AI-Driven Needs Analysis

William Crose

AI-driven Needs Analysis

William Crose

ISBN: 9798245015682

DEDICATION

I stand on the shoulders of Alexander Romiszowski, Hermann Ebbinghaus, Bela Banathy, my grad school advisor Dr. Robert Brinkerhoff, and many others whose contributions to learning and performance inspired and guided my career.

I thank my wife, Lori, for her support, advice, and pleasant company, not just during the process of writing this book, but throughout the career that led to this point.

CONTENTS

Chapter 1: Introduction

Here's some wonderful news: Humanity is progressing at the fastest pace ever! Think about that for a minute. It implies that we have the greatest opportunity to shape our future as a species, and this book aims to steer us in the right direction.

Humanity has always advanced technologically at the fastest rate possible, slowing only during pandemics, global climate events, world wars, etc. The startling acceleration of electronic technologies since the start of the Information Age is what makes today's environment unique, as this rate of change is unprecedented in human history.

Despite the positive news, it's no secret that many people find it difficult to adapt to change on both mental and physical levels. They become "fragile" when they are mentally unable to handle any more change. It's also commonly known that a number of vital social infrastructures, including banking, transportation, water, electricity, and cellular, rely significantly on brittle technologies that, in the event of a failure, could devastate society. Together, these circumstances are referred to as "techno-societal fragility."

How well we adapt to impending change will depend on the strategies and tactics businesses adopt for managing change. The traditional approaches are too slow, too subjective, too fragmented, and too narrowly focused to be fully effective. The new approaches must be rapid, cross-busi-

ness units, and backed by valid, unbiased, reliable performance ratio data and judgments free from human bias, greed, and self-interest. They must be measurable in near real-time and always focused on enabling, ensuring, and continuously improving performance across the work and worker systems. They must be ethical and climate-focused, as those are essential for rapidly growing sustainable profit.

Now is the first time in humanity when bias, greed, and self-interests can be removed from business decisions and operations; let's make it so.

About You

Most authors have their audience clearly in mind, and this one is no exception. However, describing the audience in a rapidly changing business environment is nearly impossible. As business organizations flatten and innovation accelerates, we can anticipate entire divisions and departments to change and keep changing; responsibilities and accountabilities formerly placed in one division will be merged into others, which makes it difficult to pinpoint an audience.

To simplify the description of this book's intended audience, it includes workers whose goal is to rapidly grow a business's sustainable profit. Those workers may currently or formerly hold job titles like individual contributor, industrial engineer, instructional designer, organizational development specialist, and frontline supervisor, as well as the managers, directors, and CXOs to whom those workers report.

If forced to identify reader targets from a single corporate division, it

would be those employees who are responsible for facilitating, guaranteeing, and consistently enhancing worker and work system performance. More specifically, this book targets learning and development department professionals.

Author's Perspective

Every book reflects its author's perspective, and this one is no exception. This book was written from the perspective of a learning technology expert with profound experiences in various industries, including healthcare, pharmaceutical production, retail, public education, esthetics, hospitality, agriculture, and others.

As many TL professionals initially concentrated on using AI to make their jobs easier, this author questioned how to enable businesses to act ethically, protect the environment, and generate more sustainable profit than ever before. Applying agentic AI to needs analysis across entire businesses was the solution that brought everything together.

In this book, the author explains how an AI-driven needs analysis system for businesses would work and how it will affect business globally. The vision is that of a world shifting from human decision-making to AI-calculated decisions. The change is moving from making educated guesses to having objective knowledge, from random methods to precise algorithms, and from insignificant nominal, ordinal, and interval data to more detailed ratio data.

Every element of the business has a value determined by how much

it contributes to the company's profit, including every function, employee, piece of equipment, supply, process, worker motion, dollar, and time. Monetizing every aspect of the work and worker system is what businesses do now, to the extent that existing technologies allow. With intelligence augmentation (IA) and advanced intelligence augmentation (AIA) come better data that leads to business decisions and the ability to automate them. Needs analysis will likely become the most profitable use of artificial intelligence.

While some people may lament the loss of human touch that AI doesn't have, the use of better data and decisions—replacing human choices often influenced by guesswork, bias, greed, and self-interest—will benefit everyone and lead to much faster growth of sustainable profit, provided that the systems are programmed ethically and prioritized for climate protection.

Work System and Worker System

Every business possesses both a work system and a worker system. The work system includes all of the resources and procedures needed to create a company's goods or provide its services. It includes work policies, supply chains, equipment, materials, work processes, compensation, etc. The worker system includes the resources and procedures related to developing and maintaining worker knowledge, skills, and attitude (KSA).

Needs assessments, like all business activities, must analyze both work and worker systems and align both with the business's overall goal and one or more of its objectives. Fortunately, this is simple because every business

worldwide has just one goal and three objectives. The goal is to rapidly grow sustainable profit. The three objectives are to enable, ensure, and continuously improve performance across both the work and worker system. From this perspective, needs analysis contributes to sustainable profit by identifying ways to enhance workers' ability to perform their assigned tasks, ensuring that the work is completed perfectly, and optimizing both the work and worker systems.

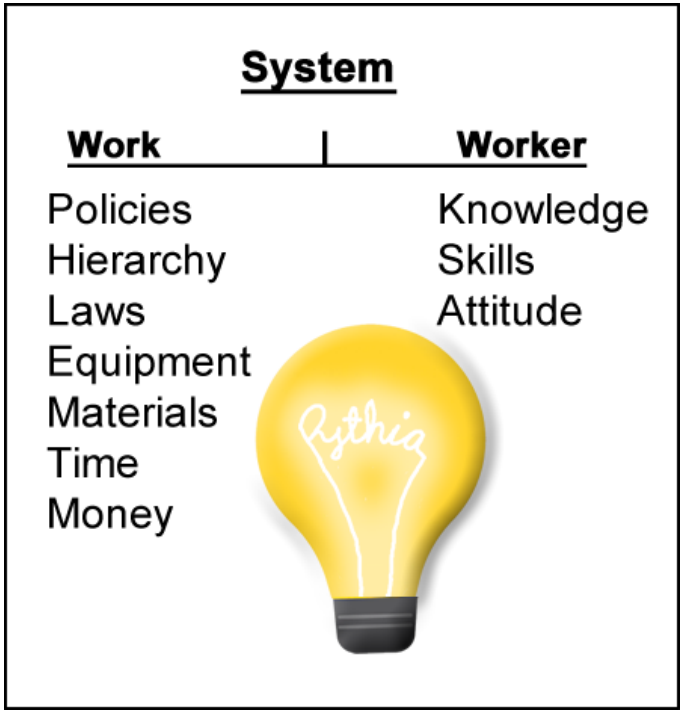


Figure 1: Work vs. Worker System

Both systems are essential, and they must interoperate to optimize performance.

In traditional needs analysis, worker and work system needs are usually

analyzed separately as if they were unrelated. Learning needs analyses, for example, might pinpoint KSA enhancements while ignoring the work system modifications required to support the worker system enhancements. To make sure the worker system changes take effect, it might be necessary to assist the new KSA with job restructuring, pay adjustments, new work schedules, new equipment, etc. In a similar vein, industrial engineers may find improvements to the work system's processes that cannot be effectively put into practice without also altering the worker system.

While it used to be impossible, it’s now advisable to simultaneously analyze work system needs and worker needs. Notably, removing as many work system issues as possible before addressing worker system needs will eliminate issues that negatively impact the worker system.

Measurement

“Anything worth doing is worth measuring,” and “what gets measured gets improved” are two popular aphorisms that perfectly explain why businesses should measure performance at the most granular level possible.

Prior to AI and AIA technologies, there was no way to reliably measure worker performance, and let’s be honest, supervisor observations never were and never could be reliable. If it’s true that anything worth doing is worth measuring, then every existing business activity must have been put in place to address a need and should be measured. Which raises the question, "Are you measuring performance at the most granular state, and if not, why not?"

Tracking the time and money spent on each step of an SOP is more detailed than tracking at the SOP level. Tracking performance at SOP step granularity is important because 1) it is currently the most precise way to measure the performance of a standard operating procedure (SOP), 2) the time required to finish SOP steps can be rolled up to show how much time is spent on an entire SOP, 3) it can reveal the steps of an SOP that can be improved, 4) it can reveal which employees require coaching on which step to improve their performance, and 5) it ultimately provides the data required to automate the process if that is a current or future need.

Another crucial needs analysis principle to understand is that making assumptions can lead to disastrous outcomes. In other words, a business that is not using an automated system to measure performance is relying on at least some assumptions for decision-making. It is not hyperbole to say that a company using an AI-driven needs analysis system does not rely on assumptions while those relying on manually performed assessments do and must. The outcome is that companies using an automated system will have a significant competitive advantage over those that do not.

The following table aims to assess the extent of guesswork in your business's decision-making procedures. For each business need listed, note which metrics your business uses to measure it. If the measure does not solely rely on valid, unbiased, and reliable performance ratio data for decision-making, it partially relies on assumptions.

If blank spaces remain in the right-hand column after completing the measurement review, then your organization has one or more opportunity to improve the way it measures its needs.

Business Need	Metric Used
Rapid response to change	
Performance enablement by: –Learning (not training) –Training (not learning)	
Performance ensurance	
Continuous performance improvement	
Perfect performance across the work system	
Innovation	
Environmental protection	
Ethics	
High data integrity, i.e., statistically valid, unbiased, and reliable	
The sustainable profit growth of existing interventions	
The prioritization of business-wide needs over individual department needs	
Perfect performance across the worker system	
Rapid growth of sustainable profit	

When determining how to address those opportunities, it's important to know that not all data and metrics are equally valuable. For example, a) if building and maintaining relationships is a top business priority, then evaluating a worker's relationship-building ability carries very low validity when the worker's job is to assemble PCBs; b) a supervisor spending one or two hours per year analyzing each direct report's performance cannot produce unbiased or reliable data; and c) a needs analysis process that always or nearly always leads to a training recommendation is biased. If needs analysis and the data it uses are to be valid, unbiased, and reliable, then businesses must always use the best available a) work system data, including equipment performance, supply availability, and work policy data; b) worker system data, including worker performance data; and c) data collection methods. The reader should be concerned not only about their company's reliance on conjecture rather than accurate, impartial, and trustworthy data, but also about whether work policies, equipment performance, and data collection techniques are ever fairly and honestly evaluated. This book suggests that if your business is not using an AI-driven needs analysis system, then it either has or will soon fall behind its competition.

Sustainable vs. Unsustainable Profit

Just as not all data is the same, neither is all profit. Sustainable profit that lasts over long periods of time is better than unsustainable profit that may be high for a time, then falls. Instead of increasing sustainable profit, businesses often choose quick and short-lived payoffs. This suggests that, while unsustainable profit might be simpler, quicker, and less expensive

to grow than sustainable profit, it is ultimately more cost-effective to invest resources into making profit that lasts forever. To avoid confusion, when referring to “rapidly” growing sustainable profit, the term "rapid" simply means that sustainable profit is reached more quickly than before, not that it will grow more quickly than unsustainable profit.

Understanding why a business’s decision makers choose to grow unsustainable profit instead of sustainable profit can tell a lot about the business and its decision makers. Some reasons for this include missing technological capabilities, the lack of sophistication required to make the necessary technologies function properly, and the interests of those who stand to gain more from immediate profits. Executives who aren’t looking for long-term employment and those who want to immediately please investors instead of waiting another quarter stand to gain the most from short-term profit.

The Lagging TL Profession

The training/learning profession spans all industries and at its foundation is the ability to quickly, effectively, and economically reveal problems limited to the worker system, KSA. In essence, the role of a learning professional involves promptly identifying human performance issues and then fixing them solely with improved KSA. Although TL has historically lacked the technologies to achieve much more than that, AI and AIA will revolutionize the profession. Work and worker systems can now be analyzed simultaneously thanks to AI and AIA technologies, ensuring that improvements made to one system won't negatively impact another.

Nowadays, establishing and preserving favorable relationships is considered the most important attribute that companies look for. Companies frequently hire, promote, and let go of their workers based on the connections they have made and maintained. When relationships take precedence over performance, it can be difficult for anyone working in the TL or other performance support function to let a powerful client know that a certain aspect of their work is inadequate. TL professionals naturally hold back when they believe they lack the political capital to deliver negative news to a superior. At the very least, that reticence to communicate openly raises lost opportunity costs.

Not only can a learning professional fear telling a powerful business executive that their baby is ugly, but the same goes for learning professionals providing constructive criticism to TL organization leaders. Therefore, the TL organization often fails to provide the constructive criticism that a client may need to focus on real problems. Unfortunately, external consultants are frequently the only source of constructive criticism that business leaders feel they can safely receive, which results in higher costs and often, longer project timelines are needed to reveal and remedy issues.

Despite accelerating automation, every business in the world still relies on manual workers to build most of the products and deliver all of the services they depend on for profit. This is important to acknowledge because a) businesses could survive longer without managers and leaders than without products and services to sell, and b) traditional businesses spend more resources developing soft skills across the management/leadership

hierarchies than they do on developing the production and service delivery skills of front-line, manual workers. For these reasons, this book encourages businesses to focus on hard skills and manual laborers over soft skills and knowledge workers.

A business must have at least a high-level understanding of how a prospective new system would function before making any system changes to the existing systems. Businesses must understand the workflows and data required to measure performance in order for AI to function effectively. The company can only create an algorithm and begin gathering data for the AI to use once the workflows and data requirements are understood.

This book provides a workflow that describes each step of a recommended needs analysis system so that readers can begin their AI-driven needs analysis project more affordably.

This book makes the case that when companies use AI to analyze needs, they will be able to increase sustainable profit faster than ever and they'll be able to create a competitive advantage.

Opportunities for TL Organizations and Individuals

While the focus of this book is on AI-driven needs analysis, it presents many opportunities for TL organizations and the people who work in them to rapidly grow sustainable profit for their parent businesses. The opportunities are presented as things that can or must be done to save the TL profession from its infatuation with fads, quick fixes, and false claims, which

will raise their credibility with their clientele.

Before taking advantage of any opportunities, The TL organization must adopt a common nomenclature. This includes clarifying terms like training, learning, goal, and objective; improving data and statistical proficiency; and avoiding learning myths that cannot be supported by mathematical evidence. These opportunities are present whether or not a company plans to implement an AI-driven needs analysis initiative. In other words, the discipline used to enable an AI-driven needs analysis is a valuable undertaking in and of itself and should not be disregarded.

An AI-driven needs analysis system offers enormous opportunities to rapidly grow sustainable profit. They include 1) dramatically reducing the cost and time needed to perform needs analysis, 2) eliminating human bias, greed, and self-interest from needs analysis, 3) always selecting the best solutions for enabling, ensuring, and continuously improving performance, 4) enabling business-wide decision-making instead of one department at a time, 5) simultaneously analyzing both the work and worker systems, 6) facilitating automatic and continuous collaboration, coordination, and data sharing across divisions and departmental, lines, and 7) establishing ethics and climate responsibility as essential profit growth strategies.

The Promise

Humans have experienced five major technological ages since the Horticulture Age. The Artificial Intelligence, or AI Age is the sixth. Each technological era has brought massive social and economic upheaval, along with

the promise of a better world. The AI Age is no exception.

AI's promise to humanity is the ability to make better decisions faster and cheaper than humans, without the bias, greed, and self-interest that accompany human decision-making. This promise alone has the potential to upend the world order, as the countries that profit from AI first and most efficiently will dominate the world economy.

This book aims to give both a high-level overview and a detailed workflow, demonstrating how AI can deliver on its promise to provide the biggest profit boost ever for businesses that use it properly.

The Problem

AI-driven needs analysis addresses many business problems. They include:

- The AI Age is upon us, and we don't know how to safely leverage it. While businesses struggle to figure out the best ways to use AI, governments are learning how to regulate it for safety.
- Whether decisions are made manually or automatically, they must be objective and predictable. AI depends on objectivity and predictability, so it requires a consistent, repeatable procedure as well as a performance record made up of statistically significant quantities of valid and reliable ratio data. To be objective, the analysis of valid and reliable data must be devoid of prejudice, greed, and self-interest. While it is possible to lessen bias, greed, and self-interest, human analysis is inherently subjective and unpredictable, and neither can

be eliminated without automation.

- Only automatically captured performance ratio data, i.e., that which is captured without human involvement, can be valid, unbiased, and reliable enough to be predictive. Ratio data includes the most precise performance information possible, which is the time it takes each worker to perform every step of every SOP they perform. Capturing data at that level allows for the automatic revelation of needs at the process step, worker, and work location levels. Time and money are considered ratio data because they can be used in mathematical calculations, converted into monetary values, and compared broadly across workers, SOPs, equipment, and other important performance variables.
- Perfection is one of the most important unspoken business needs. Although it is recognized that performance perfection—completing each step of an SOP precisely as designed each time—is essential in hazardous work environments where people could die and property destroyed, its importance diminishes with hazards. When the importance of perfect performance diminishes, quality suffers and costs increase whether in hazardous environments or not.
- In hazardous work environments, many SOPs require the flawless execution of every step, each and every time. Until recently, ensuring the performance of every SOP step would have required a supervisor to monitor every worker 100% of the time. That is impractical, but when errors could kill people, damage property, or cause significant

waste, such as those occurring in nuclear power plants, pharmaceutical development, food production, medical/surgical procedures, etc., 100% supervision is necessary regardless of cost.

- Performance ensurance is frequently believed to be the responsibility and accountability of the training department, even though it is well known that trainees forget up to 60% of the training material within the first hour following training. It is in fact, front-line supervisors, not "learning organizations," that shoulder the responsibility and accountability for providing the spaced practice and feedback that learning requires. That means front-line supervisors are responsible and accountable for learning. This lack of role clarity is disingenuous when it is allowed to persist.
- Ensuring performance in a traditional business would require managers standing over every worker and monitoring their every action. That’s fiscally and physically impossible. A smooth and nearly instantaneous transfer of information demonstrating that every step of an SOP is carried out perfectly is the only way to guarantee performance. The data exchange required to ensure frontline workers' performance can be facilitated by AI and AIA.
- Lastly, companies that choose to unfairly skew wages toward higher-level workers, fail to protect the environment, refuse to hire workers of particular races, ages, or gender differences, etc., are demonstrating the pervasive business issues of human bias, greed, and self-interest. Ironically, self-interest, greed, and human bias are the

main causes of most business issues; however, no needs analysis model currently accounts for these three important factors. Unless built into an algorithm, AI lacks human biases, greed, and self-interest, therefore, it can make more objective decisions than people when provided an objective algorithm and valid, unbiased, reliable performance ratio data.

The Solution

This book recommends an AI-driven needs analysis system as a solution to the business problems described within. When provided with VUR-PRD, the system can continuously analyze the needs of the entire business without the time, money, bias, greed, or self-interest of human needs analysis. The system can identify, prioritize, and constantly update a list of performance enablement, performance ensurance, and continuous improvement opportunities. It can also present those opportunities in project plan templates that include the project objectives, measures, deadlines, budget, potential issues and risks, communication strategy, recommended team roles, and even individual assignments.

For AI to work optimally, businesses and individuals need to a) be open to new ideas and change, b) agree on clear goals that everyone in the business can support, c) gather and share accurate and unbiased performance data across the business, d) set up a system to collect the valid, unbiased, reliable performance ratio data that AI needs, and e) create an algorithm AI can use to assess needs.

The Light

If we analyzed the root causes of most modern problems, including climate degradation, poverty, and inequality, we'd observe a trail of human decisions that prioritized personal and professional relationships and immediate self-gratification. When AI fulfills its promise to make more and better business decisions faster than humans, we will have the chance to advance humankind and create the largest economic boom in history. The greatest economic booms to date have coincided with each new technological era, so why should the AI Age be any different? It's pretty obvious that we're in for a massive boom, if history is any guide.

Since labor costs—which include hiring, training, paying, and providing benefits—are at the top of every company's expense list, using AI to ethically lower labor costs always makes sense. The most impactful way to reduce labor is to eliminate more of the higher-paid decision-maker jobs, while keeping more of the lower-paid production and service provider jobs. While it's true that most businesses worldwide still rely on manual workers to produce most of the world's products and deliver all of its services, it's also true that a business relying on labor can survive far longer without middle managers and executives than it can without its production workers. From that perspective, replacing as many highly paid managers and executives as possible with AI promises a massive windfall that boards of directors will not be able to ignore forever, even as deeply embedded and popular supervisors, managers, and executives object.

What to Expect

Every technological era has brought a great deal of anxiety and fear that jobs will disappear and people won't have a way to support themselves. We asked, "What jobs will remain after steam engines, cars, computers, cameras, cell phones, and whatever else comes?" Since every new technological era has created more jobs than it has destroyed, we can be sure that the AI Age will be no different, but we must not leave that to chance.

The mistakes and false starts that have accompanied all previous technological advancements will undoubtedly accompany this one and those to come. Some companies will attempt to replace employees with robotics and AI before they're ready. Others will put immediate profit ahead of long-term sustainability. And businesses will lose their competitiveness if they wait too long to implement AI.

The strategy for rapidly growing sustainable profit and significantly lowering management costs must specify how the shift will benefit all workers. Simply put, employees need to understand why they must accept things that will ultimately result in their job changing or termination. Let's be clear: if the objective of every business endeavor is to quickly increase sustainable profit, then those who are working toward that goal will be entitled to a larger portion of the increased profits they have contributed to, and failing to meet their expectations will lead to less than ideal outcomes for all involved.

This book advances the notion that every company in the world has a single goal: to increase sustainable profit as quickly as possible. Additional-

ly, it advances the idea that all businesses worldwide have just three objectives: to enable, guarantee, and continuously improve performance across the worker and work systems. With that one goal and three objectives, every decision a business makes and every dollar it spends must be connected to a program that supports performance ensurance, performance enablement, and continuous performance improvement in ways that rapidly grow sustainable profit.

Until now, the most crucial data for all decision-making, including business needs analysis, could not be automatically captured, and decisions had to be made based on whatever information was available. That kind of decision-making is often referred to as “sophisticated, wild-assed guessing,” commonly abbreviated as “SWAG”. The missing data, is the “holy grail” of decision-making data; it is VURPRD. Among other things, VURPRD includes the time it takes workers to perform each step of every SOP they perform. Businesses that use manual needs analysis will be able to make better decisions when they use VURPRD instead of SWAG. By integrating AI into needs analysis, businesses will be able to make even more decisions without SWAG or the vices that come with human decision-making.

The premise of this book is that by using AI to drive business-wide needs analysis, companies can rapidly grow enormous amounts of sustainable profit in ways that were never before possible. Better decisions by themselves can result in substantial sustainable profit growth, but businesses can also eliminate the majority of decision-maker expenses by automating decision-making and making it a near-real-time, round-the-clock

process.

Does this book imply that entire job families could be replaced by AI-driven needs analysis, as was the case with the advent of cars, airplanes, computers, blockchain, farm equipment, robotics, and many other earlier technologies? Yes, and if past events are any indication, that's exactly what will happen. The distinction and cause for hope is that the same AI technology that can drive business-wide needs analysis and eliminate entire job classes can also create new and better jobs while supporting the highest ethical standards and environmental protection.

If the vision presented within this book seems too complex, too optimistic, or even laughable, then I, the author, have accomplished my objective for this introduction. All meaningful change begins with these doubts. Consider the complexities and anxieties surrounding the early days of atomic energy and weapons, space travel, microwave ovens, electric windmills, and social media, all of which we managed to overcome. An insane, moonshot-level vision motivates every significant human achievement, leading to its creation, implementation, assessment, and ultimate acceptance as the standard. Recall that a decade or even half a decade before AI emerged as a technological era, its very existence was widely considered absurd.

As with other technological ages, high expectations accompany the AI Age. Also similar to other technological ages, The AI Age will have the ability to make life better for all living things or just a few.

To realize its potential, AI cannot be allowed to benefit a few at the cost

of many and work doesn't have to be that way. AI algorithms can be written to promote the ethics many businesses tout but often don't provide or minimally do so, to protect the environment, and to share the wealth.

The difference between the AI Age and prior ages is that AI algorithms can be audited. Businesses and governments alike can ensure their algorithms operate as intended. All of which begs the question, how great would it be to live in a world where everyone's work enabled them to live vibrant lives while protecting the climate.

Chapter 2: What is Needs Analysis?

It is human nature to strive for perfection. Unfortunately, the only thing anyone can expect of themselves and others is to continuously improve their performance. In business, doing better means rapidly growing sustainable profit. Revealing ways that individual workers can contribute to rapidly growing sustainable profit requires an objective analysis of all operations, risks, and issues and the prioritization of potential opportunities, which is the gist of needs analysis.

Finding opportunities to enable, ensure, and continuously improve performance across both the work and worker systems is the purpose of needs analysis. Ideally, a needs analysis would pinpoint specific needs as precisely as possible, such as which equipment needs to be bought or replaced, which employee needs to perform better on not just which SOP, but which SOP step, and which SOP step is causing performance to lag, all of which could contribute to rapid, sustainable profit growth when optimized. ADDIE and DMAIC are two commonly used performance enablement and continuous performance improvement models that include needs analysis phases. Neither ADDIE nor DMAIC address performance ensurance.

Training professionals are familiar with the term "needs analysis," as it serves as the initial step of every training endeavor. It represents the “A” in the ADDIE instructional design process acronym. Non-training professionals may also recognize needs analysis in the processes they use to improve performance. Analysis, for example, is the "identify problems" step

in the Kaizen process and the "A" in the DMAIC process used in Lean Manufacturing and Six Sigma processes. Every business decision starts with analysis.

Effective needs analysis is important because that's where all performance interventions begin. A poor needs analysis can lead to a costly intervention that fails to deliver a return on its investment. The limited scope of an analysis is frequently the cause of unsuccessful needs analyses. Although many training professionals are aware that their analysis should cover both the work and worker systems, not just the worker system, their clients, the leaders of the training organization, or other factors frequently restrict the scope of an analysis to the worker system alone. AI will do most or all of the needs analysis in the future, across both the work and worker systems, and it will remain the logical first step in any profit-growth initiative.

Regardless of the business or business unit performing needs analysis, the goal of needs analysis is always to rapidly grow sustainable profit, and the objectives are always to enable, ensure, and continuously improve performance. From that perspective, the results of a needs analysis must suggest one or more strategies for increasing production and improving the quality of goods and services while reducing costs, which will ultimately lead to higher profit margins when compared to competing products. In the long run, companies that adopt an AI-driven needs analysis as soon as possible will very likely acquire a competitive edge that could be essential to their long-term survival.

Varieties of Needs Analysis

TL professionals are aware of the significance of performing a needs analysis following each request for training or learning, but they may not be aware that needs analysis is also performed by other business functions.

- **Organizational analysis** is a needs analysis variety that reveals opportunities to rapidly increase sustainable profit through optimized organizational structures. An organization uses this analysis to determine the appropriate number of employees for each section, assign responsibilities, and define reporting relationships. An organizational chart is the result of an organizational analysis. Administrative expenses, the cost of administrative mistakes, production quality and quantity, and the time needed to carry out change initiatives are all measured by organizational analysis.
- **Job analysis** reveals opportunities to rapidly increase sustainable profit by grouping and assigning tasks, responsibilities, accountabilities, and work relationships into jobs. It is used to create and improve accurate job descriptions. Job analysis is required for making legally defensible business decisions and assessments. The product of job analysis is a job description, and the improved effectiveness and efficiency of a job after analysis is the measure of its success.
- **Task analysis** reveals opportunities to rapidly increase sustainable profit by improving task effectiveness and efficiency. It is used to create and continuously improve SOPs. The success of task analysis is gauged by the enhanced efficacy and efficiency of SOPs, which in

turn measures the impact of task analysis.

- **Compensation analysis** reveals ways to rapidly improve sustainable profit by optimizing employee pay and benefits. It's used to motivate better performance, attract high-quality workers, and retain the best employees. Pay and benefit plans that are reasonable and equitable for tasks and jobs are the result of compensation analysis. The benefits of compensation analysis are restricted to the worker system and are determined by the time it takes for individuals and work groups to complete their assigned tasks, higher-quality goods and services, and lower management costs.
- **Audience analysis** reveals ways to rapidly improve sustainable profit by filling the needs of specific work groups. It ensures that workers who need them can access expensive and time-consuming interventions. Audience analysis impacts established work groups, equipment users, training classes, new hire classes, and other classes of employees, work locations, etc.
- **Performance analysis** reveals opportunities to rapidly grow sustainable profit through increased productivity, efficiency, safety, and quality from both workers and work systems. It is used to reveal and create performance enablement, performance ensurance, and continuous improvement interventions and ways to improve work policies, equipment, supply chains, etc. Many businesses also use worker performance analysis, aka performance reviews, to allocate compensation and benefits in ways that are intended to increase

worker contributions at the lowest cost.

- **Training/learning analysis** reveals ways to improve profit through a worker's ability to memorize, then perfectly recall and perfectly execute their assigned SOPs while on the job. Training analysis uses written tests and surveys to measure short-term memorization of KSA delivered via training interventions. Learning analysis measures the long-term memorization of KSA via on the job performance. Training is analyzed immediately after the completion of a training intervention. Learning is analyzed on the job. Training/learning analysis is used to create and improve training, short- and long-term memorization, IA and AIA systems, and other performance enablement interventions. The return on training/learning investments in relation to reduced production costs and better-quality goods and services is used to gauge the effectiveness of training/learning analysis.
- **Process analysis** reveals how to create and enhance individual SOPs. Process analysis leads to more efficient performance and lower costs associated with executing standard operating procedures.

Note that most types of needs analysis take place in organizational silos at different times using different data sets. A better and less disruptive way to analyze needs would be to analyze all needs simultaneously, across both the work and worker system, using the same data.

Needs Analysis Models

Just as there are multiple varieties of needs analysis, there are also

many needs analysis models. The more popular ones include

- **PDSA** is a needs analysis model that was developed in the 1930s. It stands for Plan, Do, Study, Act. It was later referred to as “Deming’s Wheel.”
- **DMAIC** is a needs analysis model that Edwards Deming adapted from PDSA in the 1950s. It stands for Define, Measure, Analyze, Improve, and Control.

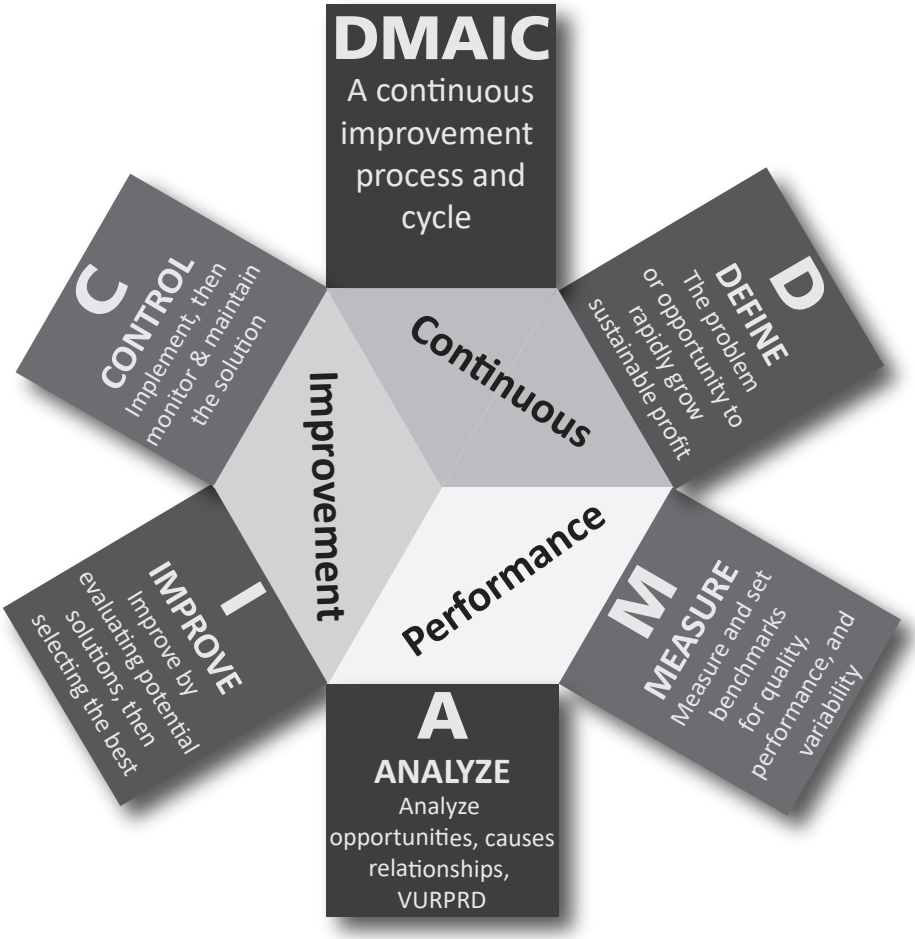


Figure 2: DMAIC Model

- **ADDIE** is a needs analysis model that the University of Florida adapted from DMAIC in the 1970s. It's used in training and learning environments, including corporate training organizations. ADDIE stands for analysis, design, development, implementation, and evaluation.
- **Six Sigma** is a needs analysis model that's used to improve manufacturing quality.
- **Lean** is a needs analysis model that focuses on customer needs and ways to eliminate waste that can lead to improved work efficiency and effectiveness.
- **Lean Six Sigma** is a needs assessment model that combines Lean's focus on customers, waste, and efficiency with Six Sigma's focus on quality.

At its foundation, needs analysis is a process that reveals performance enablement, ensurance, and continuous improvement opportunities across both work and worker systems and then recommends ways to leverage those opportunities to rapidly grow sustainable profit.

The key differences between the popular training needs analysis model called "ADDIE" and the other models include:

- **ADDIE is a subset of DMAIC**. It uses the "A" in DMAIC and focuses only on the worker system, while DMAIC reveals needs across both worker and work systems.
- **ADDIE doesn't address work system needs**; it is only concerned with the worker system.

- **ADDIE addresses one worker system need at a time and requires a request to be launched**, whereas an AI-driven model addresses all organizational needs without such a request.
- **ADDIE's success is measured by short-term memorization, trainee satisfaction, and training content quality**. It cannot be used to measure the amount of sustainable profit it is believed to contribute to the business.
- **ADDIE aims to train the most students in the least time and at the lowest cost**. It only measures training, not the application of training or the profit attributable to training.
- **ADDIE's only outputs are training interventions and training-related reports**. It doesn't collect or acquire performance data, so it can't correlate training to performance improvement or profit growth.

If it's true that we measure what we value, then training is valuable to the LD organization, not performance or profit. That must change if the LD function is to endure through the AI Age and beyond.

Chapter 3: Why Create a New Model?

