, that if improved, would provide greater financial returns.

Top-Down approach addresses management practices, the infrastructure of the organization, the very foundation created to support all efforts. Management practices address how people interact with each other, the system and environment. The Top-Down approach is a difficult route and the benefits take longer to become visible. However, the benefits are far greater. The scope of change is broad. The separation between cause and effect is vast. Visible effects are subtle. Correcting inconsistencies between policy and strategy is time consuming and sometimes gut wrenching. Adjusting behaviors to new practices takes time and practice.

Improving product or service design is one area not normally considered in the Top-Down, Bottom-Up discussion. Design is one area that provides a balance between effort and benefits. Improving design defines how to satisfy the customer's current needs differently from what is currently offered.

Let's explore the various considerations of improving production, design, and management practices in more detail.

Process Improvement

Efficiently providing products and services consists of an overwhelming number of factors. Requirements are imposed from multiple sources, each with their own needs and wants, and ramifications going far beyond the immediate area. As requirements are cascaded through the organization, the requirements are translated into actionable items. To the workforce, some requirements are immediately obvious with clear connections. Some requirements are obscure and not obvious.

Process improvement methodologies are created to improve operational efficiency. Each provides a disciplined approach for improving how a product or service is produced and delivered. The primary technique is to expose incongruities and assumptions, then redirect the focus of dedicated professionals.

Once incongruities are exposed and understood, people inherently strive to correct them. No one deliberately creates unnecessary work or bad quality. Most processes are created with the best of intentions, focusing on performing the task at hand, with the resources at hand, in the environment where they exist. Over time, conditions change and the reasons for the original decisions are lost.

Looking at one methodology, *Lean's* objective is meeting the customer needs, at a specific time. The focus is exposing wasteful activities so they can be removed. "Eliminating Waste" is the

phrase used. Waste is defined as any activity that consumes resources without creating *value*. Lean begins by identifying what activities create value in the product, from the standpoint of the customer. Value added activity is defined in practice by asking "if the customer would be willing to pay for" that activity. Once various value added activities are identified, non-value added activities are minimized and/or eliminated where possible. Value added activities are sequenced and linked into what is called a *value stream*. Emphasis is placed on making the activities *flow*, like a river. Efforts are turned to letting the customer *pull* product or service through the process. These make the process responsive to providing what the customer wants, only when the customer needs it. Not before, not after. With new knowledge, the process is repeated indefinitely, striving towards *perfection*, or at least adopting the mindset of constantly re-evaluating activities for improvement.

One of Lean's most powerful tools for exposing incongruities is described in popular literature as a 'value stream map' (VSM), also known by its more traditional name 'material and information flow map.' Similar in appearance to a standard process flow chart, a VSM shows
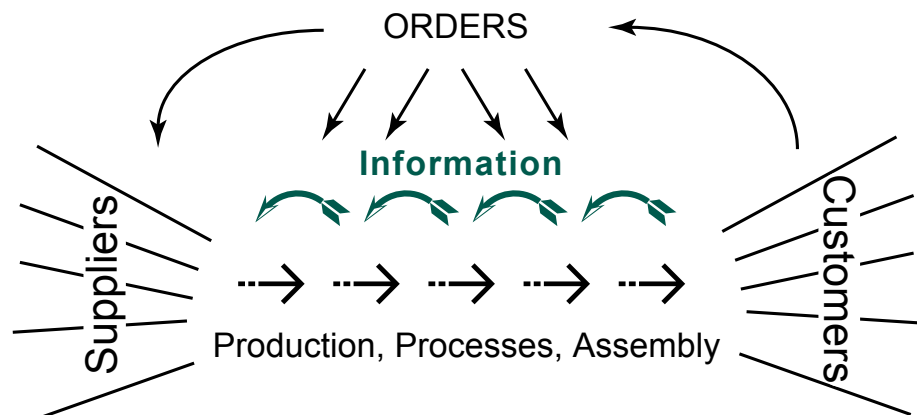

Figure 1, Value Stream Map

the product flow and includes information flow triggering each process. A value stream map is created by starting from the customer end of the process, then following the process upstream to the raw material. From a map of an existing production system, Process Improvement ideas are generated. Lean uses many tools and techniques for implementing those new ideas.