Before proceeding, it would be beneficial to address the obvious question, "Why do we need a new needs analysis model?" Some reasons include:

- ADDIE’s scope is too narrowly focused; it only covers training, which leaves work system needs unanalyzed
- ADDIE requires a request to be launched
- ADDIE allows and recommends the use of flawed, statistically insignificant data for decision-making
- ADDIE takes too long to execute

    -Rapidly evolving environments require prompt completion of needs analysis to prevent missed opportunities from accumulating and becoming unmanageable

    -Depending on prioritization, it can take weeks or months just to schedule the resources needed to perform the analysis

    -Businesses will need to be able to swiftly and effectively adopt new technologies to survive as innovation picks up speed. ADDIE and other manually driven needs analyses won't be adequate to examine every emerging technology

- ADDIE is commonly allowed to be modified, minimized, or even skipped

- ADDIE costs too much to implement

One of the most common modifications businesses make to the ADDIE model is to remove the “A” phase. In addition to removing the “A” phase from the ADDIE process, a client and the TL department may also agree to save resources by removing the “E” phase. ADDIE’s Evaluation phase is where the client and TL department prove their value by calculating the amount of sustainable profit their work has contributed to the business. When the Evaluation phase is removed, TL departments often unilaterally attempt and fail to prove the ROI of their training programs using the data at their disposal, which is generally limited tothe numbers of workers trained, scores from tests administered before the first hour after training passes, and satisfaction surveys.

Even though they are employed by the same company, TL clients and peer groups are hesitant to divulge the sensitive performance data required to assess the benefits of training initiatives. Information TL organizations require includes total sales, revenue, profit by product, profit by salesperson, and performance dates, as well as costs for supplies, equipment, and trainee compensation. The absence of data needed to calculate an ROI or break-even date for TL interventions essentially relieves the TL department from any accountability or responsibility other than developing and carrying out requested training programs.

ADDIE Uses the Wrong Data

GIGO is short for Garbage In/Garbage Out. This acronym serves as a

warning about the problems that can arise from analyzing insufficient data. Those problems include,

- ADDIE models advise analysts to use training surveys, focus groups, subject matter expert (SME) interviews, and test scores as evidence of TL needs. Each of these sources contains a high degree of subjectivity as well as at least some amount of human bias, greed, and self-interest.
- ADDIE models never recommend using or limiting the information used in needs analysis to performance ratio data. This is odd because only ratio data can be used in the mathematical calculations that establish break-even dates, or determine returns on investment.

The Data ADDIE Needs Isn't Collected

Before AIA systems were invented, it was impossible to capture the data ADDIE or any other needs analysis model requires to perform an objective evaluation of performance across the work and worker systems. In response,

- TL organizations and clients often use data that can't be used in mathematical calculations to perform ADDIE's Evaluation phase or they nix ADDIE's Evaluation phase altogether,
- TL organizations commonly refer to positive trainee survey feedback via Likert scales, freeform comments, etc., as evidence of intervention success, then conflate that popularity to infer training success and quality,
- TL organizations often conclude that training and learning are essential

and priceless values, which supersedes the need for evaluation.

In conclusion, when every company's goal is to rapidly increase sustainable profit and ADDIE's sole purpose is related to training, then ADDIE-structured needs analyses are of little value because they don't align with the business goal.

Make More and Better Decisions Faster and Cheaper

History has repeatedly demonstrated that human decision-makers often prioritize their self-interests and short-term business success over long-term profit, ethics, and climate protection. This prioritization can be linked to many social ills like racial divides, income inequities, and climate degradation. It also causes businesses to lose their competitiveness. If businesses are ever to overcome the waste, inefficiency, and lost opportunities these issues bring, then they must eliminate the prejudice, greed, and self-interest that create them.

AI can make more and better decisions faster and cheaper than humans, without human bias, greed, and self-interest, which creates the opportunity to support initiatives that rapidly grow sustainable profit in ways never before possible. Using AI, we can incorporate measurable human values—such as diversity, equity, inclusion, and climate protection—into needs analysis models and demonstrate how much the growth of sustainable profit is accelerated by those who uphold these values. This raises the question of whether companies will embrace and uphold social and environmental values as indispensable and priceless in the same way that they

have with training.

Unless we replace manual needs analysis with AI-driven analysis, we will miss the opportunity to create better jobs, better businesses, and a better world. In other words, the technical ability to automate business needs analysis is here, and the first businesses to develop that capability will reap the greatest rewards.

We can assume that before the invention of AI, needs assessment was performed in the best possible way. Hindsight and historical data show how those decisions impacted workers, customers, the public, nations, business profit, and the environment. Foresight tells us certain new technologies can enable businesses to do better. In prior technological eras, financial profit took precedence over everything else, including people, jobs, and the environment. Cities known for steelmaking and smog-filled skies referred to that acrid aroma as "the smell of money." Coastal cities loaded their garbage onto barges, dumped it in the ocean, and called it “fish food.” We must replace those attitudes and practices in ways that benefit everyone, not just corporate executives and investors.

In conclusion, when conducted by individuals, needs analysis can be time-consuming and susceptible to shortcuts and biases, or it may not occur at all. Automating needs analysis may reveal issues initially thought to be related to worker performance are actually the result of a broken supply chain, ineffective work policies, defective equipment, or a wide range of other problems.

Needs analysis should never be shorted or skipped and should cover entire organizations rather than just a single function, and VURPRD must always be used for decision-making instead of opinions.

Chapter 4: Why Change is Needed

By automating needs analysis, companies can examine multiple issues at once while greatly lowering the possibility of bias, greed, self-interest, and human error. Given the benefits and inevitability of adopting an AI-driven needs analysis method, the main impetus for switching now is the avoidance of lost opportunity costs associated with being a technological laggard in your industry instead of being an innovator or early adopter.

Unfortunately, automating needs analysis is not a simple matter of algorithmically mimicking existing manual processes, as such an approach would be comparable to using used parts to repair airliners. Because nobody wants to automate a flawed process, automating needs analysis requires businesses to update their models and practices, which will benefit them whether the updated practices are automated or not. From that perspective, the sooner a business launches an initiative to implement AI-driven needs analysis, the sooner they can enjoy the benefits.

Other reasons for introducing a new needs analysis model now include:

Traditional Organizations Can't Support Needs Analysis

Needs analysis is a key management activity performed across various functions of every business. It is by far the most important responsibility of managers and leaders and is the foundation of their value. While business professionals, including TL pros, understand and value a robust and objec-

tive needs analysis, the evidence of anyone actually performing a full needs analysis is difficult to obtain. This strongly suggests that the will to perform a robust, objective, all inclusive needs analysis exists, but the means of performing one has not until now.

One of the main reasons conducting a comprehensive and objective needs analysis is so difficult is that most business functions operate in silos, restricting their needs analysis to only their immediate scope. When organizing a needs analysis, the business's revenue quotas, analyst biases, insufficient data, and office politics often skew their decisions. For example, TL organizations limit needs analysis to training and learning needs. They often determine needs solely based on an executive's request; therefore, it's common for them to perform a "mini-needs analysis" or no needs analysis at all following an executive's request for training. Additionally, when TL professionals are limited to analyzing the nominal, ordinal, and interval data generated by the TL organization, then it's extremely difficult for them to make a convincing case for a needs analysis to an executive who demands training and proof of results.

If it seems ludicrous that the TL organization can't access performance data within their own company, that's because it is. Not sharing information within the same business can be the result of what's referred to as the "silo effect." Whether borne of honest security concerns or simply building fiefdoms via data hoarding, the silo effect prevents TL organizations and others from accessing the VURPRD they need to objectively analyze performance. This lack of information does not guarantee that a new training program or

SOP will be developed, that a new piece of equipment will be purchased, or that a compensation change will occur. It only means that the chances of those things rapidly growing sustainable profit for the business are unknown, and implementing them could waste more resources than they save or grow.

The pervasive silo effect makes it highly unlikely for businesses to perform bias-free needs analysis within traditional organizational structures. Resolving the silo effect's impact on needs analysis may seem like a simple issue to resolve, but it is deeply entrenched in most businesses; many have unsuccessfully attempted to extinguish it, but it remains pervasive.

In practice, needs analysts may diligently request the VURPRD they need from various business units via a blanket request that doesn't limit the type, amount, and date of the data being requested but only receive data related to a current project or nothing at all. That can quickly become tedious and time-consuming, which can discourage future data requests and rigor. A solution to the silo effect would be an automated needs analysis system that provides secure access to all company data.

Security is critical whenever sharing data. It can be achieved in many ways including removing individual names or applying aliases, aggregating individual data, and redacting sources. Regardless of what security means are used, sharing data is essential to rapidly growing profit and not only when assessing needs. There are many benefits to sharing data on a need-to-know basis within a business, which is a major reason for neutralizing the silo effect.

When manually performing a needs analysis, businesses should focus on resolving work system needs that impact the entire organization, such as work policies, before moving down to the worker system and process needs. An AI-driven needs analysis system can and must assess both work and worker needs simultaneously. Traditional TL needs analysis methods do not advise this approach. In fact, they may never include the work system in their analysis. Ultimately, choosing not to analyze work system needs before worker system needs can lead to training programs and other interventions that fail to address the root causes of issues.

Other reasons why conducting needs analyses within traditional organizational structures can be challenging, include:

- It can take weeks or months just to bring the right people together to launch a traditional needs analysis. When needs are immediate and competition is fierce, spending weeks or months analyzing them is decidedly insufficient.
- Needs analysis commonly begins with a client's request for training, not a request for needs analysis. From the TL organization's perspective, there is a clear incentive to fulfill all training requests based on any amount of needs analysis, or none at all, because developing and delivering training is often their only revenue source and maintaining relationships with their benefactors is their primary objective.
- Needs analysts are often subordinate to their clients, which can make it easier to sacrifice the quality of their assessments to meet the client's

demands rather than risk damaging personal relations or those of their business function. Neglecting needs analysis to cultivate client relationships and augment training department revenue may appear mutually beneficial to the training department and the client; however, this approach ultimately undermines the organization's financial performance.

Analysts frequently lack access to the data required to conduct quality needs analysis. That frequently happens in "siloed" organizations that don't collaborate with analysts or other departments. When data isn’t shared, needs analysts must make assumptions about root causes, the value of resolving a perceived problem, and resources are often wasted on low-impact solutions to problems that may not exist.

Barry Richmond first introduced the term "systems thinking" in 1987, and Peter Senge incorporated that concept as the cornerstone of his book "The 5th Discipline" (Senge 1990, p. 6). Systems thinking was supposed to enable businesses to a) see the big picture; b) identify root causes of problems; c) anticipate unintended consequences; d) create effective and sustainable change; e) improve performance; and f) shift perspectives. Subsequently, numerous organizations adopted systems thinking and continuous learning as strategic initiatives for overcoming the narrow scope and lack of collaboration experienced by TL organizations. Similar to many other idealistic business concepts, systems thinking overlooked the primary objective of every company globally, which is to achieve rapid and sustainable profit growth, and ultimately perished within an organizational silo.

Organizational Structures are Changing

Businesses tend to revise their organizational structures to fit new technological ages, and the AI and Robotics Ages will not be an exception. Examples include how the Industrial Age replaced the home, guild, and family-based businesses of the Agricultural Age with factories and non-familial hierarchies. The abolition of slavery, the rise of trade unions, and monopoly busting changed Industrial Age business structures. In the Information Age, office software replaced secretaries, and matrixed organizations replaced hierarchies.

In the AI and Robotic Ages, there will be opportunities to restructure business organizations in ways that will grow sustainable profit faster than ever. The greatest opportunities to restructure business organizations in the AI Age rise not just from replacing production workers with robots, but also from the replacement of highly paid decision-makers with automation. By replacing the highly paid decision-makers with AI and the production and service workers with robots, businesses will be able to dramatically flatten their organizations. The money saved by reorganizing labor will create opportunities for businesses to build highly profitable, ethical, and climate-friendly organizations while growing unprecedented amounts of sustainable profit.

It's now possible for computers to hire workers, enable those workers to perform their assigned SOPs with little to no training, set and adjust production quotas for individual workers, track the performance of every worker and every SOP step they perform, create personal improvement

plans (PIPs), aka “pivots” in the Amazon organization, and terminate workers whose numbers don’t meet their quotas. All can be done objectively and consistently than ever before possible without involving or paying a manager or administrator, albeit without a human touch. While some workers place a high value on human interactions, others don’t. The question of whether to automate sooner or later falls to either pleasing workers who require the human touch or the ones who prefer much higher objectivity.

Companies like Uber, Amazon, and Waymo have led the way in organizing their businesses for AI and robotics. Here’s what they’ve done:

- Uber used novel GPS and payment technologies to eliminate employees and operating equipment costs. They contracted drivers to use and maintain their personal vehicles in exchange for low pay to perform deskilled work that required minimal training.
- Amazon used novel technologies to replace the labor and facility costs of brick-and-mortar bookstores with software and robots. They further replaced delivery labor with drones. Amazon’s warehouse work shifted from traditional employees picking and packing orders to robotic pickers and packers and a skeleton crew of low-wage contractors who are expected to perform increasingly deskilled tasks under constant electronic supervision and evaluation.
- Waymo, a robotaxi company, became the first successful example of a native Robotics Age business. Waymo’s objective was to build a fully automated taxi service that would beat Uber by eliminating near-

ly all of its operating labor costs. Waymo hired hundreds of engineers to develop, refine, and optimize their robotaxi prototype. Once the product worked as intended, the engineers were let go, the company's organizational structure flattened, and it was ready to provide high-quality robotaxi services with enormous profit potential.

Future businesses will strive to develop AI and robot-native, fully automated products and services whenever feasible, just as Waymo did. That is how future businesses will operate while beating their competition. Automation, robotics, and flat organizations have arrived and they aren't going away anytime soon.

Notably, companies that want to adopt the Waymo model will need to hire a large number of workers and capture massive amounts of performance ratio to develop and optimize their products. Once the processes are optimized and enough of the time and motion data needed to program the product, a car in Waymo's case, is captured, the product is launched, most of the manual workers and their supervisors are laid off or reassigned, the organizational structure is flattened, and labor costs are permanently lowered.

Waymo has demonstrated how to shift organizational structures from hierarchies to flatarchies. Flatarchies are shallow hierarchies with minimal to no management levels and high levels of autonomy in each position. In flatarchies, the management function is replaced by AI: algorithms and AI agents that mimic management. The success of every flatocracy depends on a business's ability to make more and better decisions faster and more

effectively with fewer people, which is the perfect environment for AI and AI-driven needs analysis.

This book provides answers on why leveraging automation and robotics is critical for every business worldwide. The most important strategic question remaining is when to start the AI journey. The answer to that question is the same as always with respect to proven new technologies; it is to do so as soon as systemically, or humanly, possible.

Innovation is Devaluing Memorization and Learning

There is no research going back to the beginning of mankind, but because we know they didn't have language, we know they didn't have training; therefore, we can safely surmise that those first humans learned via trial and error and memorization. Fortunately, the earliest humans only needed to learn how to avoid predators, find or grow food, and locate or construct shelter. After trial and error revealed best practices, mimicry became a powerful learning method as sons watched their fathers hunt, and daughters watched their mothers gather and prepare food. At the dawn of humanity, people had to memorize everything, or they would die.

With the invention of verbal language came the ability to ask for and receive instructions, which significantly devalued memorization. The value of memorization declined further with the invention of print communications that enabled people to perform tasks by reading and following written instructions instead of relying on memorization, mimickry, or teaching. Back then, as now, the problem with memorization as a performance enhancer

is the same: "Human brains are leaky vessels." Leaky vessels are indicated when people a) have forgotten one or more steps of a process; b) encounter processes that have changed since they were memorized; c) are distracted in a way that causes them to forget one or more process steps, such as the pressure of an emergency; or d) don't perform a process often enough to remember its steps.

The invention of photographic, sound, and video recordings devalued memorization as a performance enabler even more. A major flaw of those media is that the processes they teach can become outdated before the content can be created. Another drawback is that outdated content, unless completely destroyed upon obsolescence, can persist, confusing future learners and wasting resources indefinitely.

The Information Age further diminished the need for memorization by making information readily available whenever needed through computers, radios, televisions, phones, and even wearable and portable technology. Unfortunately, the effectiveness of Information Age technologies still depended upon perfect human memory between the acquisition of the information and its application. For example, for workers to use a digital job aid hosted on YouTube or a similar video server, they would have to stop working, access a device that plays YouTube videos, look up the needed SOP, read/watch a step, pause the video, remember the step, perfectly perform the step, restart the video, etc.

From a learning perspective, there is no learning without memorization. Unfortunately, memorization as a performance enabler is highly flawed,

and, as just noted, undependable. From a work perspective, perfect performance now depends less on faulty memorization and stable work instructions than on-demand access to accurate, up-to-date work instructions delivered to workers as they perform their tasks. For people who work with their hands, the only efficient and effective way to deliver and receive instructions is audibly, hands-free, and at the moment of performance.

Another reason for the declining value of memorization and learning is the changing nature of work. Like Waymo, future businesses will aim to build AI and robotics native, fully automated products and services whenever possible, because that's how they can grow the most sustainable profit fastest. This strongly suggests that AI will supplant the majority of current knowledge work. Fortunately, there will be 27 million new systems and products that will need to be developed from scratch, and the only way to create product prototypes and SOPs is with manual labor. Those manual laborers will carry out quickly changing processes that are either impossible to memorize or shouldn't be performed solely from memory. They will continue to carry out these tasks until the product and SOPs are optimized and enough time and motion data have been collected to enable the work to be automated. It also suggests that the resources spent enabling workers to memorize/learn work instructions in such environments can never provide a positive return on their investment.

Not Enough Time for Memorization

Businesses need innovation to resolve new and old problems, to stay ahead of the competition, and to foster rapid, sustainable profit growth. ***The***

only thing better than innovation at enabling businesses to rapidly grow sustainable profit is faster innovation.

The traditional way of implementing new technologies involves substantial amounts of time spent on activities including needs analysis, training, practice, and memorization, each of which requires more time and money than businesses care to spend. Businesses often resort to shortcuts when their resources are already insufficient. They may cut practice from their training sessions, reduce or eliminate needs analysis, or cut training altogether. Companies that can't keep up with rapid innovation or take too many shortcuts will fail. Consequently, it would be better for companies to start building an innovation capability as soon as possible.

To get a sense of how rapidly innovation is growing and what businesses must prepare for, check the US Patent and Trademark Office's (USPTO) productivity data. They granted 48,854 utility patents in 1979, and 40 years later they granted 354,430 for a 40-year period total of 6,347,000 patents.

By trending USPTO productivity at the same growth rate forward 40 years, we can predict there will be 2,200,000 patents granted in 2059 alone and 26,985,000 granted over the coming 40-year period. This trend is important because the amount and pace of change that has occurred over the last 40 years has overwhelmed many individuals and businesses, and the amount and speed of change that is about to occur will likely overwhelm them even more. Using existing needs analysis models to assess nearly 27 million patents is simply untenable, as it would be too costly and would limit the development and adoption of new technologies, both of which would

stymie profit growth and economies. Needs analysis cannot remain as it is.

Upon examining the pace of change, it's notable that the first Homo sapiens appeared on Earth around 200,000 years ago, and our brains haven't changed significantly over that period, but our technologies have. Remarkably, in 1903 we made our first fixed-wing flight, and in 1971 we made our first successful landing on Mars. That means it took humans over 200,000 years to learn to fly, but only 68 years to fly to Mars.

It's also important to note the dramatic acceleration of technological eras that once spanned millions of years to what is about to become multiple ages per year. For instance, humanity took tens of thousands of years to reach the Industrial Age, which lasted fewer than 300 years, and was then followed by the Information Age, which lasted approximately 60 years. More recently, the IoT/Surveillance Age lasted around 17 years, and both the AI and Robotics Ages began shortly thereafter. Before the Information Age, very few people lived through more than one technological era, but now, for the first time in human history, the majority of people will experience the turmoil of having lived through multiple eras. This distinction is critical to understand given the fears, anxiety, and upheaval societies experience within a single technological era, much less three or more in quick succession or even concurrently. We must now adapt to previously unimaginable amounts of change in unimaginably short periods of time, and the systems that helped us in prior technological eras, including needs analysis models, will become obsolete.

Each technological age created a foundation for the next, and that

trend continues. The Industrial Age saw the invention of photography, video, audio, and electricity, all of which were crucial to the Information Age. Computers, the Internet, digital media, and mobile devices were invented in the Information Age and were essential to the Surveillance Age, which is also known as the Internet of Things (IoT) Age. Innovators developed digital sensors, micro-cameras, and the ability to gather data from digital devices during the Surveillance Age.

AI algorithms and robotics could not exist without data captured by Surveillance Age technologies. The combination of the Surveillance, AI, and Robotics Ages brings about so many changes that traditional methods of understanding needs, memorizing, and learning cannot effectively handle.

Innovation doesn't end with an idea or a patent. Even though some patents and ideas will never be commercialized, every inventor wants to profit from their creations as soon as possible. This means that inventors over the next 40 years will attempt to develop at least 27 million patents into profitable products and services, which will create more jobs that AI eliminates.

Inventors must put their patents through a product development process before making any money. That process (see Appendix A) requires inventors to create a minimum viable product (MVP) and at least one SOP that is used to operate the MVP. The MVPs and SOPs are continuously enhanced until they can no longer be improved. Once optimized, the SOP steps are programmed into an AIA system and workers follow those instructions as the time and motions they use to perform each step is captured and ultimately programmed into robots that mimic humans.

Knowing how products are developed is important because every step of the product development process must be performed manually until enough data can be captured to program robots. This statement will remain true until AI and automation advance to a point where they are able to innovate and then build and optimize their MVPs and SOPs without human assistance.

Because the product development cycle must be repeated for each of the 27 million patents expected over the next 40 years, businesses will need to create enough jobs and locate enough qualified people to develop at least 27 million new products. The number of jobs required for product development work alone could easily exceed 27 million, and there will not be enough time to train those workers how to execute each new and updated SOP. There is already insufficient time for traditional organizations to conduct manual needs analysis or engage in expensive change management activities; the situation will only get worse until businesses deploy an AIA and an AI-driven needs analysis system.

The Number of Unlearnable SOPs is Increasing

Since childhood, we've been told that we can learn anything. In reality, learning requires memorization; therefore, things that can't be memorized are unlearnable, and many things cannot be memorized. Consequently, no amount of high-quality training or learning programs will enable workers to perform unlearnable SOPs.

Things that can't be memorized include SOPs with more steps than can

be remembered, SOPs performed too infrequently to memorize, and SOPs with steps that change too frequently to be memorized. Each of those situations proves that learning anything or everything is untrue; they also show how and under what conditions training and learning are ineffective at enabling worker performance.

Accelerating innovation is causing the number of unlearnable SOPs to dramatically increase, and the main reason is the growing number of patents, product development work, and ultimately, a tsunami of new products and services, which has already begun. Every inventor who receives a patent wants to make money off of their creation as soon as possible, which is why they begin the process of developing new products as soon as the patent is obtained, and sometimes earlier.

Despite a growing number of unlearnable SOPs, the concept remains novel to many and has hit a nerve in the TL community. The TL community persistently defends the idea that anyyone can learn anything. As long as TL professionals deny the existence of unlearnable SOPs, they won't enable workers to perform them.

Intelligence augmentation (IA), which encompasses traditional performance support (PS) techniques, helps workers follow SOPs that are difficult to learn/memorize, but accessibility is key. For example, many manual workers are unable to safely, efficiently, or hygienically access computers, handheld devices, or printed aids as they work. Those workers include but are not limited to a) microbiologists and medical/dental workers who cannot aseptically use a computer keyboard or a phone to access the SOP as they

work; b) food and beverage workers who cannot efficiently look up, queue, watch, pause, and play instructional videos as they fill customer orders; and c) construction workers who can't safely access instructions delivered via augmented reality (AR) or virtual reality (VR) as they work. Furthermore, workers in any industry that requires a perfect response to an emergency or to perfectly perform in an environment where a mistake could blow up the town are not candidates for traditional performance aids.

Here's a story about a plant manager named Bob who must handle an emergency event in his plant:

> *Bob is responsible and accountable for safety in his Kansas-based beef processing plant. Tornado drills are held annually, but luckily, none have struck his plant, until now. All the drills and tornado preparations went as planned, which undoubtedly would save lives. But Bob is now standing in a destroyed building with many injured and possibly dead workers. What Bob does next could save or cost lives, including his own, and he knows it.*
>
> *There is an SOP for what Bob should do that's kept in their plant's Emergency Procedure Manual. Bob needs to find it, read it, and perfectly follow every step of its instructions. The location of the manual used to be a running joke among workers because nobody knew where it was kept. After the tornado damage, Bob wasn't sure he could find it at all or even if he should waste time trying to find it amid all the destruction. Luckily, despite being under duress and injured himself, Bob found the manual, and with injuries and devas-*

tation all around him, he's now supposed to find the right SOP, then read and precisely follow each step. Unsurprisingly, there was too much going on, and Bob had no time to read and follow an SOP. Bob could only react, so that's what he did.

When emergencies occur, memories fail and workers can't access emergency SOPs from a computer or phone quickly enough to prevent further property damage or personal injuries; only AIA will suffice under those circumstances.

Until AI and robotics advance to the point where they can create, optimize, and manufacture products without human intervention, product development will require at least one manual worker to perfectly perform continuously changing, unlearnable SOPs for each new product. Enabling manual workers to carry out unlearnable SOPs is an urgent and growing business need that will eventually necessitate a large enough workforce to turn 27 million patents into profitable products.

Every contemporary needs assessment model must swiftly develop the ability to identify unlearnable SOPs and advise ways to enable their flawless performance.

AI-driven Needs Analysis Will Rapidly Grow Sustainable Profit

Decision-makers have traditionally performed needs analysis manually, utilizing available data, their specialized knowledge, and a significant amount of intuition. The quality of those analyses could only be as good as

the subjective data and decision-maker intuition and bias will allow. AI will dramatically improve needs analysis in many ways. One of the most important ways is that it will remove subjective, intuition-driven, biased decision-making from the needs analysis process.

The value of AI-driven needs analysis will be highly dependent upon the model it follows, the agents that run its algorithms, and the data available for it to analyze. See Appendix B of this book for an explanation of what an AI-driven needs analysis model and algorithm would look like, as well as a quick guide to setting up a such a system.

As you read through the ANAM model and evaluate its efficacy, note that, while it's intended to be a model of an ideal solution, it only needs to be a small improvement over current ones to rapidly grow sustainable profit.

When provided a model to follow, VURPRD, and continuous improvement feedback from workers, AI can be programmed to continuously perform needs analysis better, faster, and at a lower cost than humans. Unlike human decision-making, AI can a) objectively analyze vast amounts of data in very little time; b) strictly follow the needs analysis algorithms; c) work nights, weekends, and holidays without extra pay; and d) stick to the facts while not introducing human bias, greed, or self-interest into the analysis. From this perspective, it's easy to see how AI-driven needs analysis bests human-driven needs analysis.

For decades, TL organizations have attempted to use the nominal, ordinal, and interval data they collected about the training they provided

to prove learning/memorization happened, performance improved, and a return on their training investments was achieved. Unfortunately, algorithms and mathematical calculations can only use VURPRD. AI algorithms work by using previously collected performance data to predict future performance. For example, if a robotaxi is making a left turn and the traffic light turns yellow, does it stop in the middle of the intersection, does it back up to the stop line, or does it stop to analyze oncoming traffic and then continue to turn? In short, it chooses the most effective option by quickly evaluating the traffic data gathered from thousands or hundreds of thousands of human drivers who successfully responded to the same scenario thousands or millions of times.

Surveillance Age technologies made AIA possible. AIA allows workers to execute SOPs without prior training or memorization, guarantees that they accurately complete every step of each assigned process, and continuously enhances the performance of individual workers and the processes they perform. By capturing the time and motions that manual workers use to execute their assigned SOPs, businesses create the dataset that AI algorithms. This is the same data that managers need but don't have to make objective decisions. To clarify, businesses need to capture the time and motions that production and service workers use to perform their tasks, whether planning an AI-driven needs analysis system, an AIA system, a native robotics system or not.

Before AI can replace manually performed needs analysis, it must be able to mimic human decision-making, and that requires VURPRD and AI

algorithms. Businesses may be able to accelerate the development and implementation of their AIA and AI-driven needs analysis systems by purchasing pre-configured algorithms, but because most businesses customize even the most common SOPs, the VURPRD that feeds those algorithms must ideally be captured within each business and across all manual workers. Gathering and analyzing locally generated data also significantly reduces AI errors and hallucinations caused by "dirty," publicly sourced data. Technologies of the Surveillance Age made it possible to continuously collect VURPRD, which is essential because worker and work systems are constantly evolving and because more data improves reliability and predictability.

It’s important to note that building an AI-driven needs analysis system to mimic an existing or traditional needs analysis model cannot be expected to rapidly grow sustainable profit, as it can only be expected to maintain the status quo at best. A new system must be built that can 1) simultaneously and instantly analyze millions of data points; 2) remove human bias, greed, office politics, and self-interest from decision-making; 3) protect the environment, consumers, and workers; 4) create model solutions and score each model based on the break-even date and return on investment; 5) recommend the best model; and 6) draft project plans that include the project goal, objectives, milestones, tasks, resources, and dependencies and make preliminary resource assignments and due dates for doing the work required to fulfill the need.

The best news is that all this is possible and will soon become a com-

petitive advantage to businesses that are among the first to implement an AI-driven needs analysis system.

AI Will Improve Legal Compliance

When the only goal of every business worldwide is to rapidly grow sustainable profit, then some businesses will attempt to grow their profit in any and every way possible. Some will choose to operate with total disregard for anything but their profit—not future generations, and not the environment, the public, or their workers. For evidence of this, look no further than the number of full-time workers in the US who also qualify for SNAP and other government assistance, the Love Canal tragedy, the Pullman Strike, and the most egregious example of all, slavery.

Governments have passed many laws to protect workers when businesses would not. While grossly oversimplified, US employment laws require all business assessments and decisions to be based on valid, job-related performance data, aka VURPRD. Although this standard may initially appear to be limited to employment decisions such as hiring, compensating, promoting, and laying off staff, in practice, it ultimately trickles down to all facets of the work and worker systems that have an effect on employees. In other words, the US government requires all business decisions to be supported by VURPRD, even though most businesses can't collect enough performance ratio data to make that data reliable.

As new technologies are introduced and technological eras evolve, everything changes, including organizational structures, jobs, SOPs, com-

pensation, etc. According to employment laws, a needs assessment must be performed before every business decision and prior to every change to the work and worker systems. Businesses that capture VURPRD can meet that government mandate, whereas others cannot. Moreover, by proactively capturing VURPRD and enacting worker-friendly policies, businesses can comply not only with the letter of the law but also with the spirit of the law.

According to this perspective, everyone will benefit from AIA and AI-driven needs analysis—including the business—and the sooner a company starts to capture and use VURPRD to assess needs, the more sustainable profit they can rapidly grow.

Chapter 5: The Current State of Needs Analysis

The problems that obstruct worker system improvement and quick, sustainable profit growth are addressed in this chapter. Each item listed here indicates a performance improvement need, the failure of prior needs assessments, and an opportunity for AI-driven needs analysis to grow sustainable profit. We can assume that prior needs assessments would have prevented or resolved these issues if they had been successful.

We can characterize the current state of needs analysis in TL organizations as negligible, haphazard, and nominal. It wouldn't take much to improve needs analysis in TL organizations, but it only makes sense to do so by first optimizing a manual process and then adapting it to AI.

Emphasis on Failure and Punishment

Do you remember your first day at any new job? Were you fully informed of everything that could have you terminated in the most precise manner? Yes? It's a pretty common occurrence and most of us are fully aware of what it would take to be fired from every job we have ever held or will ever hold. A more enlightening question is, did you receive the same detailed information about how to get a promotion, the highest performance rating, or the biggest raise as you did about how to get fired? It's pretty common for businesses to effectively instruct workers on what they could do to get themselves fired, but not on how to do excellent work, earn a top rating, or receive the highest raise. One must wonder if businesses that can

define failure but not excellence really want their workers to excel.

In a monumental 1968 study, elementary school students were given an IQ test, and their teachers were told a set of their students had exceptionally high IQs, while others were average. In reality, the students in the group designated as “exceptional” students were randomly selected and didn’t necessarily have high IQs. Over time, the researchers observed that the teachers created better environments for the supposedly high-IQ students and gave them more time and attention than they did for the average group. Eight months later, the students were given another IQ test, and the results showed the scores of the students previously identified as having high IQs had risen significantly when compared to the group identified as average.

The experiment proved that teacher expectations created a self-fulfilling prophecy that caused students who believed they were gifted to perform at gifted levels. In short, “When we expect certain behaviors of others, we are likely to act in ways that make the expected behavior more likely to occur.” (Rosenthal & Babad, 1985) Since that study, additional research has corroborated that the “Pygmalion Effect,” as this is referred to, is active not only in schools, but also nursing homes, athletics, military services, businesses, and even courtrooms. In summary, “The essence of the Pygmalion Effect is that teachers get the students and managers get the workers they expect. Those who expect more, receive more. Conversely, those with lower expectations tend to receive less.” (Eden, 2014)

Companies that want to rapidly increase their sustainable profit must understand the power of the Pygmalion Effect. Consider this scenario:

Pat is a recent college graduate and lead technician at the end of their first year on their first professional job. When Bob, the hiring manager, interviewed Pat for the job, he concluded that Pat was the best candidate given the business's values, how Pat presented themself, and the relationships Pat had built in the past. Pat displayed a high motivation to succeed, a charismatic appearance and demeanor that suggested no problem fitting into the business's culture, and a history of building relationships and working well with others. Pat was dressed well, tall, and athletic, and by every definition they appeared to be a "natural-born leader." Pat had good connections, including a very rich, well-known family. He even reminded Bob of his younger self.

During the interview process, Pat told Bob he was a real achiever and would do whatever it took to be the best. Then, he asked Bob what it would take to earn the highest performance rating and largest raise in this position. Bob was ecstatic to hear that question, as it suggested that Pat was a real go-getter. Bob's response was glowingly optimistic, albeit extremely vague, but indicated that by working diligently, Pat would be very successful in the job under consideration. Bob took care not to promise anything, as that was part of his training. Pat was offered the job, and despite not getting answers to his questions, he accepted. After all, no other prospective employer directly answered his questions either.

During Pat's first year on the job, Pat was repeatedly recognized as the group's best performer, and their peers affectionately referred to Pat as "Gung-ho Pat." Pat didn't mind the moniker but often complained to their

family about the lack of effort displayed by their peers, especially the older colleagues.

At the end of Pat's first year, production had increased, cycle times and errors decreased significantly, and profits rose sharply, directly reflecting Pat's contributions as performance review time approached. Everything indicated that Pat had a fantastic year. He built many stellar relationships, got awards for his performance, was glad to be working for this company, and went into the performance review meeting with high expectations of being well-rewarded for such outstanding work.