There is a striking similarity between VSM and Dr. W. Edwards Deming's 'Production Viewed as a System' diagram.[1] Both display segments of knowledge, string them together in a coordinated effort to help managers and workers understand how elements work together. Apparently VSM has its roots in the 1950's work of Dr. Deming.
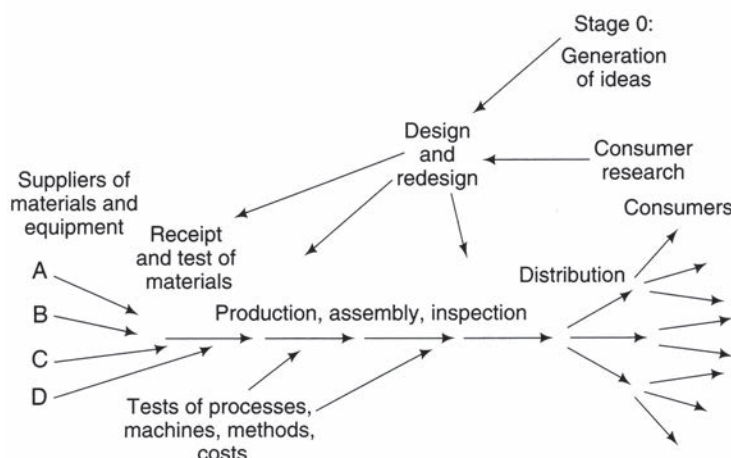
Other process improvement methodologies are available and they are known by many names. Most use a structured approach to understanding the existing conditions, generate improvement ideas, then implement changes. The scope of the

Figure 2, Dr. Deming's - Production viewed as a system

[1] W. Edwards Deming, The New Economics for Industry, Government, Education (Massachusetts Institute of Technology, Center for Advanced Engineering Study, 1994), 58. - used by permission, courtesy of The MIT Press

project changes according to the needs of management or the problem at hand. *Six Sigma* focuses on a deep dive investigation in a tightly defined project, directed towards reducing variation. *Theory of Constraints* focuses on a shallow dive into the broader scope of improving throughput from raw material to finished goods. The choice of process improvement methodology is primarily based on management and workforce acceptance.

Each process improvement methodology looks at the product or service through its own respective theories and tools. However, their perspective may or may not satisfy the current or future needs of the customer. Many process improvement activities begin by assuming the product or service is designed in the most economical way to satisfy the needs of the customer. They also assume the current product or service fulfills the functional requirements of the market and the customer. Various methodologies address product design issues after processes are defined, refined and behavior is understood. Generally product design changes are requested to facilitate efficient production.

Improving operational efficiencies increases productivity, which in turn, decreases operational costs. The time delay between process improvement and benefits is short, resulting in an improvement in the organization's bottom line very quickly. However, sustained financial gains may be fleeting, as the market is constantly changing. *A company could end up with the most efficiently produced product that nobody wants.*

Product Improvement

The design activity consumes five percent of the product cost, while it has a 70 percent influence on the final cost. On the other hand, material and labor costs can consume 65 percent of product costs, while only influencing the final cost by 25 percent. Where would you invest your capital and human resources to produce the largest return, improving the 25 percent or the 70 percent influence on product costs?

The underlying foundation of *value methodology* is to challenge the assumptions about how the product or service satisfies the needs of the customer. Customers need something *done*, they want an *outcome*. Customers don't want a *feature*, they want a *function*. After all, it is the function that creates a benefit for the customer.

Value methodology has been evolving for the last 60 years as a way to remove "unnecessary cost" from the product design before, during, and after the fact. This approach is slightly different than Lean. Many times Lean's "eliminating waste" is subject to local definition, frequently carries emotional baggage or uses a limited perspective. The value methodology approach is emotionally neutral and is a result of a study from a cross-section of business functions.