In the following discussion, Bob wraps up his performance review meeting with Pat.

> *Bob said, "So, Pat, as we discussed many times this year, your first year's performance has been outstanding. I couldn't have asked for more. Therefore, I've given you an overall rating of 'Meets Expectations,' and you'll be getting a 2% raise in your next paycheck. Congratulations, and thank you for your outstanding work."*
>
> *Pat responded, "Thank you, Bob. I appreciate your recognition, but I was hoping to get a better rating than a 'C' and more than a 2% raise."*
>
> *Bob said, "Oh, a 'Meets Expectation' rating isn't considered a 'C' here; it actually means you did very well, and you should keep up the good work. We don't give out 'Exceeds Expectation' or 'Far Exceeds Expectations' ratings often, and to get one, you'd have to*

have 'walk on water' level performance."

Pat responded, "I see. That's kind of disappointing because I worked so hard. But as we begin the next performance review cycle, I'd like to reiterate what I said during my job interviews. I said I was willing and able to do whatever it takes to get the best raises and promotions as quickly as possible. After saying that, I got an offer letter and then negotiated my pay rate with the recruiter. I asked for 10% above the offered rate, and the recruiter advised me to take a lower amount; otherwise, I'd top out of my pay range too quickly. While that didn't make a lot of sense to me, I knew my capabilities and took the job knowing I could quickly make up the difference. Given what you just told me, I won't be able to make up the difference this year, so can we talk about what I need to do this coming year to get the highest possible raise and fastest promotion?"

Bob asked, "OK. What are you looking for specifically?"

Pat responded, "If you tell me what it will take for me to get a 'Far Exceeds Expectations' performance rating, I'll do it. So, that's what I'm looking for, as well as knowing how much of a raise I'll get after performing at that highest level of all."

Bob explained, "I appreciate your ambition, but I have to tell you I can't make any promises. I submitted a 'Far Exceeds Expectations' rating of your first year's performance to human resources and was told they wouldn't approve it because they don't believe there's any

way a new hire can far exceed the expectations of their job in their first year."

Pat asked, "While I agree there's much more for me to learn in my job, shouldn't my first-year review be based on what first-year employees accomplish instead of comparing performance to what people who have been here for years have done?"

Bob said, "No. We look at team performance, then give raises to the best producers on the team."

Pat replied, "I see. So, my peers, X and Y, have been here the longest, and they got the best raises? I would think they've topped out of their compensation range by now and aren't getting any more pay increases."

Bob further explained, "It's not that simple. Pay increases partly depend on where employees are on their pay scale. As your recruiter told you, employees can top out of their pay ranges, and in those cases, they don't get any more pay increases. In addition to that, our business sets a payroll target at the beginning of every year, and we're required to stay below that number."

Pat acknowledged, then asked, "So, peer X and peer Y didn't get raises, and I got 2%? What is this coming year's payroll target?"

Bob answered, "2%, which is what I awarded to you this year. You put in the best performance and got the highest pay increase in my group."

Pat clarified, "Thank you. So, even if the business booms with a 30% profit increase, the payroll budget won't get bumped up?"

Bob confirmed, "That's right."

Pat conjectured, "And if I find a way to do twice the work of the next highest performer in our group at higher quality, we'll both get maximum raises of 2% next year as long as neither of us has topped out the pay range?"

Bob said, "I'd go to bat for you with HR again if you could do that, but it depends on the next highest performer's pay."

Pat asked, "When we set my next goals and objectives for next year, can we focus on putting me on track for a promotion and getting a 'Far Exceeds Expectations' performance rating?"

Bob said, "Yes, we can do those things, but you should understand that human resources may not allow me to give you a 'Far Exceeds Expectations' rating regardless of your performance. As I said previously, the unofficial requirement for getting that rating is that the employee must have "walked on water," and you don't look like Jesus. I can put you on a management fast track and enroll you in training that should give you greater upward mobility, but I can tell you that human resources will not consider doing that if you ask them the same questions you just asked me."

Pat noted, "OK. I'll still do my best work this year because my work ethic simply won't allow me to do otherwise, but it seems odd that

our company can tell me with certainty what would get me fired but cannot tell me what I could do to get the best raise. If everyone knew what it would take to get a bigger raise, then it would make sense that they might perform better, which would grow our company's profit faster and sustainably. It's a simple application of the Pygmalion Effect. Am I wrong?"

Bob concluded, "I don't know anything about the Pygmalion Effect, but suppose you're right. Would you like me to arrange a conversation for you to share your perspective with our human resources representative?"

Gung-ho Pat suddenly realized why their older colleagues put forth minimal effort and that the "gung-ho" moniker was actually a ridicule, not a term of endearment. For the first time, Pat, the best performer in the group, thought of finding a new job.

This case exemplifies the institutionalization of central tendency bias and the perpetuation of mediocre performance expectations. The business created this situation by failing to define excellence, forcing workers into a single performance review category, penalizing exceptionally good performance when it occurs, and over-rewarding the poorest performers. Central tendency bias actually rewards average and underperforming workers while punishing the overperformers. With central tendency bias, businesses can achieve short-term compensation savings and passable performance. However, the best performers soon discover that their extra efforts are not rewarded. The short-term profit gains of central tendency bias quickly be-

come unsustainable due to higher employee turnover costs, mediocre and poor performance, and low employee satisfaction.

From a needs analysis perspective, this example of a commonly occurring work scenario shows how subjective data from job candidate interviews, supervisor observations, and performance reviews are often invalid, biased, unreliable, and incapable of revealing ways to rapidly grow sustainable profit. It also suggests that capturing performance ratio data would expose both the existence and preservation of systemic central tendency bias, reveal how much it costs the business, and project the ROI of an intervention that would eliminate it.

Businesses that launch needs analysis activities in environments practicing central tendency bias will never know if a perceived problem is caused by the effects of rater bias, central tendency, a self-fulfilling prophecy, or something else. There is no doubt that overall performance suffers when the cadre of employees who produce exceptional work receive the same performance ratings and incentives as those who perform at average or below-average levels. This is because the exceptional employees will ultimately pare their contributions or find other jobs, and those who perform below average won't be incentivized to do better or leave. Eventually, the company is reduced to accepting the minimum standard performance by average producers, at best.

Trust is Missing

Achieving excellence doesn’t just happen; it begins with aspirations that

are turned into achievable plans and quotas supported with attractive employee incentives, all of which are then effectively communicated in words and actions across entire businesses. Even with the best incentives, quotas, and plans, things can go wrong. When things go wrong, a lack of trust between employer and employee is often to blame.

Every day, businesses have the chance to establish trust with their employees, but performance review day offers the greatest opportunity of all. On that day, the worker system is told how they'll be rewarded by the work system, and employees determine whether they received fair treatment or not. While employees are generally discouraged from sharing their performance review rating or compensation, the word eventually gets around and any sense of unfairness is proven.

Most US workers, who have spent over ten years in school, likely learned that a test score of 100% signifies perfection, but due to environmental and other factors that should not be counted against the student, the top performer's score was used to "curve" all others. In Pat's case, that didn't occur. Instead, perfection was set as the benchmark, there was no "curve" at the top, but there was one at the bottom designed to prevent low performers from getting fired. Essentially, the poor performers were pushed up the curve, while the best performers were pushed down. As the exchange between Pat and Bob illustrates, employees feel deceived and can be expected to react negatively when their expectations, performance, and performance rating are incongruent.

Employees build trust through their production or service performance

in exchange for job security and fair incentives paid as promised, without issue. Any job security and pay anomalies that happen during a work year create distrust between workers and their employers, both of which prevent businesses and workers alike from achieving excellence. Contrary to supervisor and higher-up behaviors, it is the employer's responsibility to initiate, model, and nurture trust, not the frontline employee's.

Trust is built when workers accept and support their employer’s employment proposals, plans, quotas, and incentives, and after the promised incentives are fully delivered. The trust loop isn’t closed until employees accept the incentives they’re offered. Employees may not leave a job after losing trust in their employer.

Employee compensation and other incentives are the glue that employees and employers need to trust each other and stick together. As a result, businesses must create and deliver on every effort to foster trust with their workers, and the best way to do so is to make and honor commitments. The current state of needs analysis allows businesses to violate worker trust by not flagging unfair practices such as unfair compensation.

When building trust, employers and employees alike must keep in mind that trust is fragile and difficult to rebuild once broken. Employers must understand that, just as they constantly evaluate their workers’ performance, workers constantly evaluate their supervisors’ performance. In light of this, companies need to consistently demonstrate their dedication to excellence by doing two things: The first is to never miss a payday or pay the wrong amount. The second is for supervisors to never miss an employee’s perfor-

mance review date. Employees may only know of one appointment their supervisor has every year, and that is performance review day. If a supervisor misses that appointment, then they've missed 100% of the appointments the employee is aware of during the year and that's never a satisfactory example of excellence.

Fundamentally, employment is an exchange between an employer and an employee. The employee requires financial support and security, while the employer requires the production of a product or delivery of a service. The official consent to the quid pro quo is expressed in employment documents. When either party violates this agreement, issues and mistrust arise and productivity drops.

Traditional needs analysis models allow employers to violate worker trust by repeatedly committing the behaviors described here and many others.

Performance Management System Failures

The current state of needs analysis in businesses that administer performance management systems is untrustworthy, and there are no traditional needs analysis models that advise analyzing performance management systems for their ability to enable, ensure, and continuously improve performance.

The value of performance management is measured by its ability to motivate workers to deliver not just good or great performance, but perfect performance. Its most potent motivators include the promise of a fair and

consistently rising amount of compensation, more responsibility, authority, accountability, and job security. Problems arise when the motivators are weak, dishonest, inequitable, or simply nonexistent.

Traditionally, operations managers were trained to use performance management techniques with their employees, but they paid little attention to the work system that directly impacted worker performance. Those systems typically incorporate a performance review cycle that begins with goal setting and concludes with financial and other rewards that are intended to commensurately reward workers for their contributions. While those reviews can improve performance when well done, “when well done” is the key and primary challenge. A recent poll revealed that only 2% of corporate human resource officers (CHROs) think their performance management systems work, and only one in five workers say their performance reviews are transparent, fair, or inspire better performance. (Barrett, B. W. and H. 2025) When 98% of CHROs believe their performance management system is ineffective and 80% believe it is unfair, opaque, or uninspiring, there is a serious issue with a crucial business function that must be revealed by needs analysis, analyzed, and then fixed. The ongoing existence of dishonest performance reviews clearly indicates the failure of existing needs analysis to expose the issue.

If a business intends to achieve excellence, it must have an effective, trusted reward system. Businesses with malfunctioning performance management systems can benefit from the implementation of an AI-driven needs analysis by flagging these issues,

- **Unclear communication** includes confusing definitions and the improper use of the terms "expectations," "goals," and "objectives." Unclear communication can severely impact a business's ability to meet its obligations to investors, customers, the community, and employees. Each has its own distinct meaning and purpose with respect to employee motivation.
- **Not communicating expectations, objectives, goals, or quotas** can only lead to confusion and failure, especially given the long-standing conflation of each term and lack of interest in clarification.
- **Not tying performance to the business goal** leads to inequitable rewards across multiple workers and positions. For instance, if one worker makes PCBs and another sells them, both should be rewarded based on the profit the PCBs generate, not the number of PCBs produced or sold. That is necessary because producing and selling large numbers of products doesn't address profit, which is critical when the goal is to rapidly grow sustainable profit.
- **Incongruent communication** includes all conflicting messages from any level of management that are delivered to labor. A common example of this is the one delivered by a supervisor who tells their staff to disregard how a corporate trainer told them to perform an SOP. Another is a performance review format containing five rating categories, of which only three are ever used.
- **Rewarding failure** and mediocrity is the opposite of rewarding suc-

cess. When workers who don't meet their quota receive the same rewards as those who do, failure is rewarded. Businesses often pay all workers the same. That is frequently done to avert difficult conversations or to reduce payroll costs.

- **Not rewarding excellence** means rewarding something other than excellence or nothing at all. A company cannot reward excellence if it cannot define it.
- **Uncertain or fluctuating quotas** indicate that the business has either not determined the target performance level or is manipulating its payroll at worker expense. Quotas are often raised when more workers than projected exceed their quotas but they're never lowered when the majority of workers miss their quotas.
- **Unfair compensation** often occurs when businesses communicate the possibility of five performance rating categories but never assign the top or bottom one or two levels. Common explanations for this include a) the business only budgeted for average performance; therefore, the top categories can't be awarded; b) the top category is reserved for "walk on water" performance, and since nobody can walk on water, supervisors aren't allowed to award that rating to anyone; c) supervisors don't or are not allowed to assign the lowest two performance categories, as that indicates that there are workers who should be fired but the supervisor has shirked that responsibility; and d) it's less disruptive to award average/middle-level performance rating than a below average rating.

- **Not periodically evaluating and rewarding performance** happens when supervisors fail to take the responsibility for enabling, ensuring, and continuously improving their workers' performance. This situation often arises when a) supervisors fail to prioritize sufficient time to observe and objectively evaluate their workers' performance; b) it's easier and safer to assign an "average" rating than any other; c) payroll budgets decrease and supervisors must perform tricks to keep their payroll from costing them a personal pay cut; and d) it's too difficult or impossible to access the VURPRD required to perform a fair and honest performance evaluation.
- **Not using measurable performance benchmarks** makes it impossible to accurately and objectively calculate performance improvement. There are only two ways to objectively benchmark performance; the first is to make perfect performance the benchmark, and the second is to benchmark perfect failure. Unfortunately, the performance benchmark most businesses use falls randomly between perfect success and failure.

It's important to note that one of the most important, if not THE most damaging things a business can do to itself, is to play compensation games with its employees. The first game is to miss a worker's performance review date, the second is to not pay workers on time, and the third is to use subjective data to determine the performance rating and compensation amount.

An entire book could be written about the compensation tricks businesses play on their employees, with hundreds of examples ranging from sup-

pressing performance ratings to laying off workers just because they have the highest incomes.

Another current performance management issue is its use of words describing performance categories. As noted in a prior chapter, there is only one expectation of anyone in any situation, and it is “to do your best.” Given that definition, a “Meets Expectation” performance rating, which many businesses use to cover the third and fourth standard deviations of performance, suggests the worker performed to the best of their ability but didn’t do outstanding work. In other words, the worker was expected to perform at what the business considers an average level. For those who delivered outstanding work and spent most of their first two decades of life being told that a “C” grade in school was “Average,” having their year’s work rated as such can be demoralizing and lead to anything but future excellence.

One of the most common criticisms of performance management systems is their lack of fairness. This flaw is particularly noticeable in companies that are unable or unwilling to use VURPRD and appropriate benchmarks to measure performance changes. For a business to fairly evaluate worker performance, there must be reasonable benchmarks and objective data to define them. There are three main ways to set those benchmarks: they are to 1) establish a 0-100 scale that starts at 100 and deducts points for undesirable performance, 2) establish a 0-100 scale that starts at zero and adds points for satisfactory performance, or 3) establish a 0-100 scale that starts at 50 or another random point, then deduct points for undesirable behavior and add points for satisfactory behavior. By choosing perfection as

a benchmark instead of the other options, businesses prove that they know what performance is and what constitutes perfect and excellent performance, as well as the point spread for each performance rating category.

Businesses that hope to grow their sustainable profit rapidly need a compensation system that doesn't rely on faulty performance reviews and subjective ratings.

Enabling Perfect Performance

"If you don't know where you're going, any road will take you there."
–Lewis Carroll

Carroll's words infer that defining perfect performance is necessary to achieve it. To perform perfectly, you must define, communicate, and reward it.

When traditional TLs recognize perfect performance as a need, they can only recommend memorization, supervision, quality checks, and job aids as ways to achieve it. Common sense suggests those interventions are insufficient for enabling, ensuring, and continuously improving performance, especially when workers can't stop what they're doing to read and follow written job aids.

Enabling manual workers to perfectly perform their assigned SOPs in traditional work environments requires SOPs to be learnable and static, the learners must be willing and able to memorize them, and expert coaching must be available on-demand, none of which can be ensured. SOPs may not be learnable or static, workers may not choose to memorize them, and

supervisors cannot be available every time a worker performs an SOP. With special consideration to job aids, they are inappropriate for most manual workers to use.

The best examples of the need for perfect performance is during emergency situations. Imagine being responsible and accountable for remediating a chemical spill that could kill workers if improperly handled. Every chemical has a specific cleanup process that must be perfectly followed. According to the Department of Toxic Substances Control, there are 80,000 chemicals used in US manufacturing, and 2,000 new chemicals are introduced every year. Each of those chemicals has its own remediation process as well a process for each chemical it could mix with, effectively doubling, tripling, or even quadrupling the number of instructions for each chemical. Memorizing the remediation process for 80,000 chemicals is impossible, much less 160,000, 240,000, or more. Without memorization, the only traditional means for handling chemical spills is to use job aids.

Every chemical used in a business is required to have a Safety Data Sheet (SDS), formerly known as Material Safety Data Sheets (MSDS), readily available should a spill occur. Those sheets are job aids that include information about the chemical and instructions on how to remediate spills. Posting thousands of SDS job aids in work areas is impractical, so the sheets are saved in SDS binders. This means that when a spill occurs, someone must discern which chemical or chemicals have been spilled, find the SDS manual, find information for the spilled chemicals, don the personal protective clothing advised for the chemical, etc.

The ability to manage risky situations is a high-priority business need, and meeting that need calls for better needs analysis and a sophisticated IA system because basic job aids are clearly insufficient.

Unclear Responsibilities and Accountabilities

Every business worldwide has just one goal and it is to rapidly grow sustainable profit. This means every employee and business unit, including the TL function has the responsibility and accountability to contribute sustainable profit to the parent organization. Unfortunately, this is not always stated so clearly.

TL organizations have perennially attempted and failed to measure their profit contributions via training surveys. Those efforts have failed so often that some TL organizations and thought leaders have claimed that training is an invaluable human asset that cannot be financially enumerated. In other words,TL organizations see their goal as training and their contributions to growing sustainable profit are priceless and immeasurable. That's quite a boast for a function that doesn't take the responsibility or accountability for ensuring learning or performance.

Just like all other businesses, their divisions, departments, and individuals, TL organizations must report the return on investment (ROI) for their operations. To do this, they must first align with the goal and objectives of their parent organization, then they must gather or obtain performance ratio data, which is the only type of data that can be utilized in mathematical computations like ROI and break-even dates. TL organizations typically

don’t capture those data, and their peer organizations often will not share it, ostensibly due to security concerns.

On-the-job performance is the measure of training, learning, and performance enablement, not training data. Since TL organizations don’t capture performance ratio data, they lack the ablility to make mathematical calculations like returns on investment and break-even dates. They lack the data they need because they’re unwilling or unable to capture it themselves, they request it and have been rejected, or they can’t collect it and don’t request it. The bottom line is that TL organizations can't measure learning because they're only responsible and accountable for training, not applying it, and training without application can’t measurably contribute to sustainable profit.

In 1885, Hermann Ebbinghaus proved that spaced practice is essential to learning, which helps explain the TL organization’s lack of learning accountability. It means that whomever or whatever business unit is responsible for ensuring learners receive spaced practice opportunities and ensures performance is responsible and accountable for learning. In most businesses, that responsibility and accountability belongs to operations managers and supervisors, not TL departments and training professionals. Therefore, operations managers and supervisors are responsible and accountable for learning and the TL function is only responsible and accountable for training.

Because TL organizations have no accountability for learning, it leaves them with no direct, financially measurable connection between their training services and rapidly growing sustainable profit. Given that every TL pro-

fessional has known the connection between spaced practice and learning for over a century, it appears TL organizations are satisfied to hand off the learning responsibility and accountability to others and not get the VURPRD they need to quantify their profit contribution to the business.

Regardless of whether TL organizations are satisfied with their name and scope or not, future needs analysis models, whether executed manually or automatically, must guide the analysis to use the right data. Unfortunately, existing needs analysis models advise using training surveys and other nominal, ordinal, and interval data to analyze needs. A new needs assessment model is required.

Learning data and training data are not the same. Learning data is performance data. Performance data is the time it takes a worker to perform a process or process step and the number of errors that were made throughout the process. This metric represents the difference between the time workers took to perfectly perform an SOP before training and the time required to do so after training. Learning must be measured this way because the goal of learning is to quickly grow sustainable profit, not to train or enable memorization.

Every activity across both work and worker systems must be measured this way.

Conflating Goals and Objectives

It's easy and common to conflate goals and objectives. Without proper differentiation, it's difficult for the various business functions and workers,

including TL organizations and TL professionals, to align their work with the business's goal and subsequently achieve their unit quota. To clarify the difference, fulfilling quotas leads to fulfilled objectives, and fulfilled objectives lead to fulfilled goals; goals do not lead to quotas or objectives.

An aphorism that illustrates the difference between goals and objectives goes like this: "Nobody buys a drill because they need a drill; they buy a drill because they need a HOLE." When the same logic is applied to training and learning, it would say, "Nobody buys training or learning because they need training and learning; they buy training and learning because they need MORE PROFIT." This simple phrase perfectly describes a major problem with TL organizations; they sell and measure drills, not holes. They confuse the goal of making a perfect hole with the objective of using a drill to make a perfect hole. When applying the same logic to traveling, the destination is the goal, and layovers leading to the destination are objectives. It would be confusing and erroneous to respond to a question about how much time and money it took to get to your destination by expressing how much you liked or disliked your mode of transportation for getting there.

In reality, businesses worldwide have just one goal, which is to rapidly increase sustainable profit. Similarly, every business worldwide has just three objectives. They are to enable performance, to ensure quality, and to continuously improve both work systems and worker systems. To be more precise, the three goals are to:

- **Enable performance**, which means making it possible for workers or machines to make perfect products and deliver perfect services.

Measuring the time and cost spent making imperfect products and services is meaningless and enabling performance is not ensuring performance. Enabling performance refers to having all the work and worker system resources needed to produce perfect products and deliver perfect services. For the record, training and learning are weak performance enablers.

- **Ensure performance** means guaranteeing workers or machines perfectly perform every SOP in the proper sequence without error. Training and learning cannot ensure performance, and supervision is a poor performance ensurance method due to the inability of supervisors to monitor the production of every product and delivery of every service emanating from their sphere of control.
- **Continuously improve performance** refers to the ongoing process of defining, measuring, analyzing, improving, and controlling the execution of assigned SOPs, whether by humans or machines. The worker system limits the scope of the ADDIE model, and the lack of VURPRD significantly hinders training and learning from continuously improving performance.

Future needs analysts and needs analysis models, whether executed manually or via AI, must appropriately define and align with the parent business's one goal and three objectives.

Conflating Business Goals and Objectives

Conflating business goals and objectives can lead business units to align their activities behind an objective instead of a goal. Here's a story about a typical business that allowed its compensation unit to align with an objective instead of the goal of rapidly growing sustainable profit. We'll call this business Company Z, CZ for short.

> *Like most businesses of its size, CZ has a compensation unit, an organizational development (OD) function, and a largeTL organization. Also like most businesses, the compensation, OD, and TL functions operate within the Human Resources Division.*
>
> *Upon asking one TL professional at CZ why their unit performs needs analysis, you may hear that the goal is to develop and then deliver training programs to as many employees as possible. If you ask a compensation anaylyst about their purpose, they might tell you that their primary objective is to minimize or reduce payroll. If you ask an organizational development specialist what their main goal is, you'll likely be told that it's to achieve the lowest possible employee count while maintaining performance quality. When CZ's employees are asked how they will determine if their goal has been reached, a TL professional may respond that success is achieved when 1,000 workers have been trained and the average test score is 70% or higher. The compensation analyst might inform you that a 20% reduction in payroll signifies success. The organizational development (OD) analyst might suggest reducing the workforce by 10%.*

Most of CZ's professionals failed to mention that rapidly growing sustainable profit is their goal.

After successfully implementing each of their programs, CZ enjoyed lower payroll, fewer employees, and a very well-trained workforce. Regrettably, despite rewarding the TL, OD, and Comp/Bene departments for their efficient implementation of the new programs, the company's profit declined. After the profit declined, CZ decided to cut costs, which led to job cuts in the TL, OD, and comp/bene departments, including the very people it just rewarded.

As shown in this example, the goals of CZ's TL, OD, and comp/bene departments were quotas that didn't contribute to CZ's business goal; therefore, the business goal wasn't understood nor was it met. Although the departments achieved their individual quotas and objectives, the overall business did not experience rapid sustainable profit growth.

If a business intends to rapidly grow sustainable profit, then all of its employees and business units must align with the real goal and objectives of the parent business.

Training vs. Enabling, Ensuring, and Continuously Improving Performance

It should come as no surprise that when TL professionals conduct needs analyses, the overwhelming recommendation is training. It makes sense because TL organizations depend on training programs to generate income. When other departments, such as the OD and compensation de-

partments examine needs, a similar outcome occurs.

In the TL case, training is not just the most likely outcome of every training/learning needs assessment and the chief revenue generator for the TL function; it is the solution category descriptor. Training, akin to the eponyms Kleenex and Band-Aid, confuses the product name with its purpose. For example, you don't need a Band-Aid or training. Band-Aids are used to increase long-term profit by preventing costs related to infections brought on by dirt and wounds. We just say, "I need a Band-Aid," rather than, "I have a cut and need to invest in a bandage to prevent the cost of a possibly serious infection." In a similar vein, we say, "We need training," rather than, "We've recently experienced multiple personal injury incidents and need to increase sustainable profit by ensuring perfect performance in the future." It's common for TL organizations to assess solutions for the sole purpose of validating a training request. This frequently happens after a strong executive requests training.

When evaluating a Band-Aid's efficacy, we often focus on how attractive we look after applying it rather than the expense of an infection that the Band-Aid probably prevented or shortened. Similarly, traditional needs analysis models assess the effectiveness of training by looking at whether trainees are satisfied, whether a test score is attained, or whether a survey box is checked; none of which can establish a link between the training intervention and a rapid increase in sustainable profit.

Since every company in the world aims to rapidly increase sustainable profit through enabling, ensuring, and continuously improving performance,

it would make sense for that goal and those objectives to be at the core of every needs analysis model. In light of those objectives, the following examples illustrate some disadvantages of traditional needs analysis models:

- Traditional TL needs analysis models only recommend training—which includes conventional classroom training and job aids as performance enablers. This implies that performance enablement has no relationship to the work system and is solely located in the worker system domain. In reality, for performance and performance improvement to take place, the worker and work systems must operate well together. If a work policy, piece of equipment, or material fails, the worker system suffers. When that scenario occurs, no amount of training will improve performance, and profit will decline. Similarly, the work system cannot compensate for a failure in the worker system. According to this viewpoint, performance improvement initiatives will be more effective if they start with work system problems at the top of the company and work their way down to the needs of the worker system. This must be reflected in needs assessment models, whether they are carried out automatically or manually.
- Worker system interventions are the sole domain of training departments according to traditional TL needs analysis models. Thanks to memorization difficulties, forgetting, and unlearnable SOPs, learning is a very weak performance enabler. Because job aids don't require much, if any, memorization, they can be effective performance enablers. However, traditional needs analysis models only suggest job

aids as a solution without indicating which type of job aid is necessary given a target work environment. There are some employees who can stop working to access specific job aids like online videos, printed instructions, and AR or VR systems, while others cannot. Needs analysis models and analysts must know all the available solutions to performance enablement issues and be adept at matching the most practical and efficient solutions with each use case and user requirement.

- Traditional needs analysis models largely ignore performance ensurance requirements. This is true because their only option for ensuring performance is constant, ongoing supervision, which is untenable. Luckily there are new technologies that can ensure workers perfectly perform their assigned SOPs. Contemporary needs assessment models must recommend using those technologies, when appropriate.
- Traditional performance improvement techniques are frequently restricted to suggestion boxes and casual conversations between managers and employees, despite the fact that continuous performance improvement is one of the three objectives used by every company in the world to quickly increase sustainable profit. With the advent of AIA technologies, employees can now offer suggestions for continuous improvement while they are working and at the very moment an idea is conceived. To effectively, efficiently, and continuously improve performance across the work and worker systems, modern needs as-

sessment models must recommend ways to improve both work and worker system performance instead of one or the other.

When traditional needs analysis can only prescribe training as an option for enabling, ensuring, and continuously improving performance, performance and profit suffer. New needs assessment models can and must do better.

Inability to Change

One of the most important business requirements that traditional needs analysis models must support is the ability to adapt in a world that is rapidly changing. People are not good at evaluating the speed of change or the need for change, especially when it involves a decision-maker's personal sacrifice. This is not a knowledge problem because when change is needed, it's highly likely that every employee in a company knows it and they have at least a general idea of how to fix things.

There are many reasons why business executives fail to support certain changes that are best for their businesses, but the main reason can often be traced to the innate bias, greed, and self-preservation of the decision-makers. None of those needs assessment failings can be expected to improve as long as humans perform needs analysis.

Analyzing the Wrong Data

Valid, objective, and trustworthy performance ratio data, aka VURPRD, is the only data that counts when every company's sole objective is the quick growth of sustainable profit. Sadly, not all companies use VURPRD,

in their needs analyses and many business professionals—including those in TL and HR departments—are unable to define what ratio data is or how to capture it.

Current TL needs analysis workflows advise analysts to use subjective data from surveys, focus groups, employee interviews, performance reviews, and direct observation for decision-making. Unfortunately, none of those data types are VURPRD. Only VURPRD is able to produce fair, legally-defensible assessments or valid, objective, and reliable solutions.

VURPRD is the right data to use in needs analysis, with performance ratio data being the most crucial piece. Performance ratio data is the amount of time employees spend on an SOP or, ideally, an SOP step while working, as well as the cost of that time. Valid data must be directly relevant to the goal and issue, accurate, comprehensive, consistent, timely, and appropriately formatted. Data reliability is based on data collection methods, frequency, completeness, and the number of times the data is collected. Data that is accurate, predictable, and trustworthy is referred to as reliable data.

Although many sources of VURPRD exist, the most significant source is from the manual laborers who produce the goods and provide the services that companies need to turn a profit. That information includes the amount of time employees spend carrying out their assigned SOPs, the steps comprising those procedures, performance dates, the feedback employees provide for continuous improvement while working, and the number and cost of performance errors.

An objective of needs analysis is to continuously improve performance, and the goal is to contribute to the rapid growth of sustainable profit. Businesses must constantly improve to remain competitive. To keep up with the ever-faster pace of innovation, businesses must a) continuously analyze their financial state, b) evaluate and prioritize sustainable growth opportunities, and c) select and implement the best interventions. In selecting the best performance improvement opportunities, each option must be assigned a value to allow it to be ranked by the amount of sustainable profit it could produce. Appraising a performance improvement opportunity includes creating a return on investment (ROI) report and a break-even date, both of which require VURPRD.

This book suggests the following steps for readers who want to automate their needs assessments: The fact that business managers and executives ostensibly already complete items a through c above indicates that the VURPRD required for sound decision-making is already available and could be accessed through an automated needs analysis system if one were put into place. Unfortunately, in the absence of VURPRD, those managers are compelled to assess opportunities for profit growth based on inaccurate data, which ultimately forces the managers to rely on their instincts. When people make decisions based on their intuition, the outcome usually ensure the decision-makers needs are met first.

While the processes for capturing VURPRD to be used in projecting break-even dates and ROI are fairly simple, getting that data from within traditional organizational structures may not be. Consider this actual sce-

nario as an example:

The leaders of a very successful regional bank decided to rapidly grow sustainable profit by changing its strategy from transactional to sales- and service-focused. The change would require a massive effort encompassing all employees and very costly training for all employees, including every branch and corporate worker.

The TL function delivered training to support the strategic change. To track their progress on the initiative, they captured training and learning data, including trainee names, the number of trainees, training dates, training costs, and trainee evaluations of the training they received. The marketing function also tracked its progress on the initiative. It captured data on trainees, training dates, sales by trainee, and production and marketing costs. When it came time to report each department's contribution to the business and propose a budget for the next year, the TL function touted the number of employees it had trained, test scores, and the positive feedback the trainees provided. The marketing function used its data to take credit for the significant sales and profit increase during the year. As a result, some of the marketing staff were promoted, while none of the TL staff moved up. The marketing department got significant compensation budget increases, while the TL organization's compensation remained unchanged. The marketing department also got the double-digit overall budget increase they requested for the following year, while the TL function's budget barely ticked upward.

It became clear that if the TL function wanted to claim any part of the bank's profit growth, then they'd need sales and profit data, something they had never captured before or been given access to. Getting that data would require cooperation from the marketing department or higher-ups to "encourage" the marketing department to share their data. The marketing department executives rejected every request for information by the TL manager, so the TL group was unable to calculate an ROI on their work.

Just prior to the second year of the transition, the TL director successfully convinced a senior HR executive, who then persuaded a senior marketing executive to grant the TL organization's request. The TL organization used their training, sales, and profit data from the marketing department to calculate a 50% ROI on the sales training they provided, which was half of what the marketing function claimed the prior year. Additionally, the TL function requested a major budget increase and proposed raising compensation for all employees in the department. Because the TL organization quantified its profit contribution at 50% of the total profit made, the marketing department no longer claim 100% of the gain. Instead, marketing could only claim 50% of the profit gain, representing a significant decline from the 100% they had claimed in previous years.

The marketing department wasn't happy with the TL group, and relations chilled between the two. But the TL organization finally had the data they needed to report the ROI on their services, just like the

marketing department had for decades.

There are two lessons related to this bank story. The first follows the old saying, “Whoever owns the data owns the future.” It means the organization that collects VURPRD controls how that data is used and who it’s shared with. The second is that siloed organizations hoard data to benefit themselves, which ultimately harms the parent business.

The bank scenario exposed TL’s misalignment with the corporate goal and its lack of data intelligence. The TL leaders incorrectly believed that continuous learning was both a corporate value and a goal, and that training data, not learning or performance data, could prove their value to the parent business. Unfortunately, those beliefs, although nominally embedded deep in the bank’s culture, failed to convince the company’s executives of the TL organization’s profit contribution. On the other hand, the marketing function had aligned with the corporation’s profit growth goal, captured sales and profit data and reported the ROI for the initiative as they did with all their initiatives.

To recap and for reference,

- Valid data refers to information that is both relevant and representative of the business metric it describes. When performance is the business metric being described, then the time it takes a worker to perform an SOP, the cost of performing the SOP, the compensation paid to perform the SOP, the location where the performance occurs, and the accuracy of how those data are reported contribute to valid-

ity. Measures of data validity include the timeliness, completeness, and accuracy of the performance data. A written test score is not valid because it measures learning, not performance. A sample size too small to establish a mean is also invalid.

- Unbiased data is valid data that represents entire populations. It can produce a mean and can prevent inaccurate predictions caused by over- or underestimating performance results.
- Reliable data is information that is accurate and consistent over time. For example, if a supervisor finds it takes 15 minutes for one employee to perform the “XYZ” SOP, then 15 minutes is highly unreliable. The employee being watched may be slower or faster than others, and there may have been a good reason for that worker to have performed slower or faster than usual while under observation. However, when the performance interval is recorded each time a worker performs the “XYZ” SOP, some workers will perform faster while others will perform slower. With each observation the dataset’s reliability rises, ultimately reaching a statistically significant number, and a mean interval can be calculated. If the mean interval is 12 minutes and 19 seconds, then this value is considered highly reliable and predictable enough for use in an AI algorithm.

Needs analysis cannot be effective when it uses nominal, ordinal, and interval data in decision-making.

Ratio Data is Essential

Every company in the world wants to increase sustainable profit as quickly as possible. The only way to determine whether a business unit or intervention has increased sustainable profit is to use mathematical calculations, such as break-even dates and returns on investments.

TL organizations typically capture nominal, ordinal, and interval data about their interventions, activities, and clients, and then they unsuccessfully attempt to manipulate that data into a return on investment report. Unfortunately, training isn't performance, and profit can't be measured by training data. The only data that can be used to calculate the return on any investment is ratio data. Ratio data includes the number of widgets produced in X hours before and after training and the cost of creating and selling each widget, including waste, before and after training. It's simple to measure and report pofit changes if you have valid, unbiased, reliable performance ratio data and impossible without it.

For reference, there are four types of data: nominal, ordinal, interval, and ratio. TL functions typically capture nominal, ordinal, and interval data, but they rarely capture ratio data. Here's an overview of the four data types:

- **Ordinal data** describes characteristics in ways that enable them to be sequenced and categorized such as letter grades, rankings, and personality traits. Ordinal data can't be meaningfully added, subtracted, multiplied, or divided, therefore, it can't be used in mathematical calculations.

- **Interval data** describes the characteristics of something and organizes that information in a way that can include zero but cannot result in negative numbers. Interval data includes dates, times, test scores, and standard deviations. As with ordinal data, interval data cannot be meaningfully added, subtracted, multiplied or divided.
- **Nominal data** describes physical characteristics like colors, sizes, and, popularity. It also cannot be used in mathematical calculations.
- **Ratio data** describes characteristics, sequences, and categories of information, and it is defined by the presence of a true zero. It includes the quantity of items produced, time to completion, costs, and defects. As the highest level of measurement, it permits all mathematical and statistical operations, and allows comparisons like “double” or “half”.

Nominal data is collected via from trainee surveys, ordinal data from Likert scales, and interval data from test scores are the main sources of information used in traditional training and learning needs analysis. Before the Information Age, that data was the best any TL department could hope to gather, but it is now insufficient. A TL organization cannot use test results obtained prior to the first hour following training as proof of performance or learning if they hope to secure a seat at the C-Suite table, where high-level business decisions are made.

For the record, needs analysis, whether done manually or automatically, is worthless without ratio data to assess.

Preserving Systemic Bias

Traditional needs analysis models fail to address systemic bias, which can negatively impact needs analysis outcomes and waste a business's resources.

To be clear, all bias is unethical and can lead to business decisions that courts reject as unfair because it is a type of prejudice that involves unfair support for an individual, group, object, or work policy. Prejudice differs from bias because it is defined as an unreasonable opinion not based on actual experience. An irrational belief that a system is intended to uphold is known as systemic bias.

Types of systemic bias include:

- **Organizational bias** often presents itself as the "law of the instrument," "Maslow's hammer," or the "golden hammer." This bias represents an over-reliance on a single solution for fixing problems. Organizational bias can lead to a single favored solution chosen over other, often better options. An example of organizational bias in military organizations is bombing. In psychiatry, psychiatric drugs serve as the primary instrument for treatment. For training organizations, the hammer is training. Organizational bias also includes decisions made based on an organization's structure, culture, strategy, tactics, or factors other than data. Organizational bias is revealed by the makeup of its workers, which is overwhelmingly populated by those of the same gender, age, physical characteristics, conformity or non-conformity with a group, etc.

- **Emotional bias** can override factual information, leading to suboptimal decision-making. For example, someone who strongly believes in the value of training and learning or relies on selling training and learning products for a living may overlook better performance enablement options. Like most biases, emotional bias is usually spontaneous and undetected by those harboring it. Bias is often so deeply rooted in a person's experiences that it clouds their decision-making capability and is difficult to overcome, even with the support of others. Emotional bias includes a) mental shortcuts that influence decision-makers, like the "if it isn't broken, don't fix it" attitude; b) a preference for the status quo; c) loss or regret aversion; d) low self-control; e) overconfidence; and f) prioritizing short-term satisfaction over long-term profit.
- **Rating bias** skews assessments to the low, high, or middle standard deviation on the natural distribution curve. The most common example of rating bias is central tendency, which skews performance evaluations to the middle. Rating bias is often enforced through written or unwritten work policies that a) prohibit managers from assigning the highest performance rating, which is typically linked to the largest pay increase; b) prohibit managers from assigning the lowest performance rating, which would suggest that the worker should be terminated instead of receiving the same compensation increase as their higher-performing peers; and c) require that most or all workers receive a middle rating, a practice commonly employed to avoid

conflict with lower-performing workers and to prevent higher compensation for higher-performing workers.

Needs analysis cannot be fully effective when systemic bias skews the data it uses to reveal opportunities to rapidly grow sustainable profit.

Failing to Weigh Organizational Priorities

Existing needs analysis models often fail to accommodate certain business priorities such as ethics and climate protection. This happens when decision-makers, including shareholders, choose short-term profits over sustainable long-term gains.

Finding opportunities to increase profit quickly and sustainably can be challenging. This is especially true in companies that manually conduct needs analyses and when choices are made with a focus on short-term, less sustainable profit. For example, a business might choose to fund quick profit boosters like staff and pay reductions instead of investing in more sustainable things like new equipment, innovative technologies, climate protection, diversity, equality, inclusion, or other important long-term needs.

When businesses fail to assess their priorities objectively and decide to implement lower-priority profit growth interventions rather than the highest-priority ones, their ability to rapidly grow sustainable profit is severely diminished.

Preserving Organizational Politics

Organizational politics can dramatically skew traditional needs analysis and waste a business's resources. Examples of organizational politics that

weaken needs analysis include:

- **Withholding Information.** Like the marketing organization that wouldn't share their data with the TL organization, withholding information is likely better for the business unit doing the withholding than for the parent business,
- **Gatekeeping.** Similar to withholding information, gatekeeping is when an individual or group intentionally blocks new ideas, information, etc., from being broadly shared with other internal groups,
- **Favoritism.** When an individual or group is repeatedly chosen for recognition and choice assignments instead of others,
- **Alliance Building.** Joining others to advance or oppose proposals based on relationships instead of merit,
- **Bossism.** When a manager prioritizes their own interests over those of their direct reports,
- **Manipulation.** Using tactics to entice others to support proposals they don't agree with,
- **Playing Politics.** Creating and following unwritten rules that can build one's power or erode the power of others,
- **Territorialism.** This may be a business function or an individual who fiercely protects their domains by forbidding collaboration with other business functions or individuals.
- **Siloing.** This is the lack of collaboration between functions within the

same business.

Current needs assessment models do not consider how clients or executives might use organizational politics to divert focus from critical needs to less important ones or push for pet solutions without a thorough and unbiased needs analysis. Despite safeguards, organizational politics can influence every manually performed needs analysis, skewing its results and dramatically lowering the ROI calculated for an intervention, SOP, work group, or even individual worker.

Excluding or mitigating organizational politics from a needs analysis can greatly improve its effectiveness.

Allowing "Mini-Needs Analysis"

The current state of TL needs analysis allows what's often called a "mini-needs analysis." This option is frequently offered to clients who refuse to support a full and proper needs analysis. TL professionals offer this option when the alternative is no analysis at all. A mini-needs analysis is a means of placating clients, maintaining relationships, and fitting the organization's culture at the expense of intervention quality and effectiveness. A mini-needs analysis resulting in a minimally effective intervention can waste far more resources than performing a full and wholly objective needs analysis.

Limiting Scope

Needs analyses delivers the best results when its scope is unrestricted. The scope of a traditional needs assessment may be limited in many

important ways, including,

- **Solution scope** strictly limits solutions recommended by needs analysis to one or two options. For instance, when clients seek training from the TL organization, the scope of the needs analysis is limited to training solutions.
- **Organizational scope** limits analysis and solutions to only one business function. Ideally, conducting a needs analysis across the entire business ensures simultaneous resolution of all needs. The narrower a needs analysis's organizational scope is, the more likely secondary, tertiary, and even primary needs are missed, and the less effective a solution will be.
- **Financial scope** is when a business sets a maximum amount of money to spend on an intervention. Setting a spending limit for a solution could prevent the analysis from uncovering the most important issues.
- **Technological scope** limits the types of technologies a needs analysis can explore or recommend. This is especially important, as limiting interventions to existing technologies may limit the business's competitiveness and ability to thrive.
- **Informational scope** limits the information a needs analysis and a solution recommended by the needs analysis can access. A narrow informational scope can significantly reduce a business's ability to calculate a prospective intervention's break-even date, ROI, or both.
- **Timeline scope** limits the amount of time during which a needs analy-

sis can be performed. This often occurs when solutions are needed immediately and there may not be enough time to identify and implement the best solution.

- **System scope** limits needs analysis to a single system, such as the work or worker system, or even more specifically, an HRIS, communications, financial system, etc. A needs analysis with a system scope will be less effective than one that analyzes all issues regardless of system type.
- **Geographical scope** limits needs analysis to issues within a region, country, state, city, or other location.
- **Language scope** limits needs analysis to those who speak the same language.

There are many other reasons why businesses limit the scope of needs analysis; chief among them is one or more of the activities that can be described as “organizational politics.”

Organizational politics most commonly limit the scope of needs analysis when TL clients request training instead of a needs analysis. Requesting a solution instead of a needs analysis can represent a client’s attempt to change the needs analysis rules to their liking, which could also be a form of gatekeeping, bossism, territorialism, manipulation, or any combination of these.

Starting a needs analysis with a particular training solution in mind, such as eLearning, is another popular scope-limiting method. The scope

of the solution is effectively limited eLearning, classroom training, or another specific training method is requested, and all other training options are excluded.

Instead of starting with an analysis request, traditional needs analysis models often start with an intervention request. For TL functions, the request is commonly a training program, and the needs analysis activities are designed to validate the need for a requested training program instead of the need to fix a problem. When that happens, the analysis's scope is tailored to the intervention instead of what may be broader issues that are confounding the business.

Limiting the scope of needs analysis is a hallmark of “siloed” organizations. “Siloing” is a form of organizational politics that prevents effective collaboration between divisions and departments within the same business. Siloed organizations don’t collaboratively analyze needs or share the data that are required to effectively and efficiently resolve performance issues.

When siloing happens, needs analysis is fragmented, and many needs may be left unrevealed or revealed but unresolved because the solutions aren’t within the scope of the organization or analysts performing the analysis.

The state of needs analysis today is similar to the "Whack-a-Mole" carnival game in which a single hit causes several more moles to appear, making it impossible to hit every mole and progress.

Not Addressing Root Causes

Conventional training/learning needs analysis models deliberately ignore or hand off non-training/learning needs revealed during an analysis to other business functions, concentrating only on training or learning needs. Even at its best, this method only partially fixes issues and misses chances to improve and bolster the analysis. For instance, changing a company's culture requires reorganizing the workplace, updating job descriptions, adjusting compensation, creating new and updated SOPs, and much more than training alone.

It is unrealistic to expect a needs analysis process that only focuses on training/learning to reveal the root causes of its issues, and a business will never be able to boost sustainable profit as quickly as it could if these issues are left unresolved.

Jumping to Training Solutions

The purpose of needs analysis models is to identify sustainable profit growth opportunities and then suggest strategies for turning those opportunities into sustainable profit. Many of those opportunities would go unnoticed without a thorough, businesswide, impartial needs analysis devoid of prejudice, greed, and self-interest. When businesses jump to training as a way of rapidly growing sustainable profit, they miss other opportunities to grow sustainable profit, including ones that don’t require training.

Contrary to popular belief, training is not a cost-effective performance enabler. In fact, it is an expensive performance enabler that can only in-

crease sustainable profit when workers are able to perfectly execute what they were taught while on the job. Similarly, learning is only possible when an SOP can be perfectly recalled on demand and executed flawlessly while working without assistance or aids. Even with intensive training and long-term learning, perfect performance on the job is never guaranteed. This is true largely because humans are always error-prone, and there is no guarantee that SOPs won't change after being memorized.

Given the three objectives of all businesses are to enable, ensure, and continuously improve performance, training and learning are weak performance enablers. This is largely due to the limits of human memory, the effects of forgetting, changing SOPs, and the existence of unlearnable SOPs. Additionally, training and learning are not beneficial when employees are required to execute SOPs in the following situations: a) with crucial steps that should never be performed solely from memory; b) when the execution of any SOP or SOP step must be fully ensured; and c) when an SOP is flexible or subject to change.

Despite their high cost and poor efficacy, training and learning are very popular performance enablement interventions. The reasons for this are simple. They include:

- Businesses can assert that a single, generally accepted, and relatively straightforward intervention—training—has solved an issue. Dr. Robert Brinkerhoff referred to this as being like “sheep dip.” Those who know about sheep farming recognize sheep dip as a method for applying insecticide to livestock. It involves farmers herding their

flock through a pool of insecticide, dunking each one fully under before exiting the pool. The sheep dip intervention is far more effective at treating sheep parasites than enabling human performance.

- Training can be used to shift the responsibility and accountability of performance improvement, along with its consequences, from CXOs, directors, managers, and supervisors to frontline workers. When a worker's performance doesn't improve following their initial training, those employees are typically sent through the same training until their performance improves or until it is determined that they are incapable of learning and fired.
- Many people have emotional biases that favor training and learning as performance enablers over other, sometimes more effective, performance enablement means.
- TL organizations carry organizational and emotional biases that favor training and learning, particularly when the TL function receives funding for training development and delivery but not analysis.
- TL functions that are dependent on funding through training program development and delivery are inclined to deliver as much training as possible, whether it is needed or not.
- TL functions are not held responsible or accountable for ineffective training when the content was requested and paid for by an executive who refused a needs assessment or professional TL advice.
- TL organizations operating under zero-based or self-funding budgets

often create training programs based on trendy topics instead of needs analysis to raise more revenue for their function.

- To keep their jobs, the leaders of TL organizations need to build and maintain good relationships with their clients. To achieve that, they commonly approve all training requests regardless of need.
- Clients often loathe paying for a needs analysis, which makes it easier for TL staff to forgo the effort as well as avoid any possible backlash from having developed ineffective content that they didn't recommend.

Each of those situations leaves TL professionals in the awkward position of insisting upon a full needs analysis, declining the client's request, or passively honoring a request they know is unlikely to generate sustainable profit. The choice is difficult because the TL function could damage its relationships by declining client requests just as easily as if they had wasted tens of thousands or millions of dollars by delivering a completely ineffective intervention.

Organizational politics can dictate if and how a needs analysis is performed. This is often presented as an executive request for training instead of a request to resolve a problem. The executive's emotional bias toward training, maintaining the status quo, or another reason may have led to their request. When this situation occurs, needs analysts must weigh the advantages and disadvantages of either insisting on a needs analysis or immediately fulfilling the training request.

Jumping to training as a performance enablement, performance ensurance, or continuous improvement solution is costly and often ineffective. Therefore, training and learning should only be recommended a) after all other intervention options have been exhausted, b) when SOPs exist, can be memorized and perfectly recalled over long periods without practice, and c) when IA and performance ensurance technologies aren't required to prevent profit loss.

Ignoring Ebbinghaus

Traditional training needs analysis models ignore Hermann Ebbinghaus's research, which has been validated repeatedly over more than a century and is well known by every TL professional and those educated in the TL discipline.

In 1885, Hermann Ebbinghaus published a study that proved up to 60% of training is forgotten within 60 minutes, and little can be done to change the rate of forgetting aside from frequently practicing the KSA that was trained over time. Ebbinghaus further demonstrated that without spaced practice, trainees can forget up to 90% of their training within a week. This implies that without organizing multiple opportunities to practice the content from training sessions, long-term memorization, also known as learning, will not occur. Put more bluntly, it means that if 60–90% of KSA delivered via training is lost in a week without memorization, then 60–90% of a training investment can be lost within a week.

Ebbinghaus effectively demonstrated that training primarily involves

short-term memorization and that learning is synonymous with long-term memorization. In short, Ebbinghaus proved that if it can't be memorized, then it can't be learned. Furthermore, if it can’t be memorized, then no amount of training will enable workers to learn or perform it.

This raises the question of why some former training organizations put “learning” in their names when they aren’t responsible or accountable for learning at all. When TL organizations delegate the responsibility for providing the practice opportunities and coaching required for learning to frontline supervisors, as is most common, then the organization that delivers training is a training organization, and the organization that delivers post-training practice and coaching is a learning organization.

Neglecting Ebbinghaus could lead needs analysts to recommend training without ensuring sufficient practice for improved job performance and long-term retention. To prevent content from being forgotten within a week, it is essential to engage in practice and coaching; otherwise, a business risks wasting up to 90% of its training investment.

While giving credit to a training organization for learning is relatively unimportant, honesty and trust are, and an organization that doesn't accept accountability or responsibility for the required practice and memorization, limiting itself to training development and delivery, is dishonest when calling itself a "learning organization." Furthermore, a “learning program” that doesn’t include practice is a training program, at best.

Ignoring the Value and Difficulty of Forgetting

Existing needs analysis models don't address the negative impact or usefulness of forgetting. In the past, forgetting was every human's worst enemy. Forgetting how to gather food, construct shelter, or avoid predators could have been fatal in prehistoric times. Nowadays, forgetting is a crucial component of change and daily operations. It is not always simple to forget things that have been committed to memory, even though forgetting is normal and the approximate rate of forgetting is known. Without efficient and effective forgetting, innovation would be significantly slowed.

When thinking about how forgetting impacts performance, consider that before a worker can successfully execute a recently modified SOP that they have committed to memory, they first recall the original steps, then they must recall which step has changed, and then they must recall what replaced the changed step. Only when old steps and new steps are perfectly recalled can workers execute the new SOP without assistance or support. Given this reality, it is more wishful than practical to think that, without assistance or support, employees can accurately recall and then perform SOPs that have changed while on-the-job.

Needs assessment models that suggest using training for tasks that change frequently or are too complicated to recall over time probably waste more company resources than they generate or save.

Recognizing Unlearnable SOPs

Current needs analysis models fail to address or even acknowledge the

existence of unlearnable SOPs. This raises the questions of how traditional businesses enable, ensure, and continuously improve the performance of those SOPs.

Unlearnable SOPs include those with too many steps to memorize, steps that change too often to memorize, and ones that are performed too infrequently to memorize. No amount of training can enable workers to perfectly perform unlearnable SOPs.

Unlearnable SOPs typically belong to the worker system, but TL organizations disregard them as if they didn't exist. In fact, if you ask training professionals how they address unlearnable SOPs, you'll likely ignite a heated discussion over their existence.

Needs analysis models must distinguish between learnable and unlearnable tasks that employees must complete, then suggest efficient and effective ways for frontline workers to perfectly perform them.

Nominally Supporting Manual Workers

Businesses often treat their manual workers as step-children of little importance. Compensation and benefits are saved on manual workers and spent on executive decision makers, more training dollars are spent on soft skill development than production KSA, and work policies like starting and ending work times are more vigorously applied to manual workers.

Despite the ongoing automation boom, there are and will continue to be more manual workers making most of the products and delivering all the services that businesses worldwide depend on for profit. If past technolog-

ical eras are predictive of future ones, the number of manual labor jobs will increase rather than decrease. Those who fear losing their jobs due to new technologies, such as artificial intelligence, should find solace in this news.

It makes sense that manual laborers are a company's most valuable employees when taken as a whole because businesses rely so heavily on them. However, the training, pay, and other benefits they receive show that their employers do not treat them as such. Among those who receive the least amount of pay, training, and other benefits are those who work in environments that make it impossible for them to access computers, handheld devices, or even printed aids in a safe, effective, or aseptic manner.

According to Training Magazine's annual Training Industry Reports, businesses routinely spend more of their training dollars on executives, managers, and supervisors than on manual laborers despite the former amounting to far fewer employees. This is demonstrated by the 2024 report, which found that only 37% of training budgets were allocated to non-exempt workers, including manual laborers who work with their hands, compared to 63% for exempt workers.

Manual workers are essential in nearly every business worldwide, making it impossible to rapidly grow sustainable profit without them; therefore, needs analysis models and performance enablement interventions should prioritize the needs of those workers.

Replacing management and leadership positions with AI could lead to the greatest and fastest sustainable profit boom in history. That is not

hyperbole, since every new technological era has resulted in the fastest growth in employment and profits to date. The AI Age will likely follow suit and the decision maker ranks are prime targets.

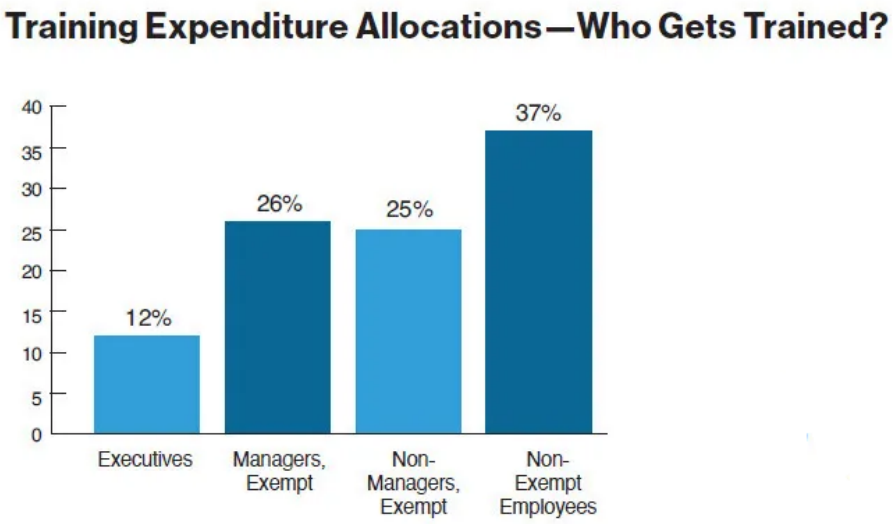


Figure 3: Training Budget Allocation

It should be clear that the simplest way for any business to swiftly grow sustainable profit is to implement cost-saving changes across the largest group of employees. Increasing manual laborers' productivity will have a greater impact on profit growth than improving the performance of any other group because they constitute the majority of workers in most businesses and are the main source of every business's revenue and profit. This implies that needs analysis models should prioritize the needs of manual laborers over all others and that management and leadership training will soon become obsolete if AI is able to effectively replace those decision-makers.

Not Addressing Error-Prone Work

There is a lot of truth to the proverb "to err is human." It implies that human labor will inevitably involve mistakes. Performance errors can have wide-ranging effects, such as destroying a bridge with your ship or grammatical errors in routine communications. Despite being a well-known business issue,

- Current needs analysis models do not adequately address how businesses can ensure their manual laborers perfectly perform their assigned tasks, especially error-prone ones. Before continuing, it’s important to note that the aim of all training and performance must be 100% perfection. CEOs, managers, and customers have never asked for less. When workers perform tasks that could injure people or damage property, perfect performance becomes especially important. Still, no bar client ever told their bartender it was OK when the vodka martini they ordered was made with gin, and nobody ever told a painter that it was OK to have painted a room blue when red was requested.
- Error-prone work refers to tasks that are more likely to result in human errors compared to other tasks. It encompasses tasks that are a) carried out so frequently that the worker's attention is diverted from the task at hand; b) carried out under stress, such as during a fire, weather event, or other emergency; c) unlearnable, which includes tasks with too many steps to memorize, steps that change, and tasks performed too infrequently to memorize; and d) too numerous to

perform all at once. Some error-prone tasks, like firefighting, toxic chemical use, and severe weather responses, require perfect performance because anything less than perfection could result in people getting injured or killed and property being severely damaged.

- Every needs analysis must account for the special needs of error-prone work and then suggest appropriate solutions.
- Current TL needs analysis models advise needs analysts to base their decisions on subjective and irrelevant information. Focus group summaries, employee and customer surveys, one-on-one interviews, test results, learning statements, supervisor observations, and managers' and leaders' intuition are among the data suggested by those models. The primary issue with analyzing that information is that the data are subjective and heavily weighted by opinions rather than facts. The following are additional reasons why this data is not advantageous for needs analysis:

1. Focus groups are useful for capturing opinions that trainees will share in a group setting but might not share individually. Everyone has opinions, and some opinions are based on facts, while others are not.

2. Surveys, like focus groups, are useful for capturing trainee opinions that they may or may not share in a focus group setting. The data surveys collect are opinions even when captured anonymously.

3. One-on-one interviews, like focus groups and surveys, one-on-one interviews with needs analysts result in a list of opinions, not facts. Furthermore, similar to surveys, one-on-one interviews only disclose the opinions that interviewees choose to share,

which may be what the interviewee thinks the interviewer would like to hear instead of the truth.

4. Test scores report the amount of knowledge and skill a worker gained from training. The issues with using test scores to demonstrate improved performance include:

    » Tests are often given before the first hour of training ends, which is important to note because up to 60% of training content is forgotten during that hour. A more honest way to capture the amount of knowledge a trainee accrued from a training class would be to administer tests sometime after the first hour passes.

    » Because test and work conditions can differ greatly, test scores may not accurately reflect how workers perform on the job.

    » Written tests are poor predictors of future performance. A high test score doesn't guarantee a trainee will perform as they were trained while on the job. There are many factors that make this true. For example, some managers tell workers to ignore training because "that's not how we do it here." Another factor is the significant amount of forgetting that occurs when spaced practice of the training content and coaching is not provided.

    » Tests administered by TL organizations are designed to measure training, not performance.

    » Test taking aptitude varies among individuals. Therefore, tests are effective at evaluating a worker's test-taking ability but don't accurately capture their performance capabilities.

    » The goal of every business worldwide is to rapidly grow sustainable profit. Profit is measured in dollars, not knowledge, skills, attitudes, relationships, or test scores. While it is true that training can minimally improve performance, there's no guarantee that it will and the measure of whether it did or not is on-the-job performance and profit growth, not test scores.

» Learning statements, simply put, don't measure training, learning, performance, or profit at all.

» Supervisor observations often form opinions based on a limited number of brief, highly unreliable observation sessions.

» Manager and leader intuition, also known as sophisticated, wild-assed guessing (S.W.A.G.), is at best, well-informed opinions.

The main reason TL organizations advise using subjective data instead of VURPRD is that TL organizations don't capture performance data, and the business functions that do capture VURPRD often won't share it with the TL group. Withheld VURPRD compels TL organizations to use inferior data they have or can collect independently of other business units.

After delivering an intervention, the TL organization often produces an ROI report using the same subjective data they collected from their needs analysis. Doing that doesn't just seem awkward and possibly deceitful; it is awkward and deceitful, and the intended consumers of that information are rarely fooled.

Responsibility and Accountability for Learning

Current needs analysis models do not fully address the responsibilities needed to successfully carry out performance enablement, performance ensurance, and ongoing performance improvement efforts. These duties would logically be assigned to an organization that identifies itself as the "learning organization" or the "training and learning organization," but that is rarely the case.

Differentiating between training and learning is important because learning can lead to measurable and sustainable profit growth, while training cannot. Simply put, training helps businesses increase sustainable profit only when learning occurs.

Accountabilities are goal-oriented, while responsibilities are task-oriented. Ebbinghaus's research demonstrates that learning requires memorization, which is only attainable through spaced practice and coaching. This means that in companies where the operations group is given accountability and responsibility for the spaced practice and coaching of new KSA, the operations group—not the self-proclaimed TL or learning organization—is the learning organization. Making this distinction eliminates confusion and distrust, which could potentially lower trust and profits.

At this point one must wonder what a learning organization is accountable for if it does not accept responsibility for learning, and how effective can a learning needs analysis can be when the company is uncertain about who is responsible for learning. In actuality, the majority of business units that identify as learning organizations are really just training organizations with a trendy moniker.

Why should anyone care if the an organization is called a training or learning organization? It’s because there’s an inference that learning is on a higher plane than training, which is true; it is more meaningful to have learned than to have been trained. However, it’s disingenuous for an organization to claim it is on a higher plane than another organization when they aren’t.

While aspirations can be beneficial, learning needs analysts must know who's actually responsible and accountable for learning, not who aspires to be. They must understand that learning is confirmed by performance data, not training data. By defining who is in charge of what, businesses can save time and money on their journey toward rapidly and efficiently increasing sustainable profit.

Failing to Coordinate, Collaborate, or Share Data

The biggest issue with existing needs analysis models may be the inability of different work groups to coordinate, cooperate on their needs analysis efforts, or share the data they gather. The way various business divisions collaborate and exchange data to comprehend needs is incredibly disjointed. Team leaders often use local data alone and concentrate solely on their needs, leading to solutions that don't help the entire company. This is frequently referred to as "siloing." Because of this, there are many distinct, narrowly focused analyses and myopic interventions that may waste more resources than they produce or conserve.

Coordinating needs analyses is crucial because unmet work system needs frequently have a negative impact on the performance of the worker system. According to that viewpoint, it would be incorrect to analyze a) jobs before the corporate organizational structure, b) SOPs before jobs, c) compensation before SOPs, and d) training before all the needs of the work system have been examined and addressed. It would be a mistake to analyze the corporate structure, wait a year to analyze jobs, wait another

year to analyze compensation, and then wait yet another year to analyze training. But in most businesses, this is precisely what happens.

In an ideal world, every business need—including those of workers and work systems—would be continuously and objectively examined. AI can do that; humans cannot.

Failure to Share Data

Among the three needs—coordinating, collaborating, and sharing data—the one that most negatively impacts business-wide needs analysis is data sharing. Whether using humans or AI to analyze business needs, the right VURPRD is required and must be shared across business functions.

Various business functions gather different types of data for their purposes. For instance, TL organizations record training data, HR departments record labor costs, operations departments record production costs and profit data, and marketing departments record sales data. Work systems would be far more efficient if all business data were accessible to all business functions through integrated software, but interdepartmental competition often prevents that from happening.

Regardless of the data's quality, each business unit must rely entirely on the available data for reporting and decision-making when they fail to share data. For TL groups, this means relying on suboptimal nominal, ordinal, and interval data such as trainee evaluations, test scores, and the number of people trained when making decisions and calculating ROI. Using that data

to analyze needs can only result in higher expenses, ineffective interventions, and lower profit.

Recommending Obsolete or Fad Solutions

The history of the TL function is replete with unproven fads and outdated solutions. Examples of this include the 70/20/10 model, the learning styles concept, and the use of computer-based job aids for manual workers who cannot access them.

Cash-strapped TL organizations can easily increase revenue by offering fads and outdated solutions, but it is rarely possible for them to demonstrate a return on investment from those interventions.

Failing to Adopt New Solutions

When new performance enablement, performance ensurance, and continuous improvement technologies are invented, older needs assessment models that haven't been updated to include those technologies are incapable of guiding needs analysts to recommend them. That situation represents a lost opportunity to rapidly grow sustainable profit.

As innovation continues to viciously accelerate, businesses incapable of leveraging new performance enablement, ensurance, and continuous improvement solutions will ultimately fail to compete with those that do. The most recent technologies must be incorporated into needs analysis models on a regular basis, keeping in mind the need to steer clear of fad solutions with scant evidence of their efficacy.

Handling Resistant Clients

Current needs analysis models don't advise analysts when to anticipate or how to deal with clients who resist a needs analysis. Addressing client resistance is crucial, especially given that many professionals in TL roles lack training or education in their field and may undervalue needs analysis.

When building and maintaining relationships is a key performance measure, then the easiest and safest response a needs analyst can give to a client who resists a needs analysis is to politely or silently acquiesce, even if doing so will lead to a failed analysis and subsequent solution. Simply following a client's intervention request can lead to transactional responses to business problems, resources wasted on activities instead of solutions, and undetected vulnerabilities that erode business profits. This can be the case when a client requests a training program instead of a needs analysis or when a client insists that analysts use client-provided data instead of capturing or accessing it independently during the needs analysis process.

There are many reasons why clients resist participating in needs analysis, and understanding those reasons will help analysts convince their clients to fully support the activity. For example, clients may have personal agendas they're pursuing or issues they'd prefer not to have exposed by a needs analysis. They might also distrust the expertise of a pretentious training department that calls itself a "learning organization." Because the expertise of a learning needs analyst can range from none to very high, it could be advantageous to the analyst if a needs assessment model provided suggestions on how to convince resistant clients to support a needs

analysis. On the other hand, ensuring needs analysts are professionally developed instead of self-educated and eliminating the pretentiousness would go a long way in raising the TL organization’s trustworthiness.

Failure to Secure Data

Traditional needs analysis models fail to address information security needs. The use of electronic interventions exacerbates this risk. One common justification for not sharing data across divisional silos is the lack of security surrounding needs assessment activities, since breaches can result in catastrophic data breaches and potential lawsuits that could deplete a company's earnings.

Any needs analysis, whether carried out manually or automatically, must ensure all data used in the analysis is appropriately secure, as that is a fundamental requirement for any business.

Failing the Climate

Global warming poses an existential threat to all living things and its impact extends to all businesses. Until we stop human-caused global warming, it will continue to be the most significant obstacle facing all businesses, living things, and future life worldwide.

In retrospect, 20th-century needs analysis models should have prioritized climate protection initiatives or at least considered them, but they failed to do so. Perhaps we wouldn't be dealing with an existential climate threat today if companies had always taken the environmental cost of their operations into account. But this existential business necessity must never

be disregarded again.

Today it's imperative that every company and every employee seize every opportunity to slow or stop global warming; therefore, every needs analysis model must include climate protection provisions.

Overlooking Ethics

Current needs analysis models do not consider the impact of ethics on profit. This means that when looking for ways to quickly increase sustainable profit, businesses view both unethical and ethical solutions as equally viable. For example, a system that automatically records how much time employees spend on each process and step they perform can be used both ethically and unethically. It could be used unethically to set productivity targets that employees cannot safely meet, or it could be used ethically to reveal ways to improve worker performance and income.

Every company in the world aims to increase sustainable profit quickly, so a strategy for doing so is essential. Whether written or not, unethical work strategies and policies can seriously harm a company's viability. Rather than quickly increasing sustainable profit, they can result in expensive lawsuits, injuries, property damage, decreased competitiveness, and even bankruptcy.

Over time, the performance of unethical companies has consistently lagged behind that of ethical companies. As a result, it is critical that needs analysis models identify all unethical business practices so that they can be eliminated and profit growth can accelerate.