Value methodology transcends corporate cultures and uses language that goes past symptoms, to the heart of the business issue. This approach essentially separates INTENT from METHOD, creating *clarity of thought*, then builds a METHOD based on INTENT.

Value methodology studies bring marketing, finance, operation, design, customers and suppliers together to systematically explore how the product performs the function the customer needs. A particularly interesting part of this investigation is when costs are associated with functions. When everyone knows the cost

Figure 3, Value Methodology as a system

of specific functions, they make informed choices about the configuration of the product or services. This comparison can also be used as an analysis of effective implementation.
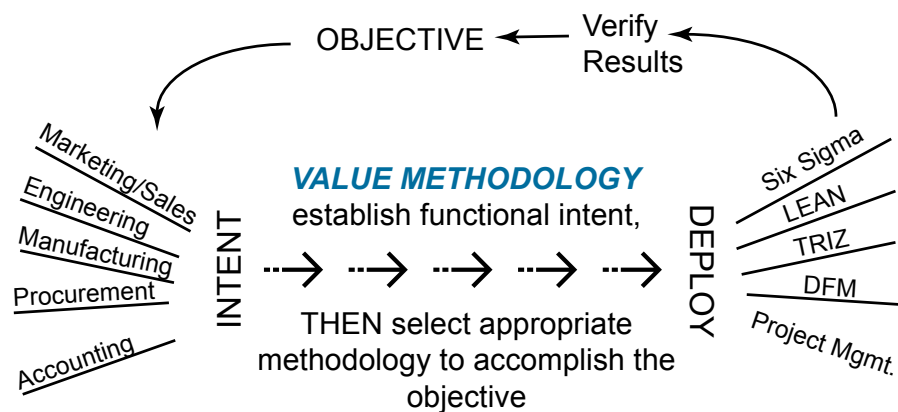
Modern day value methodology originated at the General Electric Company during World War II as *value analysis*. Lawrence Miles, a GE engineer, was tasked to determine how to produce hardware for the war effort, despite shortages of key materials. He approached the problem by identifying what intent the hardware had to perform, and then exploring alternative ways of providing those functions.

Lawrence Miles outlines a structured process that consists of defined steps called a "job plan." This "job plan" builds on the foundation of identifying what the customer needs, as opposed to the producer's perception of what the customer wants. From the foundation of customer needs, a series of requirements are created and prioritized. His approach is based on a few deceptively simple questions: 1) What is it? 2) What does it do? 3) How much does that cost? 4) What is it worth? 5) What else will do that? 6) What does that cost? Very easy questions to ask, and many people are quick to answer. However, bring a group of people together from inside and outside the organization to answer these questions, you quickly find a vast array of answers. Almost as many answers as people, each from a different perspective, each with different viewpoints and preconceived ideas.

To Lawrence Miles' surprise, his alternative solutions often achieved the required functions with lower cost and/or higher performance. His approach was so successful that the US Navy adopted his methodology and changed the name to *value engineering*. Since then, value engineering has spread to industries and governments throughout the world.

In the 1960s, Charles Bytheway developed a graphical method of analyzing the dependencies between sequential functions. A structured modeling approach that separates "what: must be done (intent) from "how" we choose to do it (architecture). With this method, he was able to identify a complete, non-redundant set of functions. He created a diagram to quickly recognize missing functions, redundant functions, and areas of low value; and for mapping functions to organization's processes, products, events, and other systems. His Function Analysis System Technique (FAST) has become a mainstay of value engineering.

In the early 1980s, J. J. Kaufman expanded the basic concepts of both these men's work, broadening the application of value engineering beyond the application of physical sciences into the area of resolving business problems and capturing business opportunities. He created *value management* - an organized effort directed at analyzing goods and services to achieve necessary functions and essential characteristics in the most profitable manner. Value management determines cost generation and evaluates a range of alternatives including new concepts, reconfiguration, eliminating or combining items, and process or procedure changes. These elements bring marketing, engineering and manufacturing together to "take deliberate action to improve cost effectiveness."

Let's discuss "Value" in more depth. We are talking about economic value, not political value, not social value, not judicial values, etc. Lean defines value as satisfying the customer's current need at the right time. Value management defines value in three elements: 1) *use or performance value* – how well does it work, 2) *worth value* – what is the purchaser willing to pay for the product's function, and 3) *esteem value* – desire to own, e.g. a brand name. The ultimate value can be calculated as *use*, *worth*, and *esteem*; divided by the price paid. This definition is more difficult to define, however, it provides a robust description of value for the purpose of product design. Lean's definition, while also challenging to define, is activity based and in a language more suited for the production environment.

Management Practices Improvement

Human activities and efforts in any organization are based upon management practices. Management practices govern how people interact within the organization, as well as, how people interact between the organization and the rest of the world. The practices may be consciously created and based on theory, or may have simply emerged as the organization grew and matured.

Management's job in the area of improvement is to create and facilitate an environment for learning and cooperation. One area to start is to remove policies and barriers that inhibit people from doing a good job. At the same time, it should encourage communication between functional areas and different levels of the organization. How can management accomplish this? Several issues come to mind.

Remove or minimize any ranking, rating, merit, incentive pay, or pay for performance programs. These programs institutionalize internal competition. *The organization should not be in competition with itself.* Great losses arise from selfish competition between departments and individuals. The organization is a system, working together towards a common purpose. It must be managed as a system, complete with managing the interactions and grey areas between components.

Overcome the temptations to manage based on results or relying solely on numbers for decisions. Do not confuse coincidence with cause and effect. Managing by outcome does not improve anything. The same system created both the positive and negative outcomes. Only by improving the system can long-term, sustainable improvement happen.

Improvement Triad: Process, Product, and Management Practices

A system is a network of interdependent components working together to accomplish the aim of the system. Leaders must recognize and manage interdependencies, aligning efforts towards the common aim. How is this accomplished? By removing barriers, resolving conflicts, encouraging cooperation and communication between components.

Every component of a system has an obligation to that system. That obligation is to contribute its best to the aim of the system, not to maximize its own production, profit, sales, or any other competitive measure, at the expense of the organization as a whole. When a component makes recommendations for improvement, show how the recommendation contributes towards the aim of the organization. Identify how other components are affected, risks, tangible and intangible benefits, and a plan. Possibly make recommendations for several scenarios. After all, a component may not be aware of all the factors involved with the environment in which it exists. An improvement may provide intangible benefits that outweigh strict dollar savings.

Keep an eye on long-term solutions and long-term efforts as well as changes in technology and markets. Of course take care of the emergencies and fires that arise. However, only long-term solutions will keep the organization alive in the future. Keep reminding people of the larger purpose of the organization and the role of improvement in the success of the organization.

Another aspect of management's obligation to improvement is to encourage the exploration of data and theory for the purpose of creating knowledge. Without knowledge, any change is just a guess. Frequently, guessing just makes things worse. Data, information and knowledge are not the same. Data is just that, data. Measurements and observation counts are two examples. When data is placed in a context, information is created. Understanding how data is classified and interpreted based on the concepts in which it was created, along with how the data is used for action, are just a few factors of converting data and information into knowledge.

People are different. To help create an atmosphere of learning, explore how people interact with each other, with the circumstances of their environment, and with the system. People learn in different ways. Some learn by reading, others by listening, and still others by watching pictures, movies, or someone else. Don't be trapped by the idea that people learn by doing. People don't learn only by doing, despite what is advocated in popular literature.

People are motivated by those who inspire them, not through coercion. Rewards and incentives have a negative effect on learning. People will only fulfill the requirements in order to obtain the incentive. Animals are trained by using rewards. People learn so they can improve their ability to contribute and make a difference, to the group, company, or society.

Marya Mannes said "Generosity with strings is not generosity; it is a deal." Certainly show an appreciation for efforts and contributions. However, do not make that appreciation a reward or incentive. Telling people if they do something, then they will receive an incentive, will only demoralize them.