Not Enabling Innovation

Enabling innovation means that companies must thoroughly examine and test promising new technologies before swiftly and effectively implementing the ones with the best chances of success. In an era of rapidly accelerating innovation, innovation is already a crucial component of business success, if not the most crucial. As a result, failing to innovate is already one of the most common ways for a business to fail, and it will only get worse.

Relying on decades-old needs analysis models for issue resolution leads analysts to favor outdated technologies over newer, more effective, and more efficient ones. Using outdated technology recommended by out-of-date needs assessment models may make it easier to manually address performance issues, but it will never help a company survive the fierce competition of the contemporary business climate.

Disregarding the Impact of Existing Interventions

When putting a new needs analysis model into practice, keep in mind that all existing work and worker system interventions were selected using the best available data and decision-making tools at the time they were developed. If the needs analysis was done manually, analysts must know that human bias, greed, and self-interest influenced the analysis and its results.

Future needs analysis models must not assume existing work and worker system interventions are operating efficiently and effectively. Instead, new models must evaluate existing interventions along with proposed ones.

Chapter 6: The Future State of Needs Analysis

Up to now, this book has addressed the troubles of traditional needs analysis models. The focus now shifts to how businesses can use AI to automate their needs analysis system and address the problems identified in current needs assessment models. This chapter also discusses how companies can prepare to use AI to perform their needs analyses, since preparation is an essential part of any change.

How We Got Here

During the Industrial Age, all needs analysis was performed by people, and the vast majority of TL interventions were led by instructors. When expressed in human terms, needs analysis expanded from infancy to early puberty in that era. The data collected for all forms of needs analysis has traditionally come from human observation and until recently, were saved in printed documents.

Computers, digital content such as digital text, audio files, video, and images, and content combinations such as eLearning, multimedia messages, teleconferencing, and videoconferencing were all introduced during the Information Age. Content was "king" during the Information Age, automatically capturing ratio data was still in its infancy, and needs analysis models had reached early adolescence. Digital attendance records, eLearning usage, training evaluations, and computations performed using pocket calculators—the first electronically accessible IA system—were among the

data that TL organizations were able to obtain.

Around 2008, humanity entered the Surveillance Age, which is also known as the Internet of Things (IoT) Age. Cameras, sensors, and other devices could be applied to digital content to create and capture various data, including ratio data that could be used in near real-time mathematical computations. Content's value declined as a result of this change, while data gained prominence. Despite the monumental changes brought by the IoT Age, needs analysis models largely remained unchanged.

The AI Age has made it possible to automate many tasks that previously required humans. By using computers, algorithms that mimic human decision-making, and VURPRD, computers can now make more and better decisions faster than humans. Although technically capable of carrying out needs analysis automatically for a decade or longer, AI-driven needs analysis models lacked the maturity needed to automate them successfully. The existing TL needs analysis models had changed little since the introduction of the Mager & Pipe model in 1997, the Kaufman model in 1994, the Arthur model in 1993, the Four Phase Model in 1988, the Figuring Things Out model in 1985, Gilbert's Performance Matrix in 1978, Harless's model in 1975, and so on.

Traditional TL needs analysis only addresses worker system issues and has always relied heavily on supervisor expertise, observation, and other subjective data to reveal a business’s training and learning needs. The majority of manual TL needs analyses have overwhelmingly resulted in training recommendations. While traditional needs analysis systems continue to

exclusively recommend late 20th and early 21st century technologies as solutions, training has evolved from instructor-led training to digital content to IA and AIA.

Where We Need To Be

In the future, needs analysis must be faster, more thorough, and better at assessing a wide range of opportunities aimed at quickly boosting lasting profits. It must be a continuous, round-the-clock, 365-day process, that assesses all aspects of the work and worker systems, including existing interventions, work policies, and SOPs.

As with every business activity, the goal of needs analysis is and always will be to contribute to rapidly growing sustainable profit. In light of this, the USPTO granted 49,000 patents in 1979 and 354,000 in 2019, for a total of 6,000,000 patents over a 40-year period. Upon trending that data forward, it predicts 2,200,000 patents will be granted in 2059 alone, and 27,000,000 patents will be awarded over the coming 40 years. Every patent granted has the potential of growing into a new product that will require a training initiative. This is important because it suggests that at least one new manual laborer will need to be hired to develop each of those 27,000,000 newly patented products. It also means 27 million needs assessments will need to be performed over that period.

To make things even more challenging, the United States is not the only innovative nation in the world. According to Beijing Sanyou Intellectual Property Agency Ltd., China granted 921,000 invention patents in 2023

alone. Compared to the 346,000 patents granted by the USPTO in 2023, the US would need to nearly triple its output immediately to compete with China, which would surely push its granted patents, manual worker population, and demand for needs analyses well beyond 100,000,000 by 2060.

The point is quite obvious. Completing 100,000,000 or even 1/10 of those needs analyses manually would be too costly and time-consuming for any nation's businesses to perform manually. For those reasons alone, needs analysis must be automated.

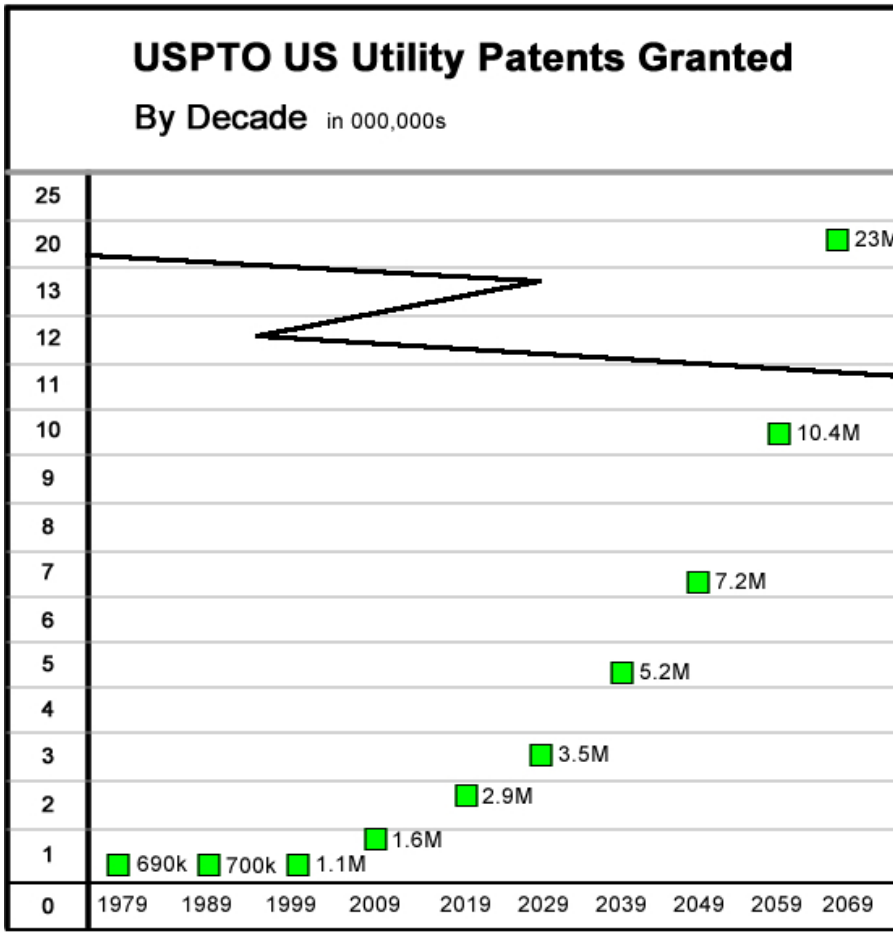


Figure 4: Patent Trends

To bolster the argument for automating needs analysis, consider the following: a) the likelihood of being able to manually and concurrently perform needs analysis across both the work and worker systems, business-wide; b) the chances of using only valid, unbiased, reliable performance ratio data when decisions are made by individuals or groups of people; c) the odds of VURPRD being available for manually performed assessments are very low; and d) the labor required to perform a needs analysis for every new patent is impractical on an individual basis, and when taken together, is preposterous. This leads to three needs analysis options 1) never performing needs analysis, 2) sometimes performing needs analysis, or 3) automating needs analysis.

With the correct model, algorithms, and data, it is already feasible to use AI to drive needs analysis. Clearly, AI-driven needs analysis is a cutting-edge technology that will transform international business operations.

VURPRD Access

Regardless of whether they plan to use AI to automate their needs analysis system or continue evaluating needs manually, businesses cannot expect to improve their needs analysis results without improving the data they use to reveal needs. Getting access to or creating sources of VURPRD, which is especially challenging when gathering that data from manual laborers, is likely the chief barrier to implementing any AI system. While the process of obtaining or generating streams of valid, unbiased, reliable performance ratio data is relatively simple, most businesses will need to figure out how they will automatically collect it.

Automating Needs Analysis

To process all the common needs analysis requests plus the ones associated with newly patented products, systems, and services, needs analysis must become quicker and less expensive than it has ever been. To accomplish that, businesses must a) automatically collect VURPD from production workers as they perform their assigned SOPs at the lowest possible level, which is the individual worker and process step, b) gather ongoing feedback from workers as they perform their tasks, c) develop algorithms that can constantly and fairly analyze the collected VURPD and worker feedback in ways that reveal performance improvement opportunities, d) set up connections, APIs, between the automated needs analysis system and important data streams like hiring, pay, supply chain, and sales, and e) create algorithms that use the various system data to identify opportunities for quickly increasing sustainable profits for both the worker and work systems. Those interfaces and algorithms will largely mimic and replace human decision-making.

Automating needs analysis will eliminate a large number of jobs and enable the companies utilizing it to make more sustainable profits faster than ever. Just as it was in every prior technological age, the profit windfall will enable businesses to hire more workers who directly contribute to growing the business's sustainable profit and to further accelerate innovation. This has been the case with every technology that has ushered in a new technological era.

While this vision of future work and needs analysis may be too com-

plex or too costly for some businesses to accomplish, there are many more complex systems that companies have successfully implemented, like the construction and operation of nuclear reactors, space flight systems, and quantum computers.

AI-powered needs analysis is feasible but may be slow to take root for various reasons, including executive reluctance to work themselves out of jobs. Although launching an AI-driven needs analysis system will initially be expensive, it has enormous potential for rapidly growing sustainable profit for decades to come.

The future is clear: a) AI will automate needs analysis; b) AI will replace many white-collar jobs and free up large sums of money that were previously paid as salaries; c) there won't be enough time or resources to support manual needs analysis; and d) launching an AI-driven needs analysis system will face stiff opposition. This strongly suggests that companies on the “innovator,” “early adopter,” and even “early majority” sectors of the technology adoption curve will reap incredible competitive advantages for themselves.

Analysis at the Speed of Change

The objective of needs analysis is to continuously improve the performance of both work and worker systems, and the goal is to rapidly grow sustainable profit.

AI is now capable of replacing manual needs analysis with better, faster, and cheaper analysis than humans can deliver. AI can do those things by,

- Analyzing all organizational needs concurrently,
- Using VURPRD instead of subjective data to evaluate performance,
- Eliminating human bias, greed, and self-interest from decision-making,
- Building algorithms that prioritize ethics and climate protection over short-term profit,
- Developing algorithms that can evaluate business requirements and performance in near real time, around-the-clock,
- Using algorithms to objectively balance all needs, all existing initiatives, and all opportunities before recommending solutions,
- Prioritizing recommended solutions by their ability to rapidly grow sustainable profit,
- Ranking existing interventions to reveal which should be retired, replaced, or kept as is,
- Eliminating the ability of executives to edit a pre-approved needs analysis process,
- Always presenting the highest priority solutions instead of those most popular among executives and others,
- Standardizing and ensuring decisions are always legally defensible.

Chapter 7: Why Change Now?

One must ask why a new needs assessment model is needed if AI will ultimately take over needs analysis activities. The simple answer is that it is never a good idea to automate an inferior process. Here are some specific reasons why automating an existing needs analysis model would not be a beneficial:

- Existing models were designed for management-heavy, pre-AI Age organizations that won't exist after AI is implemented.
- Existing models can only recommend technological solutions that existed when the models were written.
- Programming AI to follow an outdated or inadequate needs assessment model would result in a list of needs and solutions that don't address security, ethics, or climate change—all high-impact business needs that should never be overlooked.
- Current needs assessment models often recommend using data that cannot objectively reveal needs.
- Project plans automatically created based on the recommendations of a needs analysis can expedite implementation.
- Mini-needs analysis may be the most common needs analysis method a company uses, but automating that process can't be expected to grow as much sustainable profit as fast as a full needs analysis.
- Despite their flaws, traditional needs analysis models were the best

way for businesses to analyze needs. Unfortunately, the TL needs assessment models would only indicate whether professional development, education, or training was required; they would not cover operational, policy, equipment, or other business needs. That strategy has allowed business units to continue operating in silos and produced numerous, haphazard, and fragmented analyses that could have been much more successful if carried out cooperatively and concurrently across all business functions.

- It was uncommon to find a needs analysis model that suggested solutions beyond a job aid or classroom event twenty or even two years ago due to the limited electronic technologies and training delivery options at that time the model was developed.
- . Recommendations for outdated solutions will be sent to those who continue to use outdated models.

This indicates that needs analysis models must be updated on a regular basis as technological eras and technologies evolve.

Organizational Change

Enabling and continuously improving performance through the effective use of employees is the objective of organizational change. Future needs analysis systems must be able to identify strategies for how companies can best use their workforces to increase sustainable profits faster and more ethically while protecting the environment.

Like all technological eras, AI Age organizations will adapt their organi-

zational structures to capitalize on new technologies. Needs assessment models must show how companies can adapt to support new technologies and quickly increase sustainable profit. As the AI and Robotics Ages unfold, expect the following organizational changes to gain popularity:

- **Flatter organizations.** As new technologies are developed and adopted, some jobs will require fewer workers while others will require more. More precisely, AI can be expected to replace a majority of decision-maker jobs, such as directors, managers, frontline supervisors, and CXOs, while increasing employment opportunities for product developers and other manual laborers.
- **More product development workers.** As innovation accelerates, more people will be needed to create and optimize new products and services.
- **More manual workers.** Accelerating innovation requires more manual labor to develop and optimize new products for the market, produce existing products, and deliver all services worldwide. As a result, companies must prepare to oversee a greater number of manual laborers without the assistance of human supervisors.
- **More temporary/migrant workers.** The workers who create new products and services will no longer be needed once those products or services are fully optimized and ready for market. Those workers will need to relocate to new positions focused on creating other products. Companies must ensure that the tasks are easy enough for

migrant workers to perform with little to no training. They also must ensure that their employees learn new skills to bolster their future employment opportunities and are compensated sufficiently to cover daily living expenses while spanning the anticipated periods of unemployment in between jobs.

- **Smaller or combined performance enablement departments.** As AI shrinks the headcounts of TL organizations, industrial engineering, organizational development, marketing, and other business support functions, businesses will be able to merge those functions into a single “performance enablement” division. Once merged, intra-business competition and silos among those groups will fail to produce any benefits that may have existed prior to the merger.
- **Fewer performance ensurance workers.** In most cases, AIA and other technologies can ensure better performance than human supervision, which reduces the need for supervisors and their associated human resource costs. Businesses will have the opportunity to accelerate change even more by transferring former knowledge workers into product development roles.

Companies will be able to drastically flatten their organizations by utilizing IA, AIA, AI, robotics, and innovation. This will enable them to reduce the number of employees and worker system expenses while redeploying staff to new, high-priority tasks. This transition won't be as simple as cutting payroll and employees to flatten an organization, as was the case before AI. Workers will have to give way to computers, new ways of capturing perfor-

mance ratio data, IA, and AIA before moving on to AI and robots.

Businesses will face new challenges when implementing needs analysis in flattened organizations, such as how to obtain VURPRD for AI analysis and how to quickly make high-quality, broad-minded decisions with fewer people. A carefully thought-out shift from manual to automated needs analysis is necessary.

The following tasks suggest what must be completed during the transition and the order in which they should be addressed:

- Because every business initiative must begin with the same shared goal, begin by establishing and winning support for the company's single goal, which is to rapidly grow sustainable profit,
- Because every business initiative must begin with the same shared objectives, establish and win support for the company's three main objectives, which are to enable, guarantee, and continuously improve performance—performance that may involve work and/or worker system interventions,
- Developing and optimizing VURPRD databases should begin as soon as possible whether automating needs analysis or not,
- Integrating TL, industrial engineering, organizational development, pay and benefits, and other performance improvement functions with needs analysis responsibilities and accountabilities into a single process,
- Merging the business’s support functions including TL, industrial

engineering, organizational development, pay and benefits, and other performance improvement functions, into a single business unit,

- Developing and optimizing a needs analysis workflow that can become the algorithm an AI-driven needs assessment system would follow,
- Developing and refining AI algorithms that will assess business requirements more effectively and efficiently than humans,
- Developing and testing the application programming interfaces (APIs) that will continuously and automatically feed VURPRD to an AI-driven needs analysis system,
- Creating security measures to stop or prevent attacks on the automated needs analysis system and the interventions that follow,
- Developing and automating interventions for performance ensurance and ongoing performance improvement,
- Creating IA, AIA, job aids, and other performance-enabling solutions,
- Creating strategies and algorithms for climate protection,
- Writing algorithms to ensure ethical decisions are made whether by human-led or AI-driven needs analysis,
- Creating and automating reports that include break-even date projections, ROI estimates for each business intervention, lists of coaching opportunities, new technology and equipment to buy, adjustments to compensation, process modifications, etc.,

- Using the automated needs analysis system to examine previous choices and solutions—including those motivated by self-interest, greed, and human bias—that were based on subpar data,
- Developing an auditing strategy to guarantee that procedures are consistently followed throughout the company.

Emphasize and Reward Excellence

Before launching any new needs analysis initiative, businesses must heed Pygmalion's lesson and a) define excellence in performance terms, b) communicate the rewards that will be provided when the target is achieved, and c) make plans for following through on their commitments. When it comes to corporate performance evaluation systems, Pygmalion would advise defining for employees what constitutes excellent work, outlining the precise rewards that will be given when excellence is achieved, and then keeping your word when the requirements are met.

Remember that success requires trust, and the best way to build trust is to make and keep promises. Yes, making promises and keeping your word is crucial, even if it makes the HR and legal departments cringe. If you really want exceptional performance, then you have to define it, make a financial commitment to achieve it, and then follow through even if it requires putting your own job on the line. If you follow through on your commitments, there's no need to worry about cringing legal and HR departments. Excellence will never come to businesses that can't define it, commit to it, or support it.

Performance Reviews

The objective of reviewing performance is to continuously improve both the overall worker system and the individual worker's knowledge, skills, and abilities (KSA). The company's goal of quickly increasing sustainable profit must connect VURPRD with performance reviews to objectively measure performance.

For performance reviews to contribute to rapid, sustainable profit growth, they must be implemented with the highest ethics. They must focus on rewarding good performance and not used for other trust-killing purposes such as reducing head count and reducing payroll.

If performance reviews are to contribute to rapidly growing sustainable profit for businesses, then they must motivate workers to continuously improve their performance. To achieve this, a performance review system must be an ongoing process that a) gathers and evaluates each worker's VURPRD; b) continuously identifies opportunities to enable, assure, and continuously improve each worker’s performance; and c) eliminates bias and any other element that is out of the worker’s control that could skew the analysis and reviews.

Traditional performance reviews should be replaced by a better system that only uses VURPRD to automatically and continuously evaluate and calculate employee contributions to their employer's rapid growth of sustainable profit. After determining that profit, a portion of it can be paid to the employee and conventional, manual reviews can end.

Recognize Perfection as a Performance Need

When perfection is a performance need, then the needs analysis system must advise an effective IA or AIA intervention to enable and ensure perfect performance, depending on the use environment. For example: 1) Some workers may be unable to stop working to locate, pick up, read, and follow a printed job aid; 2) Some workers may be unable to stop working to access a phone, tablet, television, etc., queue media, and watch, pause, or play through each step; 3) Some workers are unable to touch any non-sterile objects while working; and 3) Workers operating in an emergency are unable to stop working to find and manipulate anything with their hands. In each of these cases, a worker's voice is the only way they can access support.

Manual workers must precisely follow SOPs, prompting future needs analysis models to recommend an appropriate IA system. If the company cannot find an existing solution, it must either develop or acquire the necessary technology.

Enable and Ensure Perfect Performance

Even though many tasks don't require perfection, there are some that do, and a system must be developed to cover that need. Since a system must be developed to enable performance in one or more cases, it can be used for enabling performance in all other cases. The only cost-effective way to do that is through electronic technologies, either IA or AIA.

Ensuring perfect performance requires that SOP steps be delivered to

workers at the right time, that the time each worker spends on each step be recorded and compared to the minimum expected completion time for that step, that an alert be sent if the minimum time is not met, and that the next step can only be delivered and performed after these conditions are satisfied. Ensuring performance also requires the ability of a system to deliver an immediate request for help from workers. The request should be sent immediately to the appropriate supervisor with details like the who's asking for help, where they're located, what SOP they're working on, and the specific process step that is causing difficulties. The supervisor, aided by the provided information, can promptly assist the worker upon their arrival at the worker's location.

Manually enabling and ensuring perfect performance is too costly, inefficient, and impractical, so that capability must be automated. IA systems, such as Google Assistant and Amazon Alexa, can provide workers with detailed instructions when needed, but they are unable to record the amount of time users spend on each step, which is essential for ensuring perfect performance, continuously improving performance, and calculating its profit contribution. In addition to performing all of an IA's functions, AIA systems can record how much time employees spend on each step, let them ask for assistance without pausing their work, automatically send alerts when it seems like a crucial step has been overlooked, and capture the data essential to calculating the ROI for the process and step. They can also indicate which work system issues need attention by comparing completion times at process step granularity, which is essential to revealing organizational,

equipment, supply, SOP, and other non-worker issues.

AIA systems are very effective and efficient at ensuring that employees carry out their assigned SOPs flawlessly and capture their suggestions for continuous improvement.

To enable and guarantee that employees carry out their assigned SOPs flawlessly, modern needs analysis models must specify which technology is both necessary and sufficient. If the required technology is unavailable, then the company has that issue to resolve in its effort to quickly increase sustainable profit.

Distinguish Business Goals from Objectives

Modern, business-wide needs analysis requires a needs analysis model that will match the goal and objectives of the target business. Businesses often complicate this process by confusing their goals with their objectives.

Every business must make money; therefore, the most important thing by far to every business worldwide is to get the highest return on their financial investments as possible. Too many goals can be confusing to workers, so a single goal is best. If there must be only one goal for every businesses worldwide, then it is to rapidly grow sustainable profit.

Just as businesses can have too many goals, they can also have too many objectives. Upon examining all the things businesses worldwide do to rapidly grow profit, only three objectives prevail. They are to enable, ensure, and continuously improve performance, whereas performance includes all aspects of the work and worker systems.

When developing a needs analysis model, goals and objectives must be clear and measurable. This is especially true if the business intends to use AI in any capacity because AI requires mathematical calculations, but especially if they plan to use AI to drive needs analysis.

Align with the Business's Goal and Objectives

Before a needs analysis system can be used effectively, it must first ensure that all functions, processes, workers, materials, and equipment are aligned behind a single business goal; additionally, every action taken by a business unit must correspond to one or more of the three objectives. This alignment has always been essential for efficiency and is now crucial for enabling AI to automate needs analysis. This means that the training department must no longer state that its goal is learning or be exempted from contributing to sustainable profit gains by rationalizing that learning is an immeasurable, intrinsic value. Similarly, the marketing department's goal cannot be sales, the compensation department's goal cannot be a payroll amount, the employment department's goal cannot be new hires , and the goal for managers cannot be their soft skill usage.

The measurement of all business progress has always been based on financial gains. Every business function must demonstrate its monetary contribution; from there, choosing interventions for profit growth becomes straightforward by selecting those with the highest sustainable returns.

Communicating the business's goal and objectives is a good way to start aligning business functions and workers, but communication alone is

insufficient. Every business activity, irrespective of its size or complexity, must be considered a profit-making intervention and demonstrate its financial contribution to the business. If an intervention cannot be proven to grow sustainable profit, then it must be considered a waste and consequently replaced or improved.

Once the business goals and objectives are clearly defined, needs analysis models can use mathematical calculations to identify the business's most pressing needs and assess achievements based on what truly matters: the rapid growth of sustainable profit.

The Three Objectives

Before a business can effectively update its needs analysis system, it must first align all its business functions, processes, workers, materials, equipment, etc., behind three objectives. Those objectives are to enable, ensure, and continuously improve all aspects of both the work and worker system performance. This is important because if a prospective intervention fails to enable the work and worker system to perform optimally, fails to ensure the work or worker system will perform perfectly, or fails to reveal ways to continuously improve performance across the work and worker system, then that intervention will not generate any sustainable profit.

The relationship between the 3 objectives is essential and complementary because 1) workers must be enabled to perfectly perform their assigned tasks; 2) being able to perfectly perform an SOP from memory doesn't mean that the SOP will always be performed perfectly, or even

performed at all; 3) performing an SOP from memory or using an aid that doesn't capture performance times can't guarantee the SOP was performed perfectly in the right sequence or that steps weren't missed; and 4) ensuring that an SOP is performed perfectly can't indicate how the work or worker system can be improved.

A more detailed description of each objective follows:

Enabling Performance

Models for future needs analysis must ensure that companies can enable performance across all the work environments they operate within. Because manual workers can't operate like office workers, it's insufficient to analyze performance in remote field locations as if they were office environments. Ultimately, every modern business must support a variety of performance enablement interventions, including training, IA, AIA, read-backs, etc. For example:

- Training must be available to introduce new concepts to workers and to develop basic knowledge and skills in the environments where employees work, using methods trainees can easily access.
- IA systems must be accessible to enable performance that doesn't require training.
- AIA systems must be available primarily for ensuring and continuously improving performance but also to enable performance in certain environments, to support workers with certain disabilities, and for supporting AI.

- When other performance enablement options are not supported, readbacks must be available. Note: A readback is when a worker repeats back critical instructions to confirm they are correctly understood.
- When memorization is feasible and proven to be necessary, IA can facilitate flawless performance by giving instructions and the practice needed to commit SOPs to memory with little to no training.
- IA can enable perfect performance via print text, digital text, video, audio, or a combination of those options. Selecting the appropriate IA mode is crucial because some employees lack the technologies required to receive IA while they are working, others are unable to pause their work to access specific IA modes, and still others are unable to touch objects that can cross-contaminate their work product. Using the example of a bartender, accessing computers, devices, or even printed aids while working would be ineffective, unhygienic, and against health and safety regulations for food and beverage workers, healthcare workers, electronics assemblers, etc. Hearing step-by-step instructions is both necessary and sufficient in bartending and most other manual work environments; this strategy is likely to produce more sustainable profit faster than conventional performance enablement solutions, like training or learning.
- Another method of enabling performance is through AIA. AIA is an IA variety that has the added capability of automatically recording the amount of time employees spend on each process step they com-

plete as well as their recommendations for continuous improvement. Because AIA guarantees and continuously enhances performance, it is more robust than IA alone.

Given each particular work situation, modern needs analysis must advise which performance enablement method is most effective for each performance enablement need and an effective method must be available for each use case.

Ensuring Performance

Modern needs analysis models must ensure that both workers and automation perfectly execute every step of each SOP consistently, provide a means for employees to receive immediate support when necessary, and automatically alert both the worker and a supervisor whenever the system detects a performance error.

Before AIA, the only method for ensuring performance was human supervision; however, that oversight has its drawbacks, such as 1) supervision gaps, which occur when a supervisor is not available to consistently observe worker performance; 2) supervisor bias, which can result in closer scrutiny of some workers and work systems than others; and 3) local SOP variances, such as the well-known "That may be how they told you to do it in training, but it's not how we do it here." Because of all those factors and others, performance ensurance is a business requirement that calls for an automated solution.

Future needs analysis models must reveal when performance ensur-

ance is needed, the level of ensurance needed, and the best way to ensure performance within various work environments.

Continuously Improving Performance

Modern needs analysis models must constantly analyze work and worker systems for opportunities to not only improve worker performance but also the work system's performance. Continuous improvement enables businesses to quickly increase sustainable profit through cost savings, premium pricing opportunities, and competitiveness.

Continuous improvement requires VURPRD and an ongoing process of Defining, Measuring, Analyzing, Improving, and Controlling (DMAIC) across both work and worker systems. Needs analysis is a key step in continuous improvement, as it is the "A" in the DMAIC continuous improvement cycle.

In the AI Age, AIA has rendered human observation insufficient and virtually. The best way to continuously improve performance now is to use an AIA system.

PDCA to DMAIC to ADDIE

Since Sir Francis Bacon described the scientific method in 1620, performance improvement models have undergone significant changes. The Plan, Do, Check, Act (PDCA) cycle updated Sir Bacon's model in the 1920s, and in the 1950s, it evolved into DMAIC.

DMAIC was further adapted to become the foundation of the lean manufacturing model, which focuses on performance efficiency, and the Six Sigma model, which is focused on performance quality. In 1975, Florida State

University created the TL organization's ubiquitous needs analysis model, ADDIE, by replacing DMAIC's Improve phase with Implementation and its Control phase with Evaluation.

While the Analysis phase is shared by all of these models, ADDIE and its Analysis phase are limited to training, while PDCA and DMAIC are continuous improvement models that are intended to be applicable to any organization or business function, including training and learning.

To rapidly grow sustainable profit, future needs analysis models must make needs analysis a continuous cycle that pinpoints areas where the businesses can improve work and worker systems. An automated system is the most economical and efficient since the efficiency and quality costs to administer a less robust manual system would be prohibitive.

Collect and Analyze Ratio Data

Future needs analysis models and AI depend on predictability, and high predictability depends on VURPRD, with ratio data being the key. Ratio data includes 1) the time it takes workers to complete their assigned SOPs and SOP steps, 2) the number of products produced and services delivered, 3) the labor cost of producing or delivering one item, and 4) the number of defects found upon inspection. To achieve the highest reliability, performance ratio data would need to be captured every time a worker performs a targeted SOP. That was untenable before AIA technology but is now entirely feasible, even essential to a quality needs analysis in the AI Age and beyond.

Only ratio data can be used in mathematical formulas, including those used to make predictions. The detail and frequency at which ratio data is collected determines its degree of predictability and the more predictive data is, the more useful it is across multiple business functions. For example, determining how long it takes to perfectly perform a specific SOP 2,000 times will provide an accurate estimate of how long it will take to complete the same SOP 2,000 more times, whereas collecting the same data once or any other statistically insignificant number of times has very low predictability. A company's compensation department could use that information to create a worker's total benefits, a product manager could use it to help set the price for a service, and the employment department could use it to direct hiring and to meet production schedules.

Data granularity matters. Companies that collect the time needed to complete an SOP can't tell how much time is needed to carry out each SOP step. That limits their ability to use data to ensure or continuously improve performance. It's crucial to automatically record performance ratio data at process step granularity because when it's reliably known how long it takes to perfectly perform an SOP step, 1) it's possible to accurately predict how long and how much money it will take to perform the step in the future, and comparisons can be made, 2) the time and cost to perform the entire SOP is known, 3) coaching opportunities can be accurately pinpointed, removing the cost of guessing and false choices, and 4) the business would know how much profit could be saved by cutting seconds or even tenths of seconds off a step that's performed thousands of times per day.

An AI program could be developed to independently analyze performance ratio data when it is gathered automatically and make recommendations for ongoing improvement in near real-time.

Performance-focused calculations and formulas, including break-even dates, cost/benefit analyses, and returns on investment, can only be performed using ratio data. These computations show how much each current and potential intervention might contribute to increasing sustainable profit. Once a needs analysis can accurately calculate the profit contributed by each intervention in a business, that calculation can be automated using AI.

When AI is able to accurately calculate how much profit a business intervention contributes, it can then focus on the best opportunities to improve performance, rank and recommend replacing low-value interventions with ones of greater value, and rank and recommend only the interventions that are expected to yield a superior return on investment rather. It's clearly better than pursuing every intervention that has strong executive support.

AI and ratio data must be used to drive future needs analysis initiatives. The only way to cost-effectively and reliably capture the performance ratio data needed to operate a needs analysis, whether performed manually or AI, is by using Surveillance Age technologies, including AIA systems.

Analyze Valid, Unbiased, Reliable Performance Ratio Data

The purpose of collecting and analyzing VURPRD is to provide the best possible data for revealing continuous improvement opportunities across

both the work and worker systems. VURPRD must be continuously accessible to future needs analysis systems if they are to consistently identify strategies for quickly increasing sustainable profit.

It was impossible to automatically capture VURPRD prior to the Surveillance Age. The alternative was to capture and analyze far inferior nominal, ordinal, and interval data produced by surveys, interviews, and other human-led interactions. That inferior data led to inferior solutions. This is commonly described as the “GIGO” effect, or Garbage In, Garbage Out.

To avoid GIGO, future needs analysis models must exclusively use VURPRD not only for making assessments and decisions but also to drive AI Age technologies and robotics.

Businesses must add VURPRD to the needs list if it lacks an automatic method to capture it.

Set Organizational Priorities

When analyzing needs, it is important to take into account the priorities of each business. A business may need to prioritize employee diversity, local supply chains, security, carbon footprint reduction, or other long-term profit initiatives over short-term ones.

To improve future needs analysis results, organizational priorities must be established and then new needs analysis models used to ensure their fulfillment. Once the priorities are set, needs analysis models must be able to objectively compare, evaluate, and prioritize the financial costs and benefits of prospective initiatives that are intended to grow sustainable profit,

but not always as rapidly as when there are no priorities to consider.

Mitigate or Eliminate Organizational Politics

Organizational politics can easily circumvent, supersede, or render contemporary needs assessments ineffective. The most frequent occurrence of this is when a powerful executive asks for an intervention—like a new work policy, training course, pay adjustment, etc.—without the benefit of a needs analysis.

Future needs analysis must be automated because that would be the most effective way to lessen or eradicate the influence of organizational politics on needs analysis. Businesses can easily implement the recommendations of an automated needs analysis system or use them to influence executive decision makers.

In any case, an objective, prioritized list of needs can be produced in much less time and for significantly less money when needs analysis is automated than when executives are solely responsible for decision-making.

Eliminate Systemic Bias

Systemic bias is the tendency of an organization to promote, support, and select predetermined solutions. Systemic bias is common throughout most business functions. An example is the high probability of getting a training program when the training department is asked to resolve a business issue. Companies may also be biased in favor of using marketing to boost sales, lowering frontline worker wages when profit margins decline, and closing locations in reaction to union activity.

Systemic bias can be eliminated from needs analysis by using VUR-PRD, an AI-driven needs analysis system, and AI agents.