In addition to managing the system, leaders will have to manage changes in the current system, as well as plan for changes in future systems. Organizational growth and complexity are never-

ending. Anticipating future changes many lead to redefinition in the boundaries of system and components. Preparing for these changes requires imagination about the possibilities.

Creating an Improvement Triad

Improving the organization as a whole requires that processes, products, and management practices work together. Everybody doing his or her best is not sufficient. Functional areas of a system must be aware of how their actions impact other groups and the entire system. Investigate to understand how actions of each group will benefit the whole, and identify the dangers of how their actions introduce risks to the whole. Some groups may have to accept less than optimal performance of their functional area in order for the entire system to improve.

Selecting where to start is not a question of one area or the other. All three areas are co-dependent on each other. No group exists in isolation. Every organization is a system.

When improvement is begun in any single area, the first issues addressed are usually the issues that can be corrected by the local workforce. However, as these immediate and local issues are corrected, new issues become visible. Conflicts arise as improvement efforts start to influence other areas. Especially, when the unbridled enthusiasm of one area, intrudes into another area, and the reasons for the change are unclear. This conflict produces several adverse effects. First, it negatively affects the morale of people and organizations. Second, conflict leads to reduced performance of other groups in the system.

People are not against change, they are against *being* changed. Functional work groups are not receptive to being told they must change. People need to understand the need for change from their perspective. Communication and collaboration are effective ways to overcome resistance. Management practices must provide an environment where people are given a voice in how change is going to happen and share knowledge about each other's improvement projects. During all communication use common language easily understood by most people. Do not become trapped in the exclusionary language of jargon.

The organization must learn individually and collectively. Only through cooperation and collaboration will collective learning take place. Collaboration in pairs is an interim step. Eventually, production, product design, and management practices will need to work together.

Conclusion

While process improvement will produce results quickly, those results are transient and often only include the short-term future. Product improvement can produce great benefits. However, those results take longer to realize. Improving management practices produces the greatest results, however those results may take years to realize, are the most difficult to accomplish, and many of the results may be indirect. After all, behavior is a hard thing to change, in ones' self and as a group.

Caution: there is a popular belief by many advocates that people outside the area will 'see the light' and change if you show them the results of improvement. This is a myth. Don't believe everyone will automatically accept and adopt any methodology once it is 'proven' through improved performance. The system will adapt, nothing more. And even then, the system will only adapt enough to alleviate the pain that your effort is causing.

Improvement of an organization is not a matter of selecting one path or another, but of balancing; efficient production, effective product design, and humane management practices. Each area has unique characteristics, which on their own would make great contributions to an organization. However, when working together, these three areas create a whole new level of performance.
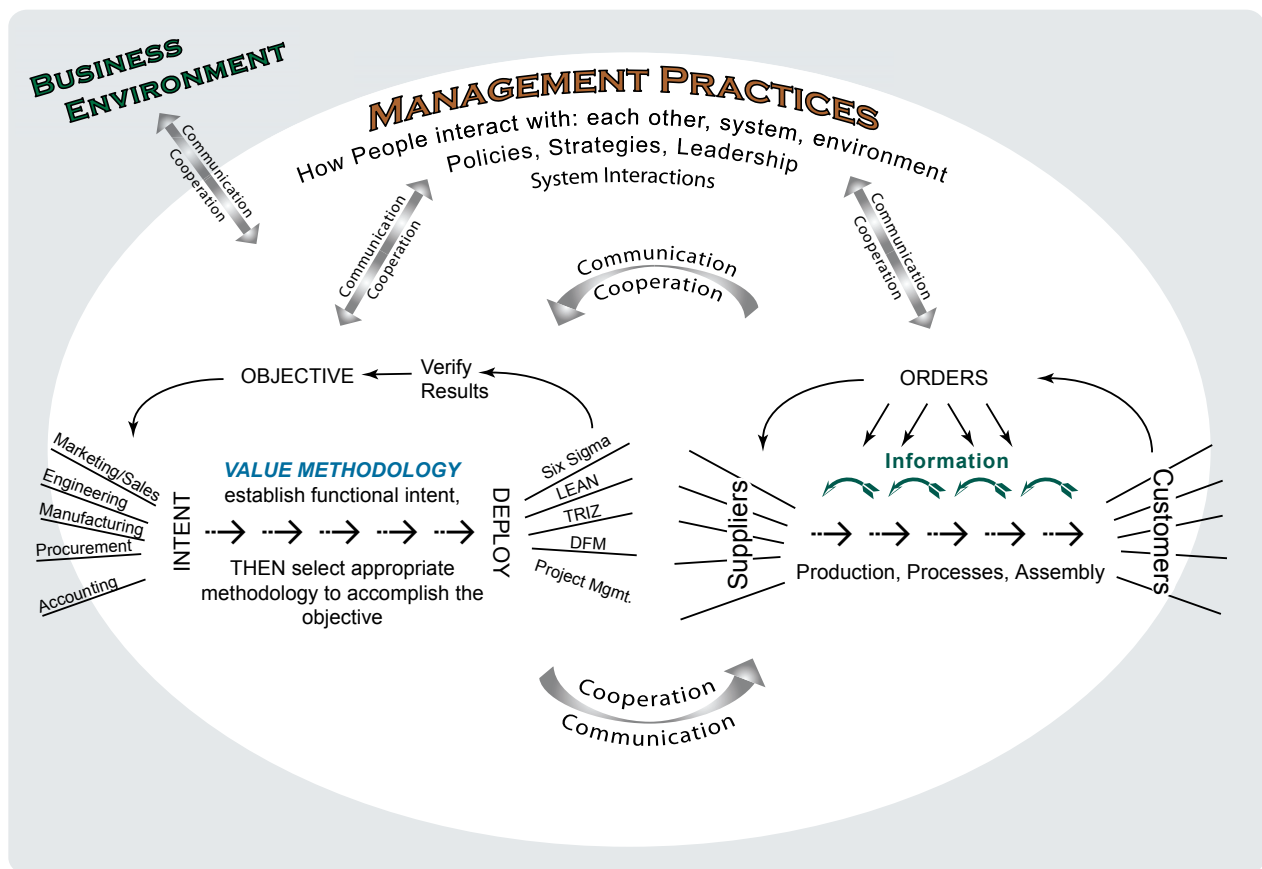

Figure 4, Improvement Triad

Improvement Triad: Process, Product, and Management Practices

One way to balance production, product design, and management practices is to support all three simultaneously, starting with pilot projects, then growing and expanding. Pilot projects may not be related, however keep the projects in close communication with each other. As the learning cycle revolves and grows, the efforts will strengthen themselves. As communication increases between each area, interdependencies become visible and a bond is created.

Don't be afraid of making mistakes. They will happen. And don't be afraid of having to rework a previous improvement effort when new knowledge becomes available, or when one effort is influenced by another effort, for that happens too. *Example:* When a process is redesigned because of a product change, or when a product is redesigned because of a process improvement. Keep the aim of the organization in view. Realize every improvement is another step in that direction.

Many people are concerned about how improvement projects are funded. The first few pilot projects may require new funding, however the amount in normally small and the risks low. As projects evolve and grow, some of the money saved from previous process improvement projects can be used to pay for efforts in areas where results take a while to become visible.

In one state government, the governor set up an agreement with various state agencies in which half of the money each agency saved through improvement projects remained in the control of the local agency. However, after three years, the annual savings were absorbed into the agencies baseline budget. The caveat was that the money could only be spent on new improvement projects or for betterment of the local constituents. All the state agencies agreed to spend their savings on computers for the local school systems. After a couple of years, every school in the state had computers and internet access, even a two-room school in a very remote part of the state. This agreement gave people a voice in how they would change their work environment and how the gains would be shared. Improving the local schools also gave the people something tangible to work towards that had special meaning to them.

Imagine what a similar agreement would look like in your organization.

Changing is hard work, with many frustrations and setbacks. However, the rewards are even greater.

It's a brave new world! Let us work together, communicate, collaborate, and most importantly– have fun!

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