Don't Jump to Training

Business executives often jump to training as a comprehensive solution to a wide range of needs that training alone is rarely able to fulfill. Training is often thought of as the essential performance enablement solution or at least a solution that could do no harm. Not surprisingly, TL functions commonly present training as a performance enablement method even when it is the most expensive, lowest-efficiency, lowest-efficacy solution to a business problem. For those reasons, training is a perfect example of systemic bias that harms businesses.

There are many ways to enable, ensure, and continuously improve performance, each of which should be considered by needs analysis models before training. To choose the best solution, analysts and AI algorithms must determine which option is both necessary and sufficient for resolving the issue or risk at hand, beginning with the lowest-cost option first, then moving up the cost curve.

Comparing and selecting the best performance enablement, ensurance, and continuous improvement solutions was much easier, albeit less effective, prior to the Information Age when the only options were printed aids, training, and human observation. By introducing new technologies, such as AR, VR, IA, AIA, and so on, Surveillance Age technologies broadened the options, but complicated the selection.

Future needs assessment models, whether manual or automated, must choose the necessary and sufficient method for enabling, ensuring, and continuously improving performance from the most up-to-date options. Additionally, they have to select the best solution for workers and their jobs. Giving printed job aids or training to every employee in every situation is no longer adequate. For example, manual workers remain the profit engine of most businesses worldwide and will continue to be for the foreseeable future. Consequently, it would be inadequate to provide 1) visual aids, such as schematics and how-to videos that can only be accessed through touch navigation, which are insufficient for assembly line workers who can't stop work to access them; 2) aids that can cross-contaminate work products during use are insufficient for workers in sterile environments; 3) written, audible, and visual aids that people with specific disabilities cannot use; 4) systems, including AR and VR, that cannot be used while working and can be effectively replaced by less expensive options; 5) training content that cannot be memorized; and 6) content that requires spaced practice that cannot be guaranteed.

Future needs analysis models must treat training as the last, not the first, performance enablement option due to its time and financial costs, low efficacy, and poor efficiency.

Stop the "Mini-Needs Analysis"

Future needs analysis models must eliminate the mini-needs analysis option. This can be accomplished by automating a needs analysis process that constantly executes every step of the process every time an analysis

cycle runs.

Plan for Change

In humanity's fastest-changing era, everything must be easily adaptable across both the work and worker systems. This means that the process of delivering, developing, and updating SOPs must be extremely efficient, effective, and instantly deliverable worldwide as many times and as often as necessary. An example of how to plan for change is to use AIA to facilitate test groups where a limited number of users can access and optimize new SOPs before they are made available business-wide. Another example is using AIA to support manual workers who optimize SOPs that are intended to be automated and therefore don't require long-term memorization.

Future needs analysis models must use AIA systems and be AI-driven. It is necessary to periodically review and update the AI-driven needs assessment model to incorporate new options for solutions as they become available.

Expand the Scope

To quickly increase sustainable profit, the various departments that make up modern businesses must collaborate. Businesses must collaborate to design, finance, produce, market, sell, and deliver the products they sell for profit. Since every business unit depends on every other business unit, it would be foolish to improve one business aspect without looking at all of its interconnected inputs. Until now, inadequate technology has prevented the practical application of concurrent, pan-business analysis, but

that is no longer the case.

To swiftly boost sustainable profit, future needs analysis models must consider all work and worker system needs simultaneously and continuously, not just those related to a single division, department, standard operating procedure, or worker. Future needs analysis models must prioritize identifying, eliminating, or mitigating the root cause of every identified need, rather than focusing on training, marketing, or any single solution. Future needs analysis must be planned and carried out cooperatively using shared data across entire companies, which can only be done efficiently using a fully or heavily-automated system.

Selecting and using a needs analysis model that doesn't restrict the analysis's scope is crucial for both effectively carrying out manual needs analysis and ultimately for enabling AI and robotics to replace manual production.

Before programming the algorithms that will enable AI to analyze needs, businesses must develop or choose a needs analysis workflow for the algorithms to mimic, and they must adopt a means for collecting VURPRD to feed their algorithms. To make the transition from manual to AI-driven needs analysis easier, these two requirements can be introduced separately, allowing AIA and AI systems to be implemented gradually instead of all at once.

There are three possible methods for carrying out analyses without restricting scope when using AI or manual methods for needs analysis. The

first is a top-down strategy, the second is a bottom-up strategy, and the third is a reactive strategy that only deals with problems when they come up or are requested by an executive.

By Problem or Request

The least effective method for choosing needs analysis targets is the problem or request method. Because it concentrates on one issue or request at a time without ever addressing the underlying causes of any issue. This strategy is referred to as the "Whack-a-Mole" approach as it resembles the carnival game where players use a hammer to “whack” one mole, only to have three others appear.

Bottom-up Analysis

The bottom-up method requires analysis to focus on fixing the worker system issues first, then progresses up and across the organization.

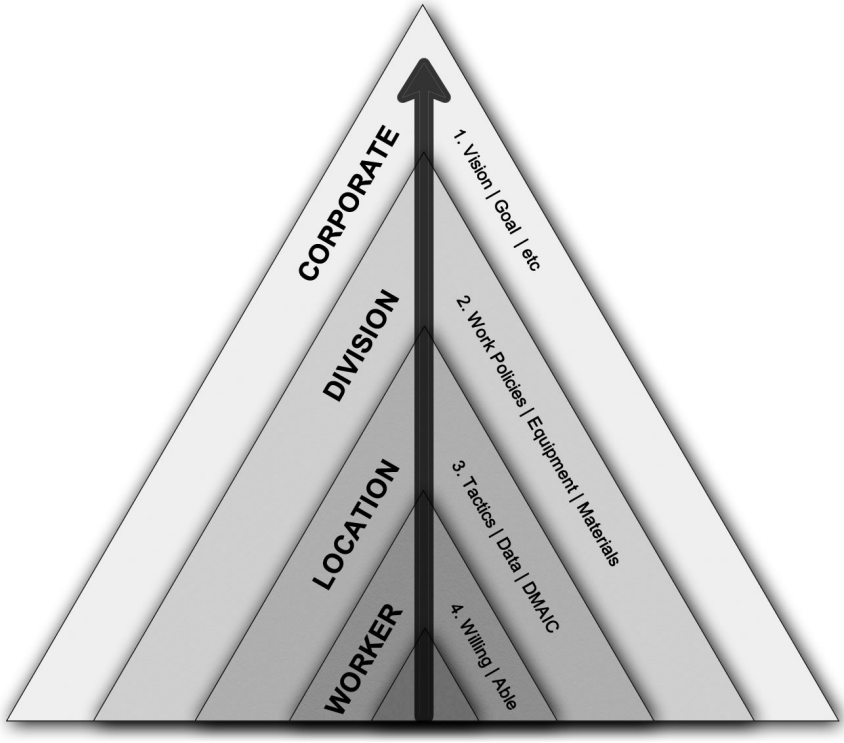


Figure 5: Bottom-Up Needs Analysis

This process starts by identifying and addressing risks and issues that affect the worker system, particularly those related to production and service workers, before moving up the organization's hierarchy. Frontline workers may experience more disruption from this option, as the work system often contains the root causes of worker issues. Notably, fixing the worker system has minimal to no impact on the work system.

Top-down Analysis

The top-down method focuses on work system needs at the broadest, corporate level, then moves down the organization. While the top-down

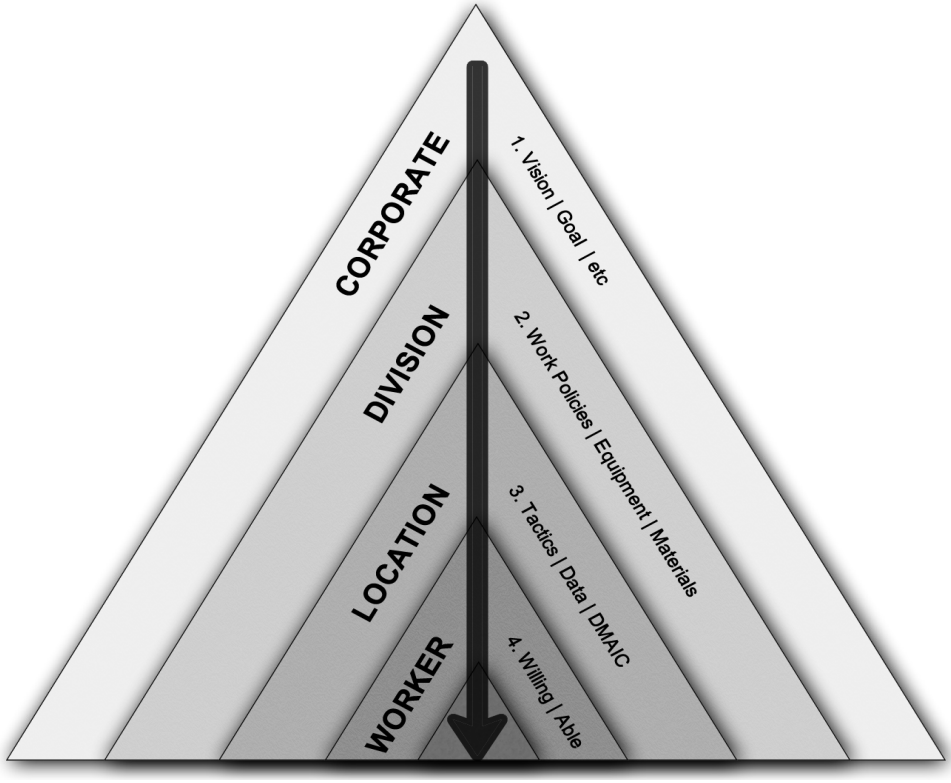


Figure 6: Top-Down Needs Analysis Flow

method focuses on the work system, any worker system issues that are revealed are addressed at the same time. This approach has the most potential to affect sustainable profit because resolving work system issues can passively lead to faster growth of sustainable profit from the worker system compared to what the Bottom-Up approach could achieve in an environment rife with work system issues. Consequently, mitigating or eliminating problems at the highest organizational level first results in less disruption for

frontline employees and an increase in sustainable profit.

Heed Ebbinghaus's Advice

As the 19th-century psychologist Hermann Ebbinghaus proved, learning requires memorization, and memorization requires spaced practice. Unfortunately, TL departments don't take responsibility or accountability for ensuring their trainees obtain the practice they need or the feedback required to correct any forgotten steps or memorized errors; frontline supervisors do those things.

Since learning can be costly and may not be the most effective performance enablement solution, it should be considered as the last option. Furthermore, learning should only be chosen as a performance enablement solution when practice, memorization, and feedback can be guaranteed.

When performance enablement is needed but learning is not a satisfactory solution, then needs analysts and needs assessment models must recommend necessary and sufficient alternatives. Effective learning alternatives may include printed job aids, AIA systems, IA systems like those found on YouTube, some eLearning programs, online procedure manuals, and electronic performance aids like pocket calculators, GPS, and Internet search systems.

Since no single performance enablement solution can meet every need, an efficient organizational needs analysis must identify the best option for the targeted tasks and workers. For instance, someone who works in a sterile environment and is unable to handle devices or touch keyboards will

not be able to use printed aids, YouTube, or an LMS, but they can use AIA.

Future needs analysis models must be automated, or we must direct analysts to the best contemporary solution for the intended audience. If IA is required, think about purchasing or building an AIA system that records performance ratio data as employees carry out their assigned SOPs.

Businesses can calculate the ROI and break-even dates for all of their interventions—not just training—when the right performance ratio data is made available. When the right AIA solution is not available, then it will be necessary to acquire or create one.

Accommodate Unlearnable SOPs

Contrary to what we were told as children, some things are unlearnable, including many SOPs. Unlearnable SOPs have always existed, and their numbers are growing exponentially thanks to rampant innovation. For those SOPs no amount of training will enable workers to perform them perfectly while on the job.

In the past, unlearnable SOPs were ignored for good reason; there was no way to enable workers to memorize them. However, businesses now have technological options, such as IA and AIA solutions, to enable employees to perform unlearnable SOPs flawlessly even when workers are under stress.

A mountain of new, unlearnable SOPs appears to be on the horizon due to the rapidly increasing number of patents and the potential for new products that result from those patents. A fully optimized process for producing

and operating the product is necessary before marketing and selling a patented product. During the optimization process, manual workers repeatedly perform an SOP, continuously improving and changing the process before initiating the next optimization cycle. An SOP could change tens of times per day, causing memorization to fail at any point, and any advantage derived from memorizing the SOP would be lost. Not only does the constantly changing nature of SOP optimization prevent learning from being a valuable performance enablement option, the aforementioned number of new patents and their requisite SOPs also hamper memorization as a performance enabler.

Unlearnable SOPs must be included as solution optons in modern needs analysis models; otherwise, companies won't be able to keep up with the rapidly accelerating pace of innovation The inability to rapidly innovate will lead to potential unicorn products being shelved and slower sustainable profit growth.

Analysts must keep in mind that the circumstances under which certain unlearnable SOPs are performed can exacerbate performance problems. For example, the stress of a chemical spill, a fire, or a weather emergency makes an SOP error-prone at the exact moment when precision is essential. In those circumstances, employees have been expected to commit the relevant SOP to memory so thoroughly that they can perform it flawlessly on their own, under extreme pressure, and while in severe personal danger. In reality, businesses can’t expect any worker to memorize every emergency SOP, nor can they expect any worker to perform perfectly under stress

and threat of danger. So when a fire, windstorm, flood, active shooter, chemical spill, or other emergency occurs, workers are expected to either perfectly perform the appropriate SOP from memory or to stop what they are doing, find an emergency procedure manual where the SOPs covering such events are kept, locate and read the appropriate SOP, and then precisely follow the written instructions step-by-step in time to eliminate or mitigate the danger. Does that suggest an unrealistic expectation that could cost lives? Of course it does.

To save property, lives, and limbs, businesses should not expect employees to search the internet, locate an emergency procedure manual, follow written instructions step-by-step, or—worst of all—perform life and property saving SOPs solely from memory. An AIA system could easily provide the verbal, step-by-step instructions when needed.

Manage Forgetting

The advent of certain technologies has devalued memorization as a performance enabler. Once we reached the Surveillance Age, it became far more important for workers to access information when needed than to memorize it.

Future needs analyses must not only consider when there's a need to memorize SOPs but also when there's a need to forget all or parts of SOPs as they change. If an SOP can be memorized but is highly susceptible to frequent change, then it is a better candidate for technological solutions instead of training or memorization.

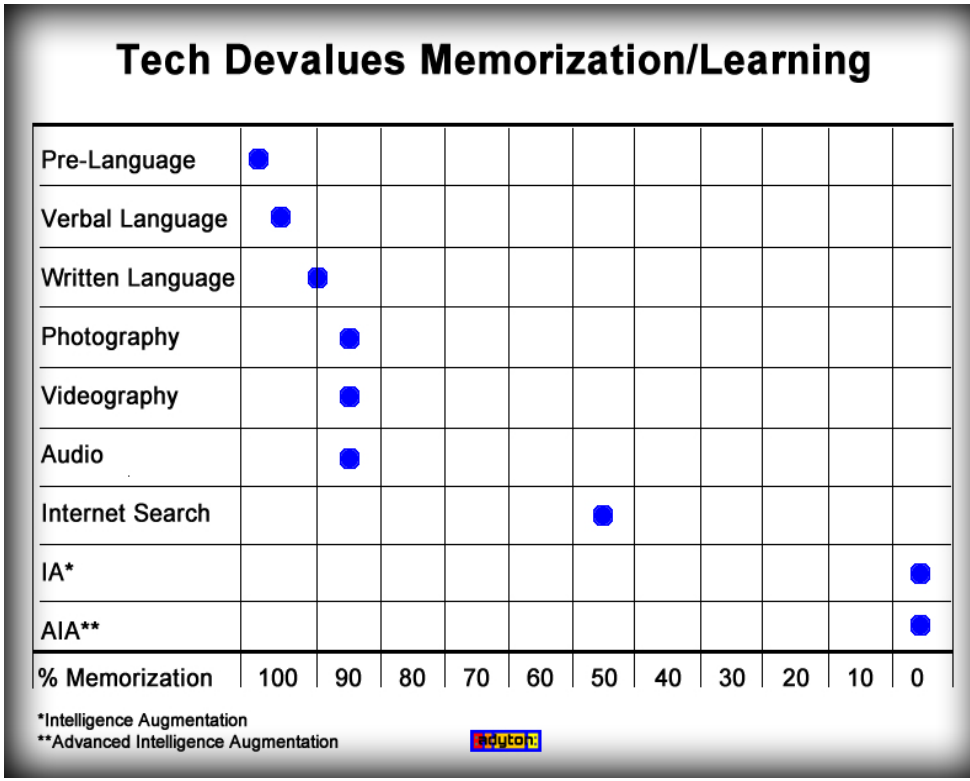


Figure 7: Tech Devalues Memorization/Learning

Figure 7 illustrates the approximate amount of memorization required to effectively use the technologies listed. Compared to all other learning options throughout humanity, IA and AIA are the leaders with no close alternative. Notably, every option listed is available to modern businesses.

Future needs analysis models must prompt analysts and automated systems to consider the impact of forgetting on performance enablement and then advise how to overcome or leverage it.

Support Manual Workers

Despite the ongoing automation boom and widespread innovation, industries worldwide still rely on manual labor to produce the majority of the goods and provide all of the services they need to turn a profit, and they will continue to do so for a very long time.

Although it seems paradoxical, the demand for manual labor will rise as a result of accelerating innovation. Since they will be the ones creating minimum viable products and optimizing processes, manual labor will be necessary to develop new goods and services. Currently, automation is only feasible after capturing enough time and motion data created by manual workers. It's the time and motions of manual workers that drive AI algorithms and robots use to mimic workers. Robots won't be able to replace human workers until SOPs and products have been optimized and sufficient time and motion data has been gathered. From this perspective, manually executed SOPs and the workers who perform them are among the most important targets for needs analysis in any business, and they will remain essential well into the future.

A significant portion of the work that must be performed manually is either unlearnable or involves steps that are too critical to perform solely through memory. Executing emergency procedures and optimizing SOPs for new products under development are two types of work that may always require manual workers to perform. In those cases, the workers will need to perform SOPs they have never performed before and may never perform again in the same way. Attempting to train workers to memorize and

perfectly perform those SOPs would be highly inefficient, costly, and ineffective, if even possible. A complicating factor is that most manual workers cannot safely, efficiently, or hygienically stop working to access computers, handheld devices, or even printed aids. Even if training were effective at enabling workers to memorize rapidly changing SOPs, it would still be unable to ensure and continuously improve performance.

While most manual workers are fully abled, others face disabilities that hinder their access and use of certain aids. For example, workers with attention and memory disabilities, illiterate or slow readers, and blind workers cannot use written SOPs regardless of whether they're printed on paper or displayed on a device. Whether supporting fully abled or disabled workers, we can enable the performance of all but the hearing disabled by audibly delivering SOP instructions step-by-step, on demand. This means verbally delivering step-by-step instructions is the performance enablement option that meets the most user needs and, therefore, is likely to deliver the greatest return on investment.

Manual workers must be ready to step in when something goes wrong even if a product or service can be fully automated. Jobs that support robots and AI when they fail include train engineers, airline pilots, and robotaxi monitors. With new inventions, the number of those and similar jobs will soar. For those reasons alone, future needs assessment models must support the needs of manual workers in various work environments.

Support Error-Prone Work

Employees will unavoidably forget to complete one or more steps of an SOP or perform those steps out of order while on the job, even if they have fully memorized the procedure. Given that truth, we say humans are "error prone." Some SOPs and SOP steps are also error-prone, with some being more prone to error than others. Error-prone tasks include those that must be performed under pressure, those performed so frequently that a worker's mind wanders, and those performed while workers are "multitasking."

It cannot be assumed that a worker will flawlessly complete even the most basic SOPs that are performed hundreds or thousands of times, whether during emergencies, under personal stress, while multitasking, or not. Error-prone work must therefore be appropriately addressed in future needs assessment models.

In the majority of manual worker environments, AIA is the best option for preventing human errors; however, the performance technology space is always growing, and businesses must always be aware of the technological advancements that could replace AIA at any time.

Use Objective, Financial Benchmarks

The purpose of needs analysis is to reveal the best ways to rapidly grow sustainable profit through performance enablement, performance ensurance, and continuous improvement. Whether needs analysis is performed manually or automatically, it requires ratio data to accurately and efficiently compare the prospective return on investment and break-even dates of

intervention options. Performance ratio data is also crucial for evaluating current interventions since it allows benchmarking pre-intervention performance and comparing post-intervention performance.

In practice, it is insufficient to state,

> *"After conducting a needs analysis, we discovered that the target workers require training on Knowledge Item #1 and Skill Item #2; subsequently, we utilized classroom test scores and trainee survey results to demonstrate that the intervention was successful."*

When the goal of every business is to rapidly grow sustainable profit, then the sustainable profit generated by an intervention is the appropriate metric for every business intervention. Survey results and training test scores cannot be used to compare pre- and post-intervention value because a) they cannot be used in computations; b) they do not carry the validity, accuracy, or reliability of actual performance data; and c) they may not accurately reflect the amount of learning that occurred depending on the interval between training and testing. Instead, the needs analyst must be able to say,

> *"Training the target workers on Knowledge Item #1 and Skill Item #2 is projected to save the business X hours of labor at a cost of Y dollars for a profit contribution of Z dollars over T months, the break-even point will be U days, and the return on investment is projected to be D dollars over the intervention's lifespan."*

With AI and optimized algorithms, those calculations can be performed au-

tomatically and continuously across an infinite number of interventions and needs.

Future needs analysis models must be able to continuously and accurately calculate break-even dates and returns on investment for countless current and potential business interventions, then rank them by potential, and they must do so using near real-time data.

Coordinate, Collaborate, and Share

Future needs assessment models must have access to and use certain VURPRD from every internal business function, coordinate analyses across all business units, and collaborate in revealing and fulfilling needs. By synchronizing needs analysis across the business, resources are maximized, efforts are not duplicated, and peak productivity that leads to rapid, sustainable profit growth can be achieved.

During a needs analysis it might theoretically be possible to manually coordinate, collaborate, and share data across all business units, but it is impractical and not timely. Since all business units ostensibly feed their data into a centralized system already, APIs could be created to enable an AI-driven needs analysis system to use those existing data along with new sources of ratio data in its algorithms. If the AI is set up to run all the time, then it could detect, assess, rank, and report on needs across all business areas, including the work and worker system, at near real-time speed. In essence, an AI-driven needs analysis system with VURPRD access could perform the same tasks as humans in less time, at a lower cost, and with

greater accuracy.

Since many or most worker system problems are also work system problems, it wouldn't be necessary for an AI-driven needs analysis to differentiate between the two. Alternatively, both systems could be efficiently and successfully investigated simultaneously.

Earlier in this book it was suggested to always analyze work and worker system needs concurrently. To be clear, in the beginning of an initiative to implement an AI-driven needs analysis or to continue analyzing needs manually using VURPRD, it would be best to evaluate and resolve work system issues prior to addressing worker system needs. Once an AI-driven needs analysis system is operative, it would be most efficient and effective to continuously and simultaneously analyze work and worker systems.

Future needs analysis models must be automated and run continuously, evaluate worker and work system concurrently, generate a prioritized list of needs with recommended solutions, and draft project plans for implementing the solutions.

Coordinate Needs Analysis Activities

Because data is dynamic and can expire quickly, timing is crucial for carrying out the various needs analysis steps. For instance, an organizational needs analysis should be the first step in any needs analysis cycle since organizational problems affect everything in both the work and worker systems. The analysis should advise how to fix the identified organizational problems along with critical other needs that were exposed in the process,

then move to job analysis, SOPs, compensation plans, work policies, etc.

Businesses can save money and time, minimize disruption to production workers, and eliminate work system problems that were previously thought to require training by adhering to this flow. The following scenario serves as an example of this.

> *A fictitious company we'll call AlphaCorp uses an outdated customer relationship management (CRM) application and a manual needs assessment process. Workers have found the CRM to be difficult to use, resulting in a significant number of errors, wasted time, and disuse, which led the TL organization to propose CRM training. The cost of a new CRM would be lower than a training program that, instead of resolving the problems, would teach how to work around them. The training was estimated to cost more than replacing the old app, would take 6 months to develop, and another 3 months to implement across the business. The business decided to replace the CRM and saved the resources it might have spent on training users on the old CRM. Fortunately, the new CRM was easier to use and included built-in IA, so the training cost would be negligible or nonexistent. Users found the IA sufficient for all their performance enablement needs, and they reduced the new CRM's break-even date from nine months to just two.*

In this commonly repeated situation, resolving a problem in the work system eliminated one or more problems in the worker system and shortened the time to when the business could begin profiting from the interven-

tion.

The ability to remove worker system needs by first addressing work system requirements must be incorporated into future needs analysis models, especially those automated using AI.

Collaborate to Assess Needs

Every business must balance the same three objectives of enabling, ensuring, and continuously improving performance across various disciplines. The human resources (HR) function, for instance, balances four key outcomes that result in sustainable profit increases and performance improvements. The four outcomes that HR balance are 1) attracting top talent, 2) regaining top talent, 3) improving employee attendance, and 4) optimizing job satisfaction.

The HR unit may use job satisfaction surveys to reveal ways to improve those outcomes. Those surveys may indicate raising compensation would increase worker attraction, retention, and attendance, but if increasing wages demonstrably fail to grow enough sustainable profit to pay within an acceptable amount of time, then the compensation increase is unnecessary and should not be implemented.

Deciding how much to raise compensation is just one example of a business decision that requires collaboration between corporate divisions. In that case, making a decision that would lead to rapidly growing sustainable profit required VURPRD from many sources rather than sophisticated guessing or strong intra-company relationships. Additional examples can

be found in the information technology department, which has to weigh the impact and cost of new software against the need to replace some employees. The marketing department must weigh the potential profit growth of a new campaign against the campaign‘s cost, the additional work that will be required of employees, the cost of retaining those employees, and the cost of hiring new employees to support the initiative. In each case, interventions that are implemented to impact an individual business function’s numbers may reduce the contributions from other business functions and ultimately lower overall profit for the business. Humans may find it difficult or impossible to fully analyze these situations, and AI-driven needs analysis would lead to more ethical, effective, and efficient solutions.

A business unit operating in a silo cannot determine how a potential intervention developed by one business unit will affect the results of other business units. Every business function has to respond to the same question and consider the same factors at the same time. That question is "How will filling this need in the proposed manner impact employee attraction, performance, retention, attendance, and profit business-wide?" All business units must collaborate closely or automate the decision-making process to respond to that question.

Instead of focusing on what can be achieved by working together with other business units, traditional needs analysis models concentrate on the needs that individual business units can meet unilaterally. This approach frequently results in pricier and unsuccessful interventions. To prevent these expenses and failures, business units must work together and exchange

data—an impossible ask for the majority of businesses. Thus, the best approach is to feed meaningful VURPRD from every business unit into an AI-driven needs analysis model, after which the system will suggest one or more actions.

Share Data

The inability of various internal business functions to share information is one of the greatest self-inflicted wounds a business can inflict and one of the easiest to remedy in the AI Age.

Identifying business needs and selecting the best intervention to fill them requires data that is rarely captured or possessed by a single business unit. For instance, the TL function records worker system data, such as some knowledge, skill, training, and learning data, but it frequently transfers accountability and responsibility for acquiring new skills and changing attitudes to frontline managers. Frontline managers should then capture VURPRD and share it with the TL function to enhance needs analysis.

In a similar vein, sales data is collected by the marketing department, SOP data is collected by the industrial engineering function, payroll data is collected by HR, and profit data is collected by operations units. To determine the profit it makes for the company, the marketing division requires cost data in addition to sales data. HR requires SOP and operations data to structure jobs in a way that maximizes profit. TL functions require data from every other unit to guarantee that their interventions result in long-term profit for the company. Every business unit requires a variety of data that they

do not typically collect; no business unit has all the information required to prioritize its interventions or demonstrate its return on investment, with the possible exception of the executive and certain operational functions. The only way to effectively and efficiently identify and prioritize business needs is to share data among different business units.

An excellent illustration of how sharing data improves needs analysis was given by a bank's corporate office. This is what took place.

> *The CEO and board of directors of the bank ordered a shift from a transactional to a sales- and service-oriented corporate culture. All of the bank's internal investments and work policies, including job descriptions, SOPs, hiring, retention, compensation, training, new marketing campaigns, etc., had to be converted to focus on sales and service to comply with the mandate. One year after the sales and service culture was fully implemented, every corporate department was required to report their contribution to the initiative. The marketing department claimed all of the profit gains, while the TL organization reported who was trained, when, test results, and training costs. The TL organization was unable to make any claims as to how training contributed to profit growth. As a result, the marketing unit requested and received a much higher budget, while the training budget decreased.*
>
> *To prevent the reoccurrence of budget cuts in year two of the initiative, the TL organization asked the marketing unit to share sales data for people who were trained, and the compensation department*

was asked to share trainee pay rates. Initially, the marketing and compensation units refused to share their data, but after significant effort, the VP of training successfully persuaded their peers to share the necessary data.

At the end of the second year after launching the sales and service culture, the TL organization used their data on who was trained to compare the pre- and post-training sales, multiplied the difference by individual pay rates, and subtracted relevant costs to calculate a 140% ROI on sales and service training for the year, far exceeding the amount claimed by the marketing department over the same period. The VP of TL used that data to support a request for a significant budget increase, which they got.

A footnote to this true story is that the marketing department wasn't happy after the data they shared was used to diminish their profit claim, so they negotiated with the TL organization to share a percentage of the profit TL had claimed. From that point onward, the TL and marketing organizations collaborated to negotiate the profit each had contributed to the business.

Another footnote to the bank story is that the bank had always promoted its CEOs from the marketing department. No TL leaders had ever been promoted to an executive level, much less to the Chief Human Resources Officer (CHRO) role. Once the TL organization started using performance ratio data to calculate their contribution to the company's profit instead of using the nominal, ordinal, and interval data it usually reported, the CXOs paid attention, and they created the role of Corporate VP of Sales and

Service, into which they promoted a training director and assigned a very healthy budget.

While it's possible to establish and enforce an agreement to voluntarily share all data across all business units, the agreement may end when one of the parties leaves the business or reconsiders the agreement. A better solution would be to use an AI-driven needs analysis system that would only require authorization to access the data once.

Recommend Modern Technologies

The outcome of a successful needs analysis is one or more recommendations on how to rapidly grow sustainable profit by enabling, ensuring, and continuously improving the performance of both the work and worker systems. Those recommendations may encompass existing technologies and ones the business has yet to adopt or create. Businesses must be prepared to be among the innovators or early adopters based on the innovation curve if they want to remain competitive. The alternative can only result in a decline in the business's viability.

Needs assessment models must be updated whenever new performance enablement, ensurance, and continuous improvement technologies become available.

Remove Analysis Resistance

Analysts may need guidance on how to deal with opposition to needs analysis. This includes guidance on how to avoid jumping into training, conducting mini-needs assessments, executives contesting results, etc.

Most needs analysis resistance comes from executives who balk at the time and money required to perform a manual needs assessment. Once implemented, an AI-driven needs analysis removes the time and money objections, as there are no longer work schedules to synchronize, travel expenses, hourly wages to pay, etc., and the resistance wanes.

Ensure Security

Effective data security measures must be in place if different business functions are to share data. Modern needs analysis models must provide guidance on both how to secure recommended interventions and how to securely share the data used in analyses. The most effective techniques available today range from straightforward and common precautions like avoiding printing and displaying sensitive data on computer screens to establishing private, encrypted networks. Security experts must collaborate with needs analysts to continuously test their operations for both current and new threats. Every system that shares data over the Internet needs to undergo regular penetration testing because hackers are always coming up with new ways to steal from companies.

Future needs assessment models, whether implemented manually or automatically, must include effective data security measures.

Techno-Societal Fragility

The phrase "techno-societal fragility" describes how contemporary societies are at risk of collapsing due to their heavy reliance on intricate, often poorly understood or regulated technological systems. This vulnerabil-

ity occurs when technology advances more quickly than society can adapt, regulate, or even fully comprehend its long-term effects. It can have several negative effects on a society's mental and economic well-being, including social isolation, anxiety, depression, and a loss of purpose or coherence, in addition to the loss of jobs, homes, self-worth, and the inability to meet one's basic needs.

Techno-societal fragility has always been an issue, but its effects haven't been significant enough to warrant alarm until now. Governments, businesses, and individuals must now act to reduce this fragility as innovation accelerates. To lower the temperature, ethical concerns must be addressed, such as how businesses will pay migrant technology workers who, without support, might spend their entire lives in low-paying jobs that never advance their income, knowledge, or skills.

Protect the Climate

Climate protection has become a business necessity as catastrophic climate events are increasing in both numbers and severity. According to the World Economic Forum, companies are already losing $16 million every day as a result of climate change, and these costs are rising quickly. Given the importance of climate protection, future needs analysis models must include it as a feasible way to rapidly increase sustainable profit.

At first glance, TL organizations might appear to have a small impact on the climate. However, a closer look shows that the impact is much more severe. For example, operating a private jet is one of the most environmen-

tally harmful forms of transportation. TL organizations may have a tradition of flying an executive to a training site to demonstrate the importance of the training event, to help launch the event, or to deliver certain portions of the adenda. Unfortunately, private jets are among the worst polluters. Instead of flying executives to distant locations, a TL organization could substitute pre-recorded videos, hold a videoconference, or even deliver a printed handout, which would be just as impactful as having an executive on-site.

Another beneficial way for TL organizations to lower their carbon footprint is by selecting climate-friendly performance enablement options. Examples include text messages, printed job aids, AIA, photos on a presentation slide, a video, or a videoconference instead of classroom training. The option with the highest projected return on investment and the least impact on the climate is always the best one as the climate ominously warms and business costs rise in response.

Because every business intervention must rapidly grow sustainable profit, a climate protection initiative must be able to calculate its climate impact and ROI. Initiatives to protect the environment can be grounded and given credibility by carbon calculators like the US EPA's and climate accounting techniques like that offered by Watershed. Note: This Watershed is not the one that offers a Learning Records Store (LRS).

Building an ROI around climate protection is entirely feasible, although it may require careful consideration. Climate-related losses and cost increases, like higher cooling expenses and flooding, along with profits from consumers favoring climate-friendly businesses, can be included in the

ROI calculation. Cost avoidance data is also available through government agencies, insurance companies, scientific research, and climate advocacy groups. After determining which data source is the most trustworthy, use APIs to incorporate it into an AI process and then use algorithms to evaluate its effects.

Despite the criticality of climate protection initiatives, implementing them may be tedious or even contentious, but once trusted data sources have been identified and the analysis process has been developed, then managing the initiative can become much easier and ultimately automated.

Given the decades of failing to act on climate protection, continuing to leave it to manual needs analysis and human decision-making can only lead to further climate degradation and slower profit growth. Therefore, the best chance for addressing the issue is through an AI-driven needs analysis system designed to do so without relying on the beliefs, bias, greed, or self-interest of human decision-makers.

Ethical Solutions

Ethics must be taken very seriously as the AI Age develops. One of the main reasons for this is that some new technologies have the potential to create a socioeconomic class that will never be able to afford families, housing, sufficient food, or health care due to their inability to find viable employment. Although those effects might at first appear to be personal issues and a lack of planning, they actually represent a long-term, worldwide business and social problem that can be linked to the demise of many failed

nations.

Many of humanity’s ills are rooted in human greed, bias, and self-dealing, each of which can find their way into any business. To prove the existence of greed, bias, and self-dealing in business, look no further than a) the disparity between executive and production worker compensation, b) the homogeneity of Fortune 500 executives, c) the emergence of "relationships" as a critical performance factor rather than capabilities, d) the failure of businesses to protect the environment, e) the failure to upskill employees, etc. An AI-driven needs analysis system offers a way to significantly lessen or eradicate the impact of human vices on a company's capacity to quickly increase sustainable profit.

Future needs assessment models must guarantee that all business interventions, both present and future, are ethical. To achieve this, companies must: a) protect employee privacy; b) make sure employees leave their jobs with more and better skills than they began with; c) make sure employees are not overworked or underpaid; d) promote and maintain employee health and safety; and e) protect the environment. An AI-driven needs analysis can meet all those requirements, whereas a human-driven analysis method one cannot.

Accelerating Innovation

The rate of innovation is faster than it has ever been in human history. This is a problem primarily because global economies now rely on accelerating innovation, and they would greatly suffer if innovation slowed.

The current needs analysis models and decision-making processes rely on people, their biases, greed, self-interest, and their availability to work. They must also add workers and expenses to scale up to meet the pace of change. The solution is to use AI to drive needs analysis.

Humanity has passed seven technological ages, the eighth is about to end, and the ninth has already begun. People have never found it simple to move from one technological era to another, and now, for the first time in all of humanity, several technological ages are converging and ending in quick succession. To be more specific, individuals born in the late 20th century will experience at least two technological ages in their lifetimes, whereas those born in the 18th century and earlier lived their entire lives in a single technological age. Techno-societal fragility existed before modern times, but it remained muted due to the amount of time people had to adapt to the changes. Now, people born in the 2020s and beyond will be forced to adapt to three or more technological eras, each with its disruptions and threats to humankind.

One example of how people have reacted to changing technological times is the Luddite movement. At the beginning of the Industrial Age, a group known as the Luddites feared that machines would eliminate all jobs, leaving people unable to support themselves or their families. For the record, the Luddites opposed human exploitation, not technolgy. Near the end of the Industrial Age, people feared that nuclear technology would eradicate all life on Earth. People once again became terrified of new technologies in the modern era but instead of being afraid of a single technology, they fear

that all at once 1) everyone's privacy will be destroyed by Surveillance Age technologies; 2) knowledge workers will be replaced by AI Age technologies; and 3) the global workforce will be replaced by Robotics Age technologies.

Knowing which technological eras have passed, which are current, and which are coming is vital to a company's strategic and tactical planning. For instance,

- **The Horticulture Age** began when humans domesticated plants between 10,000 and 20,000 years ago. It ended with the emergence of the Agrarian Age.
- **The Agrarian Age** began when humans domesticated animals around 6,000 years ago, and the Industrial Age followed.
- **The Industrial Age** began when James Watt invented the steam engine in 1769 and ended around 300 years later. The Industrial Age brought steam engines, video and audio recordings, photography, automobiles, fixed-wing flight, and much more.
- **The Information Age** replaced the Industrial Age in the late 1960s to early 1970s and ended around 2020. The Information Age brought personal computers, pocket calculators (the world’s first electronic intelligence augmentation system), cellular phones, and digitized Industrial Age media.
- **The Surveillance Age** replaced the Information Age, introduced all sorts of electronic sensors to production work, and captured data re-

lated to the use of media that was invented in the Industrial Age and digitized in the Information Age.

- **The AI Age** converged with the Surveillance Age and uses data captured by sensors and digital media access to predict human activity, build algorithms that mimic human decision-making, and ultimately drive robotics that will replace many human workers.
- **The Robotics Age** evolved alongside the AI Age, integrating decision-making algorithms from the AI Age with motion capture technologies to develop machines that replicate human movements.

Unfortunately, we can't predict how quickly innovation will spread or where a new technology will take hold first, but we know that countries, businesses, and people who can't keep up are doomed. This is the case for government auditing and regulating techno-societal fragility, which is possible via AI algorithms.

We cannot predict with certainty how long a technology or technological era will remain relevant, but we can predict the length of a technological era based on the development, growth, and decline of prior technologies and technological eras. Using flight as an example, we know it took humans millions of years to achieve bird-like flight, as the first flight occurred in 1903 on a hill in Kitty Hawk, North Carolina. We also know that it took just 68 years to go from the first flight to the first soft landing on Mars.

Although it's challenging to determine when one technological era ends and another begins, archaeologists have provided us with an approximate timeline, which is depicted in Figure 9.

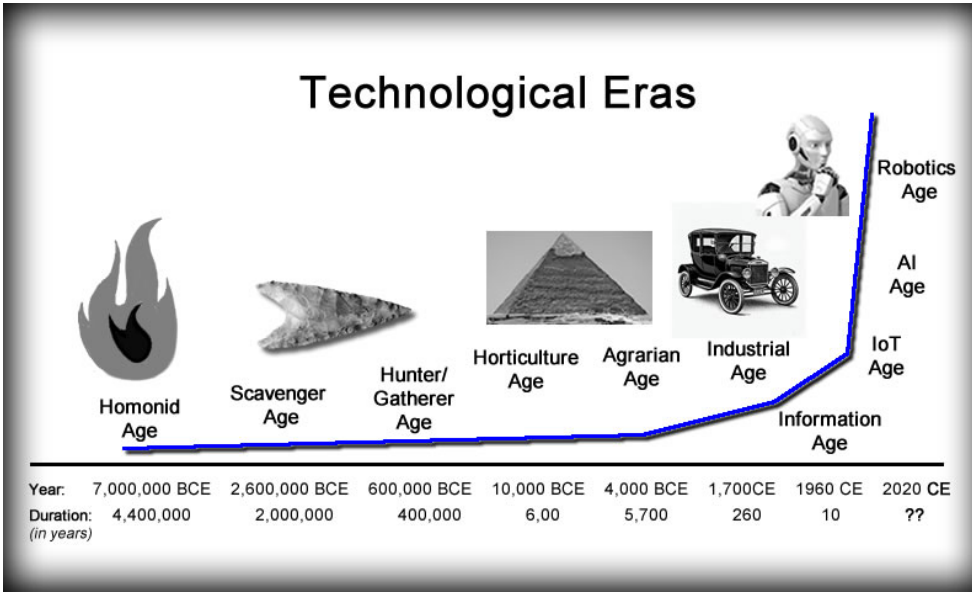


Figure 8: Human Technological Eras

As Figure 8 shows, firemaking was developed during the Hominid Age (pre-Homo sapiens) in this graphic. The Hominid Age lasted for about 4.4 million years. The process for making fire was created and spread without the aid of media, instruction, or even language.

The duration of the Scavenger Age was less than half that of the Hominid Age. At 400,000 years, the Hunter/Gatherer Age was even shorter than the Scavenger Age. Following the Hunter-Gatherer Age, the pace of innovation rapidly increased. The Agrarian and Horticultural Ages each lasted only about 6,000 years, rather than millions or hundreds of thousands of years. The Industrial Age lasted around 300 years, while the Information

Age came to an end after about 60 years. This strongly implies that future technological ages will be much shorter than those of the past and that the link between technology and societies will become even more fragile.

Due to the distinct technical requirements of each technological era, it is rare to leapfrog technologies in the same way that developing countries eschewed building telegraph and copper-wire-connected telephone infrastructures in favor of cellular infrastructures. Unfortunately, before developing new technologies, businesses typically need to establish the technological foundations of past technologies. Before utilizing the advantages of robotics, for instance, companies must use 1) Industrial Age technologies to create and optimize prototypes for the products being developed; 2) Industrial and Information Age technologies to create and optimize the SOPs that employees follow to operate the prototypes and products; 3) Surveillance Age technologies to collect performance ratio data while employees carry out their SOPs; 4) Surveillance and AI Age technologies to collect the time and motion data employees use to carry out their SOPs; 5) Surveillance and AI Age technologies to develop and optimize AI algorithms; and 6) AI and Robotics Age technologies to replace manual workers.

In addition to all the work required to develop new technologies like AI and robotics, businesses must be prepared to develop or adopt the technologies they need while transitioning from older to newer technologies. While developing new technologies, it's important to understand what technologies are trending up and down as well as which technological age is on its way out and which is on its way in.

As was true with the Information Age and the Industrial Age before it, Surveillance, AI, and Robotics Age technologies are met with great expectations and apprehensions. New technologies present prospects for transforming the current state of affairs and delivering enhanced advantages to all stakeholders, not just the executives and investors implementing them. For example, the only way to protect the climate, ensure ethical decision-making, and support other socially beneficial initiatives while rapidly growing sustainable profit for the business is through AI-driven needs analysis, not manual needs assessment.

As AI evolves, governments step in by enforcing laws and regulations when companies fail to develop new technologies in an ethical manner. For example, in 2021, the European Union (EU) received a proposal for AI regulations. Given the regulations, businesses will have to register their AI models, which will allow governments to audit and monitor business operations and output. In simple terms, governments and businesses will and must check the choices made by models like the AI-driven needs analysis model shown here to make sure that VURPRD is used for decision-making and that those choices help meet the goal of the businesses and workers.

The first step in implementing AI regulations is to develop a thorough, auditable needs analysis model like the ANAM model in Appendix B. Once optimized, customized, and automated, the ANAM model can be used to create auditable AI algorithms. While businesses often balk at government regulation, in the case of AI regulation, we can now ensure that companies use AI to advance climate protection and ethics, which benefit everyone.

All of this indicates that the pace of adopting new technologies is becoming a crucial success metric for businesses, governments, and individuals, and it all begins with a business's ability to effectively and efficiently reveal performance enablement, ensurance, and continuous improvement opportunities.

Enable Innovation

Businesses intend to increase sustainable profit as fast as possible. Innovative companies must employ manual laborers, sometimes in large numbers, to develop, refine, and expand their inventions because all innovation starts with manual labor.

AI-native businesses are those that initially design their operations to rely on AI and robots, not human labor. Those firms, which include companies like Waymo, Apollo Go, Tesla, and other robotaxi companies, employ a strategy that promises to generate previously unheard of profits by drastically cutting or eliminating labor from their service delivery while maintaining competitive prices. The approach necessitates hiring a sizable number of temporary manual laborers during the product development stages, who are let go once the product and SOPs are completely optimized and automated. To expedite time and motion studies and launch products as soon as possible, the tasks these workers carry out are frequently oversimplified. While this approach expedites product development, it is unethical because it fails to enhance the knowledge or skills that workers need to apply for higher-paying jobs in the future, and it does not support their ability to raise families, save for retirement, or endure long employment gaps.

To leverage innovation in ways that rapidly grow sustainable profit, businesses must be prepared to: 1) hire a large number of skilled temporary workers; 2) quickly enable the performance of constantly changing SOPs; 3) ensure that manual workers perform every step of every SOP in the correct sequence every time; 4) continuously improve the MVP and the SOP(s); and 5) upskill their temporary workers before terminating them.

AI-driven needs analysis and AIA systems can support each of those needs far better than traditional performance enablement and ensurance technologies or human-performed needs analysis.

Revisit Existing Interventions

Similar to how a stock investor views their brokerage account, a company's current set of interventions can be considered its investment portfolio. When performing a needs analysis, every intervention, whether a work policy, marketing plan, training program, or anything else a company invests in, is comparable to a financial stock that either increases, decreases, or stays the same in value over time. Businesses must regularly assess the value of each existing intervention and determine which are contributing to rapid sustainable growth and which are not, just like individual investors. The alternative is to spend money on ineffective interventions rather than investing in more valuable ones.

To build and maintain a high-profit business intervention portfolio, AI or a company's managers, needs analysts, or an AI-driven needs analysis system must collaborate to generate as many potential investment oppor-

tunities as possible, assess those opportunities by estimating or calculating each one's ROI and break-even date, and then select the ones with the highest and fastest profit potential. To ensure that the portfolio's value stays high, it also entails routinely assessing the ROI of current interventions.

The exception to using break-even dates and ROI to select interventions is when a strategic investment that may not break even as quickly as others has the potential to grow a much higher ROI over the long term. Those investments include things like climate protection, equitable compensation, safety and security, upskilling, etc.

Building a business's innovation portfolio can be tricky when an innovation has no history or data to drive decision-making. The business must decide whether to reject these opportunities, initiate a proof-of-concept project, or take a risk and pursue them on faith alone. Regardless of the final selection, the choice must add significant value to the business's innovation portfolio and be more valuable than other potential growth opportunities. If the portfolio already has a net positive impact on ROI, then it can stand to take on riskier innovations. If the portfolio has a negative ROI value, then the business must pass up risky opportunities or rebalance it by replacing poorly performing interventions before adding more risk.

Keep in mind that there is always some risk involved in implementing innovative solutions, but when businesses fail to maintain a competitive, highly profitable innovation portfolio, there is an equal or greater risk of financial loss due to obsolescence and lack of competitiveness. One of the best ways to calculate the ROI on any intervention is through cycle time

and error reduction, both of which require VURPD. Cycle times are calculated by comparing the amount of time employees or equipment need to complete an SOP before and after implementing a solution. Additionally, after multiplying the time savings by the average pay, cycle times can be translated into financial terms. This entails figuring out the labor rate or the cost of automation, then multiplying the outcome by the number of repetitions of the cycle.

Reducing the average number of mistakes made when carrying out an SOP is known as error reduction. Error reduction is calculated by comparing the number of errors made prior to and following an intervention. The number of errors is multiplied by the initial cost of production after the number of post-intervention errors is subtracted from the number of pre-intervention errors to determine the value of error reduction. Calculating both cycle times and errors require VURPRD.

Businesses must obtain or develop a way to capture VURPD when it is not available for assessing business interventions. It is virtually malpractice in the Surveillance Age and beyond to base decisions and intervention values on hearsay, sophisticated guesswork, manager observations, or other non-objective data.

Every needs analysis, whether done manually or with artificial intelligence, must constantly assess and rank all current interventions and all potential ones in the Surveillance Age and beyond. A company's portfolio may retain unwanted investments for longer than necessary if it fails to evaluate interventions.

Social Implications of Automating Needs Analysis

Innovation has reached a vicious pace and there is no sign of it slowing down anytime in the future. If innovation ever did slow down, a global economic catastrophe would result, and eventually, manual needs analysis will become the bottleneck that prevents escape.

Global warming has become an existential threat to all businesses and living things on Earth. Without intervention, businesses will continue to put profit ahead of people and the environment, which contributes to people fearing artificial intelligence and believing that robots will replace them at work. These circumstances show how serious the world's social problems are with respect to new technologies.

Serious social problems, such as the fear of permanently disappearing work, must be resolved for any nation to survive. Throughout history, many nations have failed because they were unable or unwilling to meet the needs of their people. Examples include the Confederate States of America, Nazi Germany, and pre-revolutionary France, Russia, and China.

Social problems aren’t just the domain of governments; religious institutions, nonprofits, philanthropists, and businesses share the responsibility. Which entity takes the lead on resolving social problems depends on the nation’s economic structure. In capitalist economies that emphasize small government, religious organizations and philanthropists frequently oversee social programs. Governments must intervene when those non-governmental organizations (NGOs) are unable to address the needs of society. This

implies that through employment, worker compensation, training, and other initiatives, businesses can play a significant role in maintaining peace and reducing the need for government intervention.

Businesses will be able to generate previously unheard-of profits thanks to new technologies like robotics and artificial intelligence. The proft generated by those new technologies will enable businesses to make morally and socially conscious decisions that weren't previously possible, such as administering fair pay structures, offering universal healthcare benefits, providing housing, awarding educational scholarships, supporting environmental projects, etc. while still enjoying a profit windfall.

Companies that assume accountability and responsibility for the welfare of their workers significantly lessen the need for social programs funded by the others. Many businesses have the financial means to address social issues, but their decision-makers rarely choose to do so because they prioritize their personal prejudices, greed, and self-interests instead. Pay disparity is the most obvious example of this. It has long been known that tall, white men receive higher salaries and promotions more quickly than other men. For doing the same work, those tall white men are paid more than women, non-white people, and even shorter white men with comparable or better capabilities. Many of those tall, white men working as executives choose to pay themselves outrageously higher salaries than any other employees. This selection, promotion, and compensation bias that favors tall, white men is something that only an AI-driven needs analysis and government intervention could remedy.

Businesses looking to rapidly grow sustainable profit through AI and robotics must overcome resistance from various constituencies to succeed. Getting support from those constituencies will require higher levels of ethics and equity than businesses have traditionally mustered. Workers will need to believe they'll be fairly compensated, shareholders will need to know that their return on investments will be greater over time, and the managers displaced by AI will need to be assured of better employment opportunities.

AI-driven needs analysis must address the growing problem of techno-societal fragility. One example of techno-societal fragility is the limitations of humans in adapting to change. Another is the delicate balance between technology and services that ensure basic human needs like electricity and water. Specifically, techno-societal fragility is demonstrated by people who "drop out" of society because they can't handle the amount of change they face daily and power blackouts caused by a cyberattack.

Future needs analysis models should take into account the knowledge, skills, and attitudes of the targeted workers, as well as their capacity to quickly adapt to changes. Merely employing people is not sufficient. All employers must offer jobs that enable employees to prosper, raise healthy families, care for their elders, and support their communities. All qualified employees must receive equal opportunities for upward mobility, irrespective of their gender, age, race, height, or any other non-performance factor.

Given the track record of human decision-making and misplaced faith that businesses and executives will do the right things, automating needs analysis is the only way to ensure that these needs are objectively met.

High Expectations of Change

For humanity to survive, innovation is both a challenge and a necessity. People have high expectations for change, and any slowdown in technology would have disastrous effects on economies, environments, and societies. Ironically, people fear change at the same time that they need it and anticipate it happening more quickly.

Increased expectations for change have the effect of spurring innovation. People start anticipating the next version of a new technology as soon as they try it and find it appealing. Numerous instances of this phenomenon can be found throughout history, such as the development of radios, which in turn led to the creation of smaller radios and their incorporation into computers, smartphones, cars, watches, headphones, and other devices.

Toward the end of the Information Age, we became fully aware of how human activity was causing the planet to reach uninhabitable temperatures. Even as climate-related disasters increase and business profits decrease as a result of climate-related losses, several factors, including human bias, greed, and self-preservation, have prevented meaningful climate protection. Businesses and people everywhere must immediately address the existential need to preserve Earth's climate if life is to go on. This illustrates people's high expectations for change because there is a great anticipation that a new technologies will arrive that will both remove pollution from the atmosphere and enable companies to quickly increase sustainable profits without changing their dirty habits.

We need and expect ever-faster change, so we must have ever-faster

and ever-more-effective ways to respond to and effect change. To react swiftly and effectively enough to effect positive change, large volumes of VURPRD must be recorded. This calls for an AIA system that automatically captures VURPRD and a needs analysis system that constantly analyzes it faster and better than humans can.

The Jobs Conundrum

The same question is asked at the dawn of every new technological era: “What will happen when there are no jobs?” Over millennia, the answer has remained consistent: new and better jobs will more than replace the old ones.

Even though robotics and artificial intelligence are undoubtedly two major innovations and threats to existing jobs in the modern era, neither would be possible without manual labor. During the Industrial, Information, and Surveillance Ages, the predictions of machines and computers replacing manual labor did not come true. In fact, those eras' technologies led to the creation of more and better jobs. The owners of horse stables were hired to build automobiles, motorbikes, railroads, airports, locomotives, and highways. Dock workers went on to become computer technicians, mechanics, loading equipment operators, and crane operators. Similarly, manual workers will be crucial for innovation until AI can create and scale up new products by itself.

Those who fear technology will eventually replace manual labor in the current and future eras will experience the same outcomes as their prede-

cessors. There will be more jobs, as hundreds of thousands of workers will need to be hired to develop new technologies, more will be hired to maintain those technologies, and even more will be hired to step in when the technologies fail.

The most profitable businesses in every technological age have been those that accessed, built, and leveraged innovative products and services faster than their competition. Industrial Age examples of this include Ford, Carnegie Steel, and Edison Manufacturing. Examples from the Information Age include Amazon, Microsoft, and Apple. Tesla, Uber, Waymo, and other companies that were able to take advantage of the technological disruption made possible by the AI and Surveillance Age technologies. Companies that have prospered throughout several technological eras, such as Ford, Walmart, and ExxonMobil, have maintained their relevance by effectively implementing new technologies ahead of their rivals. This demonstrates how needs assessment models must promote and address innovation as a business need.

Rapid innovation poses a jobs conundrum, as businesses may not adequately prepare workers for future, higher-quality jobs. Ideally, businesses will ensure that,

- Performance is monitored appropriately, transparently, and to the benefit of both workers and parent businesses.
- Workers are upskilled to enable them to qualify for better jobs in the future.

- Production quotas are realistic and adjusted for performance variances that can be expected from person to person, business department to business department, and day to day.
- Workers are paid honestly and equitably from the top of the organization to the bottom.
- Jobs are classified accurately to ensure proper compensation.
- Worker privacy is respected and protected.
- Worker safety and comfort are met.
- Workers are given ample notice of job changes and support to acquire new work.

Each of which must be ensured with VURPRD, AIA, and AI-driven needs analysis, because humans have proven incapable of doing so.

With the profit windfall that will come from using an AI-driven needs analysis system, businesses will be able to create high-quality jobs to replace outdated ones and to make difficult ethical and climate-related decisions they have historically struggled to make. An AI-driven needs assessment model is the ideal solution and perhaps our only chance to fulfill our camper's pledge to leave this world in better shape than when we arrived.

Chapter 8: Implementing an AI-driven Needs Analysis System

There should now be no doubt that AI-driven needs analysis is or will soon become a necessity for business success and longevity, but knowing how to create and implement an AI-driven needs analysis capability may not be so obvious. Therefore, this chapter addresses the mechanics of an AI-driven needs analysis system.

A needs analysis system powered by AI is constructed and functions similarly to other AI systems. It begins with an operational flowchart, VURPRD sources are created, an algorithm is programmed to mimic the operational flowchart, application programming interfaces (APIs) are developed to link VURPRD to the algorithm, and staff are assigned to carry out recommendations, to continuously improve the system, and to step in when things go wrong. The Adyton Needs Assessment Model (ANAM), presented in Appendix B, is intended to be a flowchart readers can use to save time and money as they customize their flowcharts and algorithms.

The next steps are to,

Adopt a Decision-making Flowchart

Creating or adapting an existing decision-making flowchart is the first step toward putting an AI-driven needs analysis system into place. The flowchart can begin with an existing flowchart that can be optimized for AI and usable with or without AI to improve a business's needs analysis perfor-

mance. The flowchart's visual instructions will ultimately be translated to computer instructions, also known as algorithms. APIs then are created to automatically and constantly feed VURPRD to the algorithm.

A finished flowchart provides the AI programmers with the following information: a) what decisions must be made and in what sequence; b) what information is required to make those decisions; c) where the system can locate that information; d) variables and scoping choice limits; and e) any additional information required for the AI to operate the system effectively and efficiently. The flowchart provided in Appendix B can be customized for any business or used as is.

Think Profit | Act Ethically and Responsibly

Profit has always been every business's primary goal, with ethics and social responsibility being considered "nice to haves." Given the gravity of techno-societal fragility, acting ethically and taking responsibility for climate protection and other societal needs must become essential components of every business's profit growth initiative.

AI-driven needs analysis will enable business organization structures to flatten by replacing a large number of managers and executives with robots. Noting the often ridiculously high pay grades assigned to those positions, flatter organizations can be expected to generate as much or more sustainable profit as companies did when computers replaced many knowledge workers during the Information Age. Flattening organizational structures has been a competitive advantage for companies throughout the

technological ages, but the AI, robotics, and future technological eras will offer even more opportunities to quickly increase sustainable profit through organization flattening. The process of flattening organizations can be very difficult for businesses, especially the impacted employees. This strongly implies that businesses should take an ethical approach to flattening their organizational structures.

Ethically flattening organizations necessitates an effective change management plan that encompasses strategies, communications, and contingency plans, rather than simply sending termination emails to the affected workers. But the real challenge will be in getting powerful executives to choose to give up their high-paying jobs to grow their businesses. Corporate board members, investors, and customers will ultimately demand a better return on their investments as they watch similar businesses flatten.

Build or Buy a System

Soon after choosing to implement an AI-driven needs analysis system, a business must decide whether to build or purchase it. Neither building nor buying offers a panacea, but building is relatively easy and would provide a customized approach to needs analysis and buying would require customization, too.

The tasks required to build an AI-driven needs analysis system will vary somewhat from business to business, but here are some factors to consider:

- Choose to grow a VURPRD database first. This will require an AIA

system and time to capture enough data to make it reliable. If your organization does not have the data needed to support an AI-driven needs analysis system, then it does not have the data needed to support a human-driven needs analysis system. The information is the same. Furthermore, if you start capturing the data you need first, there's a better chance of having a reliable amount of data when the algorithm is ready. The needed data includes a) all the SOPs workers are expected to perform, b) the personal data of the workers who perform the SOPs, including their total compensation, c) individual worker capabilities (KSA), d) individual worker performance records, e) regulations guiding the work to be done, f) the equipment, service records, and materials used to make the products or deliver the services the business produces, g) data illustrating how the business and its output compare with that of its competition, h) the mean operating cost for each SOP, i) investment quality, j) economic forecast, and whatever else is required for making favorable business decisions. With these data, an AI-based needs analysis system can constantly search for ways to enable, ensure, and continuously improve performance in ways that increase sustainable profit. Without this data, a business must rely on assumptions and chance.

For most businesses, especially large ones, much of the data needed to support an AI-driven needs analysis system already exists in a database somewhere. The most common sources of data useful for AI-driven needs analysis include large enterprise resource planning (ERP) systems,

human resource information systems (HRIS), and learning management systems (LMS), as well as accounting, supply chain, quality control, and project management systems. Regrettably, businesses rarely capture the most valuable data, performance ratio data at individual worker and process step granularity. That data is needed to most efficiently and effectively enable, ensure, and continuously improve individual worker and work system performance. VURPRD reveals how much time workers spend on each process and step they carry out. At that level of detail, AI can calculate the mean amount of time exemplary workers require to produce a perfect product or to deliver a perfect service 100 times, 200 times, 1,000 times, and more. It can report how long the exemplary workers spent on each step of every process and their process improvement suggestions. Upon establishing a mean duration for performing process steps, businesses can a) identify the exact process step where performance enablement, performance ensurance, and continuous improvement are needed; b) project the amount and cost of compensation and materials required to create perfect products; and c) measure the efficacy of any intervention the business implements regardless of the business function that owns it. For these reasons, any company that chooses to implement an AI-driven needs analysis system or continuously improve its manual needs analysis system should prioritize implementing an AIA system. Whether the needs analysis process is AI or human-driven, creating the data repositories a company needs to make wise decisions is imperative. Making the databases can take time, but it's time well spent.

Once the VURPRD repositories function as intended,

- When using the AIA system, workers frequently abandon a process before it's finished. If the abandoned processes are included in the datasets being analyzed, the first few steps will show higher numbers than the last few, and that would lower the data's quality. Getting an accurate data set in this case would require removing the abandoned events.
- Maintaining data integrity requires constant monitoring of the data that goes into and comes out of a database. Developing filters that can sort and archive unqualified data before making decisions or running calculations is essential.
- Create or acquire an AIA system that delivers SOPs on demand while capturing the VURPRD required to effectively fuel both manual and automated needs analysis. The data from an AIA system can and should be used to benefit and protect workers, employers, and investors alike, even if it takes a lot of communication to overcome the perception of being too "big brotherish." Ultimately, an ethically used AIA system ensures the honesty, responsibility, and accountability of both employees and employers in ways that are impossible without one.
- Ensure the organization optimizes and documents every SOP implemented in its work and worker systems. Documentation is the first step toward standardization, and standardization is necessary

for quality and continuous improvement. Process documentation is essential to every business, whether it is implementing an AI-driven needs analysis system or not. Processes must also be documented before they can be added to an AIA.

- Create application programming interfaces (APIs) to automatically gather data for the needs analysis application and develop algorithms to generate VURPRD streams, which should include aggregated and anonymized personal data, including compensation amounts, product pricing, sales, costs, profit margins, and any other ratio data that can give clear insights into performance and profits.
- Use the questions listed in the description column of this book's "Structure of Adyton's Needs Analysis Model" section to help create and customize the algorithms to be used by the AI-driven system.
- Create AI algorithms and AI agents that a) mimic human decision-making without human bias, greed, and politics; b) improve decision validity, accuracy, and reliability; and c) reduce the cost of good decisions while eliminating the cost of undesirable ones.
- Make reports that are democratized and suitably anonymized. Anonymize employee data in ways that allow employees to identify and compare their performance with anonymous peers while still giving the company useful performance data. This should help make the AIA system, data collection, and reporting more palatable to employees.

- Extensively and repeatedly test the AI system for every potential use case while continuously improving its components.
- Customize and optimize the ANAM or other AI-driven needs assessment model to fit the business. Consider entering data-sharing agreements with other businesses within the same industry to make broader analysis possible.
- Slowly transition from doing needs analysis manually to using automated functions based on the ANAM or a similar model until the whole process is fully optimized, then let the AI take over the needs assessment task.

AIA merits special mention here because, without knowing the actual time required for workers to complete tasks and steps, a business can only guess. Before AIA, guessing was the best anyone could do. But it would be a mistake to continue relying on guessing when data could easily replace it. That's what an AIA system does; it replaces guessing with data. It enables performance by revealing the exact step a worker needs performance enablement on via coaching or other means. Knowing the median and mean time it takes to perform a process step ensures that no steps are ever underperformed. Comparing the performance times of the same SOP across multiple work locations can reveal continuous improvement opportunities, such as one location performing better than a location using an older machine.

The effort required to automate needs analysis may initially seem

daunting or even impossible, but upon closer examination, businesses that are already accustomed to executing a rigorous DMAIC, ADDIE, or similar process will find little to change. For businesses that are less organized, the process will be more challenging, but accepting the challenge will result in significantly growing a business's sustainable profit in a way that would be impossible without an AIA system and an AI-driven needs analysis system.

Chapter 8: Conclusion

The promise of AI is that computers will be able to make more and better business decisions than humans, without the bias, greed, and self-service of human decision-making. When applied, that technology can ensure businesses grow a windfall of sustainable profit more rapidly than ever before while behaving ethically as they protect the climate for following generations.

Innovation, AIA, IA, AI, and robotics are rapidly changing how businesses are organized, how they grow profit, and how people work. New innovations are being rapidly added to the existing mix of performance enablement, performance ensurance, and continuous performance improvement options, and we will continue to do so. Needs analysis models must be continuously updated to address each objective and technology.

Business organization structures will be able to flatten thanks to the technologies and tactics discussed in this book. Flattening will allow a significant amount of labor to be automated and enable businesses to grow sustainable profits at a rate that has never been seen before.

Businesses will greatly benefit from being able to project and compute the true financial value of each business input in near real time, rather than relying on guesswork or assumptions. With that knowledge, decisions can be made more quickly, affordably, and ethically without the prejudice, avarice, and self-interest of human decision-makers.

As with any significant change, there will be a conservative camp that

wants to preserve the status quo and a progressive AI camp that wants to use new technologies to improve business profits, ethics, and the environment. The AI camp will win because of its capacity to accurately and efficiently monetize every facet of work, including individual worker motions and process steps, and then project or compute the ROI on every business intervention.

Now is the first time in humanity when bias, greed, and self-interests can be removed from business decisions and operations. Imagine exorbitant executive pay, unlivable wages for frontline workers, unequal wages for equal work, racial prejudice at work, and the wanton production of planet-killing waste all ending at once.

For those with the vision of humanity reaching a new and higher plane where all workers will equitably share business profits and continuously expand their KSA and earnings, and that our environment will be better when we leave the earth than when we arrived, now is the time to adopt AI-driven needs analysis and AIA.

Chapter 9: About ANAM

Adyton's Needs Analysis Model, or ANAM for short, is a workflow designed to replace obsolete, narrow-focused needs assessment models.

ANAM improves upon existing needs assessment models by,

- establishing a single goal of achieving rapid, sustainable profit.
- establishing just three objectives: performance enablement, performance ensurance, and continuous improvement,
- eliminating bias, greed, and self-interest from business decisions.
- focusing on the needs of entire organizations instead of distinct work functions such as organizational development, industrial engineering, compensation, marketing, training, etc.,
- strengthening legal defensibility and ethical decision-making by supporting all needs analysis activities, decisions, and recommendations with VURPRD,
- acknowledging executive interference in the manual needs analysis process and providing advice to analysts on how to manage such interference as it occurs,
- removing executive interference that can reduce intervention quality,
- identifying and considering long-term business priorities that have the potential to produce higher sustainable profit over time but may not project an ROI as quickly as short-term profit growth opportunities,
- directing analysis using a top-down, broad-to-discrete needs analy-

sis pathway and problem-solving methodology rather than a limited, bottom-up procedure concentrated on the requirements of a single business function,

- requiring organization-wide coordination and collaboration on needs analysis activities and organization-wide data sharing instead of allowing narrowly focused analysis performed in silos.
- differentiating and addressing critical SOP steps rather than treating all SOP steps as if they were non-critical,
- acknowledging and addressing how to perform unlearnable SOPs, especially across mobile and manual workers, instead of overlooking or denying the existence of those SOPs and special worker needs,
- advising solutions for performing SOPs that cannot or should not be performed from memory alone,
- addressing the security needs for recommended interventions in the analysis phase of system development rather than delaying it or ignoring it,
- establishing climate protection as a mandatory intervention selection criterion across the business, not just for TL or HR interventions,
- establishing ethics as a mandatory intervention selection criterion.
- establishing needs analysis as a continuous cycle instead of a closed-ended activity,
- prioritizing low-cost but highly effective technologies for enabling, en-

suring, and continuously improving performance instead of defaulting to ineffective training and inaccessible job aids,

- positioning training and learning as the last performance enablement option instead of the first or only solution,
- recommending robust, coordinated, omnibus solutions to address both work and worker system needs,
- applying the “necessary and sufficient” test before selecting performance enablement, performance ensurance, and continuous performance improvement interventions,
- providing a model for an AI-driven, fully automated, continuously operating needs analysis system,

ANAM is a continuous, cyclical, auditable, automatable, profit-, ethics-, and climate-focused business-wide needs analysis model. It leverages collaboration, accurate data, and math to identify and assess what a business needs. It suggests the most effective, up-to-date, safe, ethical, and environmentally friendly solutions that can meet those needs and quickly increase the business's sustainable profit. It creates project plans businesses can use to implement an ANAM system. It is intended to be the model for developing the algorithm, APIs, and AI agents an AI-driven needs analysis system would need to follow.

ANAM’s Audience

ANAM is designed for enabling performance, ensuring perfect performance, and continuously improving performance. It’s audience includes,

but isn't limited to TL professionals, business executives, and every worker in every function of every business worldwide. When paired with an AIA system, manual workers and their supervisors use ANAM to enable, ensure, and continuously improve the performance of manual workers. Business executives can use ANAM to rapidly and ethically grow sustainable profit and protect the climate without the resource commitment required of manual needs assessments. Investors and board members can use ANAM to keep business executives honest and grow their investments rapidly and safely. Clients benefit from businesses that use ANAM through lower-priced and higher-quality products and services. And the world benefits through climate protection and social well-being.

Structure of Adyton's Needs Analysis Model

ANAM has six phases, each with important outcomes. They include:

Phase 1: Define the profit growth opportunity

ANAM's first phase involves providing a detailed description of one or more opportunities that have the potential to rapidly grow and sustain profit. This may initially be the result of a rigorous, manually performed needs analysis supported by all business units or via an AI-driven needs analysis system when one is available. Once operational, an AI-driven needs analysis will perform this step automatically, often resulting in many opportunities that will eventually be enumerated, ranked, and recommended.

Phase 2: Measure the opportunity's financial cost

This phase is where a business establishes the metrics for determin-

ing how much it would cost to implement an prospective solution, what the break-even date would be, how much profit would be returned by the chosen investment, and how the opportunity ranks among other opportunities.

Phase 3: Analyze the problem's cause(s)

This phase aims to reveal the causes of identified problems by revealing the work system's needs as well as the worker system's needs, performance ensurance opportunities, potential security risks that could influence both present and future solutions, the capabilities and limitations of memorization, and the limitations of existing and prospective solutions.

Phase 4: Select intervention

This phase aims to weigh and then select the best intervention based on the analysis and prioritization of all options, regardless of cost. The actions include comparing each prospective intervention's impact on performance enablement, performance ensurance, continuous improvement, security, climate impact, and ethics. When automated, ANAM will recommend an intervention.

Phase 5: Forecast solution's break-even data and ROI

This phase aims to rank the best solutions from Phase 4 based on their break-even date and return on investment.

Phase 6: Handoff control

This phase aims to launch the solution design phase by delegating the solution's development to appropriate staff members.

Adyton's Needs Analysis Model

The following table coordinates with the ANAM flowchart and details each step. Use this table with the ANAM flowchart to customize the AI workflow and algorithms for your workplace.

Structure of Adyton's Needs Analysis Model

PHASE	STEP	TASK	DESCRIPTION
Prep	0	Prepare for needs analysis	Things to consider throughout every needs assessment, even when it's performed manually in preparation for automation, include: 1. All businesses worldwide share just one goal and three objectives. The only goal is to grow sustainable profit as quickly as possible. The three objectives are to a) enable performance, b) ensure performance, and c) continuously improve performance. 2. Performance is not limited to worker performance. It also includes work system performance, which encompasses company policies, leadership, management, equipment, standard operating procedures (SOPs), compensation, personal protective equipment (PPE), the work environment, and all other aspects that are not related to individual workers. 3. The needs analysis must concentrate on the business goal and three specific objectives, ensuring there is no bias or limitations in scope. 4. An organization must design solutions that represent its values, including ethical and climate-friendly operations. 5. It is the profit earned on products made and services

PHASE	STEP	TASK	DESCRIPTION
Phase 0 (cont.)	Prep (cont.)	Prepare for needs analysis (cont.)	delivered by frontline, delivered by frontline, often manual workers, that drives nearly every business worldwide, and that profit pays wages and all other costs. For that reason, focusing on manual worker needs often yields the greatest profit growth in the least amount of time. 6. AI promises to replace human decision-makers, which greatly diminishes the value of training leaders and managers. 7. Innovation devalues training, learning, and memorization as better performance enablement, ensurance, and continuous improvement technologies replace the need for memorization. 8. Access all the data needed for analysis. Businesses capture sales, profit, waste, and other valid, unbiased, reliable data that can be used to reveal the root causes of stagnant or falling profit and other issues. However, they rarely have valid, reliable, unbiased data on frontline worker performance. If the needed data are not available, then create or purchase a way to capture them before attempting to automate needs analysis. 9. The suggested intervention is unlikely to be worthwhile if the available financial data shows that profits are increasing.

PHASE	STEP	TASK	DESCRIPTION
Phase 0 (cont.)	Prep (cont.)	Prepare for needs analysis (cont.)	10. Proposed interventions must forecast a profit increase that exceeds the intervention's total cost within a reasonable amount of time. 11. Solutions must be ethical, climate-friendly, and espouse company values before being prioritized by the ROI they project. 12. Leaders and managers are responsible and accountable for performance within their sphere of influence. Therefore, analysis of the work environment and performance of direct reports is the main data used to reveal the performance needs of leaders and managers instead of their personal performance or relationships. 13. Frontline production workers and service providers are the most important targets of profit growth interventions regardless of industry. 14. Cycle time and error reduction are excellent metrics for revealing performance enablement, ensurance, and continuous improvement opportunities. 15. Data security is a critical need that every business and intervention must address and ensure, especially when businesses and interventions require internet access. 16. Every business intervention should aim to mitigate, not increase, techno-societal fragility.

PHASE	STEP	TASK	DESCRIPTION
Phase 1	0	Define the profit growth opportunity	In this first needs analysis phase, analysts or AI software search for and define potential profit growth opportunities. The opportunities may aim to reduce costs, increase revenue, or achieve both within either the work system or the worker system. The problem could be obsolete equipment, underpaid workers, or anything else. A hunch, personal observation, worker feedback, stakeholder request, regulator inquiry, or any other method may prompt a manually executed analysis. Algorithms in an automated AI-driven needs analysis system will continuously scan available data repositories for opportunities. That suggests an AI-driven needs analysis system will only need an initial issue to launch and then will operate constantly and automatically until stopped. When executives ask for an analysis, the analyst must control how the executive's influence will affect the analysis and figure out how to eliminate or lessen any detrimental effects the executive may have. Executive involvement in needs analysis driven by AI only occurs after the AI generates a list of opportunities ranked by projected ROI and break-even date in near real-time.
Phase 1	a.	How can we grow sustainable profit ASAP?	This is the first and most important question of any needs analysis. The answer to this question is traditionally the chief responsibility of every business leader and manager, and answering it is how they spend a majority of their time. This is also the recurring question an AI-driven needs analysis system asks as it mimics human decision-making.

PHASE	STEP	TASK	DESCRIPTION
Phase 1 (cont.)	a. (cont.)	How can we grow sustainable profit ASAP?	The AI-driven system is a daemon that continuously analyzes a business's data repositories in search of the answer to this question, just as humans would if they spent 24 hours a day, seven days per week, 365 days per year, without breaks. Businesses worldwide have just 1 goal, and it is to rapidly grow sustainable profit. For that reason, the overarching question every needs analysis must answer is, "How can we rapidly grow sustainable profit?" There are many ways for businesses to grow profit, and when combined into a single intervention, they can have a cumulative effect. For example, a new attendance policy might be more effective at rapidly growing sustainable profit when combined with focused communication and a compensation increase as compared to implementing a new attendance policy alone. When analyzing ways to rapidly grow profit, whether using analysts or AI, all profit growth opportunities across all business functions must be analyzed instead of singling out a specific discipline, like training, organization development, industrial engineering, compensation, etc. By addressing these questions, businesses can uncover opportunities for swiftly boosting sustainable profits. Questions analysts must ask or AI algorithms must be programmed to answer include,

PHASE	STEP	TASK	DESCRIPTION
Phase 1 (cont.)	a. (cont.)	How can we grow sustainable profit ASAP? (cont.)	1. “What can be done to increase profit?” 2. “What costs can be reduced or eliminated? 3. “Is profit stagnant or falling?” 4. “What event or events occurred before profit stagnated or fell that may have caused the change?” 5. “How long has profit been stagnant, or how much has it fallen?” 6. “Is profit stagnant or falling in one business segment, product, or location; more than one segment and location; or across the entire business?” 7. “When did profit become stagnant or begin to fall?” 8. “Did any events, such as a change in work policy, an epidemic, layoffs, or a declining national economy, occur around the time when profit began to decline?” 9. “Is there a valid, up-to-date job description for every job?”“Are workers being injured?” 10. “Is property being damaged?” 11. “Is quality falling?” 12. How can we grow sustainable profit ASAP? 13. “Is waste increasing? 14. “Are costs increasing or decreasing?” 15. “Is it difficult to hire workers?” 16. “Is attendance satisfactory?” 17. “What frontline worker issues caused profit to fall or stagnate?” 18. “How satisfied are frontline workers regarding their compensation and benefits and the administration of both?” 19. “What is the job satisfaction level across the frontline worker population?”

PHASE	STEP	TASK	DESCRIPTION
Phase 1 (cont.)	a. (cont.)	How can we grow sustainable profit ASAP? (cont.)	20. “Are there redundant jobs that can be removed or revised?” 21. “What manual tasks or jobs can be performed better with AI or other technology?” 22. “What cycle times can be shortened or eliminated?” 23. “What errors can be eliminated or mitigated?” 24. “What parts of your needs analysis model can be automated to replace high-salaried decision-makers?” 25. “How many decision-makers can AI or other new technology replace?” 26. “Are material costs rising/falling enough to renegotiate pricing?” 27. “Are any workers undercompensated?” 28. “Are any workers under-trained?” 29. “Are there workers who are performing far below satisfaction?” 30. “What changes are customers requesting?” 31. “Are customer requests/complaints handled in a satisfactory and timely manner?” 32. “Are our products and services competitively priced?” 33. “Are our marketing strategies and tactics competitive with the market?” 34. “Is the demand for our products/services falling, rising, or staying the same?” 35. “Are all business units reporting data regularly?” 36. “Is every worker at each location consistently adhering to the documented production and service delivery processes?” 37. “What continuous improvement feedback have workers submitted?”

PHASE	STEP	TASK	DESCRIPTION
Phase 1 (cont.)	a. (cont.)	How can we grow sustainable profit ASAP? (cont.)	38. “How is worker feedback being monetized?” 39. “Does the work system define and promote excellence or failure?” 40. “Does the work system define and promote perfect performance?” 41. “Who is responsible and accountable for practice and coaching after training?” 42. “Is the business’s goal to rapidly grow sustainable profit?” 43. “Are support requests intended to enable, ensure, and continuously improve worker and work system performance?” 44. “Is it clear how the proposed solution will rapidly increase sustainable profit?” 45. “Does the proposed solution end with a subjective training survey?” 46. “Does the proposed solution include a draft, high-level project plan that outlines milestones, tasks, task assignments, predecessors, successors, an issues and risks log, a timeline, and other relevant details?” 47. “Is only VURPRD used in analysis?” 48. “Is the chosen solution a top business priority?” 49. “Does the analysis seek performance improvement opportunities in both worker and work system inputs?” 50. “Are the root causes of problems identified and targeted for intervention?” 51. “Is or will forgetting become important to improved performance?” 52. “Are viable solutions offered for enabling workers to perform unlearnable SOPs?”

PHASE	STEP	TASK	DESCRIPTION
Phase 1 (cont.)	a. (cont.)	How can we grow sustainable profit ASAP? (cont.)	53. "Are the individual performance appraisal and compensation system fair and equally applied across the business?" 54. "Is the solution ethical?" 55. "Does the solution increase or decrease the company's carbon footprint?" 56. "Does the solution increase or decrease techno-societal fragility?" 57. "Is innovation an option?" 58. "Does the targeted intervention negatively or positively impact existing interventions?" 59. "Can the business afford to implement the intervention?" 60. "Does the business define and reward excellence, mediocrity, or failure?"
Phase 1 (cont.)	b.	Describe the opportunity in detail (cont.)	A detailed description of the issue will help scope and focus the analysis. The opportunity may be related to improving an existing part of the work or worker system or adding new interventions. The focus could be on cost reduction or avoidance, profit conservation or creation. Be aware that describing a need, such as acquiring a new skill or new equipment, often reveals unexpected ones. Never ignore unexpected needs. Instead, expand the analysis's scope. When performed manually, this means adding qualified personnel to support the analyst group. AI performs that automatically. Every employee of every business worldwide has the responsibility to enable, ensure, and continuously improve their personal performance, as well as the work system they work within.

PHASE	STEP	TASK	DESCRIPTION
Phase 1 (cont.)	b. (cont.)	Describe the opportunity in detail (cont.)	When performing needs analysis manually, be sure to capture all important issues, root causes, or solutions of all problems, and include representatives from each functional area of the business in the decision-making. Furthermore, consider creating a system where analysts must report and remove any subjective data from the decision-making process. Analyzing sustainable profit growth opportunities requires objective, data-driven decisions. VURPRD is the data required to make those decisions. Other information, including nominal and ordinal training and learning data, is far less valuable because it is subjective and cannot be used in the mathematical calculations required to validate needs or measure results. Questions analysts must ask or AI algorithms must be programmed to answer include: “What intervention(s) could be used to grow sustainable profit as soon as you get the chance? Options may include AIA, AI agents, new equipment, new materials, compensation change, job change, training, memorization, etc.” “How will the intervention save or make the business more money, and is the profit gain sustainable?” “Who, if anyone, needs to be involved in developing the intervention?” Include designers, implementers, target users, etc.

PHASE	STEP	TASK	DESCRIPTION
Phase 1 (cont.)	c.	Is this an executive request?	Executive requests for needs analysis only impact manually performed needs analysis. Once automated, an AI-driven needs analysis performs as a daemon; it runs continuously. It also does not require a request. It produces an ongoing, prioritized list of needs and recommended solutions based on business priorities, VURPRD gathered across all business functions, projected break-even dates, and the ROI expected for each option. This step is skipped after an AI-driven needs analysis system has been implemented.
Phase 1 (cont.)	d.	Jump to 5a	If an executive has confirmed that their request is not negotiable and a needs analysis cannot proceed, jump to Step 5a. When it is necessary to forego objective needs analysis, discuss and document the transfer of accountability and responsibility for the outcomes of the recommended intervention from the analyst to the executive. Omit this step when the needs analysis is AI-driven.
Phase 2		Measure the opportunity's financial cost	In this phase, the analysis focuses on the cost of improving an existing intervention or creating a new one. If the cost exceeds the business's budget, even with a positive ROI, the opportunity is not viable and must be removed from consideration. It's never a good idea to design, develop, and implement low-priority or low-impact solutions, especially when they cost more than their benefit. To mitigate or eliminate that risk, use financial data to estimate the opportunity's cost and to prioritize interventions before selecting or developing an intervention.

PHASE	STEP	TASK	DESCRIPTION
Phase 2 (cont.)		Measure the opportunity's financial cost (cont.)	Another reason for measuring the opportunity's financial cost is to establish the metrics that are required to evaluate intervention's effectiveness. The evaluation method used in needs analysis is the same as the method used to evaluate interventions. Using the same method to reveal needs and evaluate results will quantify the intervention's impact while indicating if it meets expectations and how to improve it. Much of the data required to perform this phase is available in quarterly and annual reports, the EEO1 report, compensation rates, and profit margins that are often categorized by product and location. Automatic access to this data makes it easier and faster to evaluate business needs and solutions. NOTE: This phase only addresses the cost of prospective opportunities. The model addresses the value and ROI in other steps. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "How much will the new opportunity cost?" 2. "Can the business afford the opportunity?" 3. "How much did lower production impact profit?" 4. "How much did poor quality impact profit?" 5. "How did waste impact profit?" 6. "What is the input cost, including security, labor, materials, equipment, etc.?" 7. "What are the lost opportunity costs, and how might they impact profit?"

PHASE	STEP	TASK	DESCRIPTION
Phase 2 (cont.)		Measure the opportunity's financial cost (cont.)	8. "How much money is being spent on HR initiatives across the target work group, including recruiting, retention, total compensation, fines, legal fees, the administration of consent decrees, disability and injury payments, etc.?"
Phase 2 (cont.)	a.	Is VURPRD accessible?	VURPRD refers to valid, unbiased, reliable performance ratio data. It includes the time it takes workers to perform their assigned SOPs, the time to perform each step of their assigned SOPs, performance dates, pay rates, sales amounts, production/delivery costs, profit margins, etc. This data is necessary for projecting break-even dates and for calculating the returns on any type of investment. Accessing VURPRD is an essential prerequisite to creating an AI-driven needs analysis system and the ability to accurately calculate break-even dates and ROI on interventions and rapidly grow sustainable profit. Without VURPRD, needs analysis relies on inferior data, including sophisticated guessing and subjective training or learning data. Unfortunately, accessing VURPRD can be difficult due to organizational "siloing." Despite the difficulties, the effort is worthwhile and often needs to be done just once before receiving permanent access to the data. When VURPRD is accessible to manual needs analysis teams, decision-making quality and speed will improve. You can use these points to persuasively advocate for the permanent integration of that data with an AI-driven needs analysis system.

PHASE	STEP	TASK	DESCRIPTION
Phase 2 (cont.)	a. (cont.)	Is VURPRD accessible? (cont.)	Not having access to VURPRD means missing out on better decisions, assessments, legal advantages, and profits, so this lost opportunity should be factored into the ROI calculations for future projects that don't use VURPRD. The need for VURPRD will not disappear; therefore, the sooner it is made available, the better.
Phase 2 (cont.)	c.	Analyze opportunity's cost	Nobody wants to implement a solution that will cost more to resolve a problem than the problem costs or to pursue an opportunity that delivers a lower ROI than other prospective opportunities. To prevent that from happening, only use VURPRD to estimate a problem's cost. Knowing the actual cost of an opportunity is essential to assessing needs, at this point in the needs analysis, an estimate is sufficient. A more accurate view of the opportunity's cost will come as the analysis progresses. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "How much have similar businesses paid to resolve similar issues?" 2. "What's the average cost quoted by 3 or more vendors for resolving the issue plus 50%?" 3. "What's the average time to complete the project as quoted by three or more vendors plus 50%?"
Phase 2 (cont.)	d.	Is the cost affordable?	Ensure that the business can handle the related costs of the proposed intervention.

PHASE	STEP	TASK	DESCRIPTION
Phase 2 (cont.)	d.	Is the cost afford-able?	When estimating an opportunity's cost, consider the probability and seriousness of the problem or opportunity. Problems with a low probability of occurrence may be worth the risk of leaving unresolved; however, problems with high seriousness, even with a low probability of occurrence, may justify immediate attention. Similarly, new solutions may carry a high probability of serious risk with low prospects of payback but might be worthwhile regardless of projected risk. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Is the business financially capable of pursuing the opportunity?" 2. "On a scale of 0-5, with five being most serious, what's the seriousness of resolving the targeted issue?" 3. "On a scale of 0-5, with five being the highest, what's the probability of the risk occurring?"
Phase 2 (cont.)	e.	Is this a busi-ness priority?	Some business priorities may not deliver as much financial benefit over the short term but are necessities over longer periods. Those priorities may include diversity, equality, and inclusion, climate protection, or other important initiatives. A question to ask and program into the AI algorithm is, "Is this a business priority that must be addressed regardless of its projected break-even date or return on investment ranking?"
Phase 2 (cont.)	f.	Is this an ex-ecutive request?	An automated needs analysis eliminates this question and the risks associated with fulfilling executive requests for solutions rather than requests for analysis.

PHASE	STEP	TASK	DESCRIPTION
Phase 2 (cont.)	f. (cont.)	Is this an executive request? (cont.)	Business politics can override best practices, including needs analysis. With respect to needs analysis, this often presents as a request for a training program instead of a request to solve a problem or pursue a new profit growth opportunity. The executive's emotional bias toward a favored solution may exacerbate this. Delivering solutions without first confirming the solution's need can lead to wasting resources on unneeded and low-priority solutions and ultimately reducing funds for emergencies and more promising initiatives. If an executive presses for a specific solution without the benefit of analysis, it could be advantageous to enlist other performance improvement experts who might advocate for a collaborative approach. Regardless of the request, maintaining relationships and "fitting" the organization are often the top expectations of employees, which means performance improvement experts must carefully weigh the pros and cons of pressing for a needs analysis after an executive requests a training program. By pressing a high-ranking executive to accept a needs analysis before launching one of their requests, an analyst could damage the department's relationship with the executive or their personal job and career opportunities. For the department and individual analysts, the best course of action is to immediately comply with the executive's request even if not performing a needs analysis could lead to inefficient use of company resources. Over time, the performance of executives that override

PHASE	STEP	TASK	DESCRIPTION
Phase 2 (cont.)	f. (cont.)	Is this an executive request? (cont.)	needs analysis will compare poorly with their peers who routinely allow it, and that will be exposed by future needs analysis.
Phase 2 (cont.)	g.	Abandon initiative	Abandon the initiative if there's no executive advocating for it and no financial justification exists for pursuing a targeted profit improvement initiative. You can revisit the perceived issue if conditions change. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Is this an initiative that may not be needed now but could be needed in the future?" 2. "Does this perceived issue or risk need further analysis that could be assigned to an individual worker or a task force?" 3. "When should this initiative be revisited, if at all?"

PHASE	STEP	TASK	DESCRIPTION
Phase 2	h.	Share VURPRD across the organization	Always share the data collected for needs analysis across the entire enterprise. Doing this will foster greater collaboration across various business units, better relationships, and greater profit growth. When VURPRD is automatically captured into a database, sharing it is as simple as granting database access to individuals, groups, and the AI-driven needs analysis system. Consider anonymizing the collected VURPRD and sharing it with trusted vendors and workers. When shared with vendors, they can monitor and analyze performance for you, proactively recommend solutions, provide services, and report the ROI on their work. Sharing the data with frontline workers enables Always share the data collected for needs analysis across the entire enterprise. Doing this will foster greater collaboration across various business units, better relationships, and greater profit growth. When VURPRD is automatically captured into a database, sharing it is as simple as granting database access to individuals, groups, and the AI-driven needs analysis system. Consider anonymizing the collected VURPRD and sharing it with trusted vendors and workers. When shared with vendors, they can monitor and analyze performance for you, proactively recommend solutions, provide services, and report the ROI on their work.

PHASE	STEP	TASK	DESCRIPTION
Phase 2 (cont.)	h. (cont.)	Share VUR-PRD across the organi-zation (cont.)	Sharing the data with frontline workers enables workers to take more of the responsibility for improving their personal performance, as they'll be able to com-pare their performance with that of their anonymized peers and pinpoint improve-ment opportunities at the process step granularity.
Phase 2 (cont.)	i.	Jump to 5a	This step is to be eliminated after auto-mating needs analysis because the AI will continuously execute the analysis flow without interruption. If a project executive has confirmed their request for training is not negotiable and a needs analysis cannot proceed, jump to Step 5a. When required to forgo needs analy-sis, discuss and document the shift of responsibility and accountability for the proposed initiative from the analyst and their department to the executive deci-sion-maker.
Phase 3		Deter-mine the prob-lem's cause(s)	Because problems can be very complex and multiple causes often exist for each problem, manually performing this step requires the operational data and assis-tance of other specialists, including sub-ject matter experts (SMEs), operations personnel, vendors, compensation and benefits experts, industrial engineers, or-ganizational development professionals, etc. When automated, the AI can access VURPRD and determine the root causes of problems better, faster, and cheaper than the SMEs.

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)		Determine the problem's cause(s) (cont.)	In addition to collaborating with other internal professionals, consider sharing anonymized and aggregated VURPRD with trusted vendors and consultants who can assist with determining the problem's cause. External experts often work faster and with less bias than internal experts. It wouldn't do much good to fix worker system problems while leaving the work system issues untouched. Therefore, when performing needs analysis, fix the work system problems from the top down before analyzing the worker issues. Start with issues that impact the entire organization, then shift to local organization issues, followed by job issues, SOPs, motivation (which is a combination of work system and worker issues), and finally worker issues. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Is this problem caused by something in the work system, the worker system, or both?" 2. "Do the target workers have all the materials they need to do their jobs?" 3. "Do the target workers have all the equipment they need to do their jobs?" 4. "Is all the production equipment up-to-date, well-maintained, and fully operable?" 5. "What work policies exist that may impede worker performance?" 6. "What security issues exist that may be causing the problem?"

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)		Determine the problem's cause(s) (cont.)	7. "What continuous improvement suggestions have the manual workers provided, and how are those suggestions being provided?" 8. "Are there incentives for workers who provide valuable continuous improvement suggestions?" 9. "Is poor performance incentivized?" 10. "Is exceptional performance incentivized?"
Phase 3 (cont.)	a.	Did prior decisions use *VURPRD?	Interventions selected and implemented prior to using a VRPRD-based needs analysis, whether AI-driven or manually administered, carry a high probability of being insufficient, unnecessary, ineffective, inefficient, or all four. Therefore, existing interventions must be reassessed after implementing an improved needs analysis system. Making decisions wholly or partially based on interview response data is not advised, as the respondents may find greater personal advantage by answering certain questions in less than truthful ways. Decisions based on automatically captured VURPRD are always best; therefore, make every attempt to only use VURPRD when performing needs analysis and bans subjective data from the decision-making process.

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	a. (cont.)	Did prior decisions use *VURPRD? (cont.)	Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "What data was used in choosing existing interventions?" 2. "What is the ROI for each existing intervention?" 3. If VURPRD wasn't used to analyze a problem or select an intervention, then ask, "What is the presumed value of each of the highest-cost interventions?"
Phase 3 (cont.)	b.	Is the organization broken?	In this step, the analyst or AI algorithm follows the DMAIC process to continuously reveal and resolve organizational problems. Even the best profit growth solutions can fail in broken organizations, so fixing the organization's needs first can save resources later. Broken organizations experience stagnant or declining profits due to factors such as low-quality products and services, waste, inefficient SOPs, personal injuries, property damage, and other poor outcomes, all of which can be revealed by an AI algorithm but are much more difficult to do manually. Organizational problems impact every part of a business, so it's best to mitigate or remove them before analyzing any other potential risks or issues.

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	b. (cont.)	Is the organization broken? (cont.)	Analysts need to possess organization-related VURPRD or work with professionals who can provide the data that reveals whether the organization is dysfunctional or not. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Do all divisions, departments, and individuals share the business’s goal and objectives?” 2. “Does the business have a long-term/strategic plan?” 3. “Is the strategy understood and supported throughout the organization?” 4. “Does the business have short-term/tactical plans for every department and location?” 5. “Are any leaders doubling as managers?” 6. “Are any managers doubling as producers?” 7. “Are managers doubling as leaders without the pay or recognition?” 8. “Are workers ‘temporarily’ placed long-term in roles of higher responsibility than their job description outlines without commensurate benefits?” 9. “What production problems are being experienced in the target organization?” 10. “Are production goals being missed?” 11. “Is there a staffing problem at the production level?” 12. “Is employee turnover a problem at the production/service level?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	b. (cont.)	Is the organization broken? (cont.)	13. “Is there a staffing problem at the production level?” 14. “Is employee turnover a problem at the production/service level?” 15. “What data does the organization use to measure success and reveal profit improvement opportunities?”
Phase 3	c.	Is/are the job(s) broken?	In this step, an analyst or AI follows the DMAIC process to continuously reveal and resolve job-related problems. Fixing broken jobs, which negatively impact a business’s profit, is crucial before addressing other issues. In general, it’s best to resolve organization-wide issues before resolving job-related issues. VURPRD is required to determine if jobs are broken and how to fix them. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Does every position in the business have a job description that was developed using formal job analysis?” 2. “Do compensation rates match job requirements for each job description?” 3. “Do the job descriptions realistically describe the work requirements, what they must accomplish, and how they are to accomplish each requirement?” 4. “Are the job descriptions understandable, complete, and accurate, without loopholes that managers or executives can use to assign work that doesn’t fit the description?”“Are the postings for open jobs accurate,

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	c.	Is/are the job(s) broken? (cont.)	5. “Are the postings for open jobs accurate, do they use appropriate keywords, and do they realistically represent the work to be performed, the educational qualifications required, etc.? 6. “Are workers hired based on their documented capabilities over their presumed ability to ‘fit’ into the organization?” 7. “Is there a clear and viable career path and upward mobility options for high performers? Are there workers currently placed on that path? Is the path being used effectively?” 8. “Have members of the target workgroup recently been promoted, and if yes, what evidence exists to support their promotion ahead of others, and is that evidence valid, unbiased, and reliable?” 9. “Are diversity, equality, and inclusion represented in all work roles, and are those values executed nominally, or is there evidence of full support, such as going above and beyond minimum requirements?” 10. “Are performance reviews valid, unbiased, and reliable enough to base legally defensible compensation, upward mobility, and other decisions on?” 11. “Do performance reviews only include VURPRD?” 12. “Are the same employment, compensation, and other rules applied similarly across all job levels, from CEO to frontline workers?” 13. “Are the same rules, data, and decision-making processes applied to all employment levels, from executive to producer levels?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)		Is/are the job(s) broken? (cont.)	14. “Have the respective employees accepted the responsibilities and accountabilities outlined in their job descriptions?”
Phase 3 (cont.)	d.	Is/are the SOP(s) broken?	In this step, the analyst or AI follows the DMAIC process to continuously reveal and resolve SOP-related problems. AI or requirements analysts should concentrate on examining and repairing SOPs after resolving job issues. Fixing broken SOPs before implementing interventions may save resources by eliminating the need for proposed interventions. To determine if SOPs are broken and how to fix them, the needs analyst or AI-driven system must use VURPRD. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Is there an SOP for every task that workers must perform?” 2. “Are SOPs complete, efficient, and up-to-date?” 3. “Is access to SOPs appropriately provided to workers on demand?” 4. “Do the SOPs represent best practices as determined by industry-wide analysis?” 5. “How do the targeted workers provide suggestions for improving SOPs?” 6. “How often do the targeted workers offer continuous improvement suggestions?” 7. “What happens to worker suggestions after they’re submitted?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	d. (cont.)	Is/are the SOP(s) broken? (cont.)	8. "How often are worker suggestions implemented?" 9. "Are there incentives and rewards for workers who provide continuous improvement suggestions?" 10. "Are SOPs performed consistently across all workers who perform the same work?" 11. "How does the business ensure every worker follows the same SOP?" 12. "How are the SOPs protected from unauthorized access or theft?"
Phase 3	e.	Does solution require workers?	Some performance improvement solutions don't require workers. If that's the case, jump to Step 4d.
Phase 3 (cont.)	f.	Review decisions using VURPD	When analyzing current problems, analysts must be aware of previously implemented interventions that may impact subsequent interventions. Those interventions may have been selected and developed using less than optimal data and decision-making. For that reason, interventions implemented without VURPRD must be re-evaluated when VURPRD is available and objective decision-making is possible. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Was VURPRD used to make prior decisions and interventions?" 2. "How would VURPD change prior decisions and interventions?"

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	g.	Define the organization problem(s)	Use this step to define the possible organizational problem(s). Subsequent steps will allow you to verify the problem(s). An AIA will reveal the problems it detects automatically as well as list the improvement suggestions provided by the target workers as they work.
Phase 3 (cont.)	h.	Define the job problem(s)	Use this step to define the possible job problem(s). Subsequent steps will allow you to verify the problem(s). An AIA will reveal the problems it detects automatically as well as list the improvement suggestions provided by the target workers as they work.
Phase 3 (cont.)	i.	Define the SOP problem(s)	Use this step to define the possible SOP problem(s). Subsequent steps will allow you to verify the problem(s). An AIA will reveal the problems it detects automatically as well as list the improvement suggestions provided by the target workers as they work. When using or planning to use an AI-driven needs analysis system, this is when SOPs should be evaluated for use as Agent Operating Procedures (AOPs) in AI algorithms and edited appropriately if found not to be.
Phase 3 (cont.)	j.	Jump to 4d	Some performance solutions belong solely to the work system. When that's the case, jump to Step 4d.

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	k.	Use VURPRD to measure the problem(s)	Use VURPRD to reveal and measure organization-related problems. The data to be used include worker recruitment costs, performance results, retention costs, attendance, regulatory costs, and any other data noting differences across similar organizations, departments, and individuals over time. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "What are the reviewers on Indeed and other recruiting sites saying about the business?" 2. "What is the Better Business Bureau's grade for the business? What complaints have been reported, and how were those complaints handled?" 3. "Is the number of job applicants rising, falling, or staying the same?" 4. "Are job interviews focused solely on the valid job requirements written into the target job's position description?" Note: Organizational "fit" and relationship building are not valid or job-related requirements for most jobs. 5. "Is every interviewee asked the same list of questions in the same way?" 6. "Do job interviews last the same amount of time for every interviewee, or are some interviews cut short while others are extended?" 7. "Is overall productivity rising, falling, or stagnant?" 8. "Is employee retention rising or falling?" 9. "What would improve attendance?" 10. "Are some departments and individuals performing better than others?" 11. "Are some departments and individuals performing better than others?"

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	k.	Use VUR-PRD to measure the problem(s) (cont.)	12. “Do workers know the company’s strategy and tactics?” 13. “Do workers have performance plans that contribute to accomplishing the annual tactics and long-term strategy?” 14. “Does the organization distribute compensation and benefits equitably from the top to the bottom?” 15. “Is new hire compensation based on their experience and SKA, or does 16. “Do performance evaluations result in central tendency bias, which gives the worst and best performers the same pay increase?” 17. “Is there an employee suggestion program, and are the accepted suggestions rewarded in ways that encourage additional suggestions?” 18. “Is upward mobility performance-based and validated via VURPRD?” 19. “Is the workforce diverse in gender, age, race, etc. from top to bottom?” 20. “Is the top employee (CEO) paid a fair wage with respect to the lowest-paid employee and vice versa?” 21. “Is the same equipment available to all employees?” 22. “Are the work policies related to attendance, performance, compliance, etc. applied equally across the organization?” 23. “Are there workers with inexplicably high compensation?” 24. “Are there workers who were hired or promoted without the requisite skills noted on their job description?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	l.	Use VURPRD to measure the problem(s)	Use VURPRD to measure the impact and priority of a perceived risk or issue. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Are the skills required for performing jobs accurately communicated via job descriptions and job postings?” 2. “Are education requirements accurate for the work to be done?” 3. “Is the actual compensation typical for the work to be done?” 4. “Are some departments outperforming other similar departments?” 5. “How do retention rates compare to similar organizations and departments?” 6. “Has recruiting become easier or more difficult, or has it stayed about the same?” 7. “Are people hired or promoted into jobs based on VURPRD alone?”
Phase 3 (cont.)	m.	Use VURPRD to measure the problem(s)	Analyze the SOP- or AOP-related VURPRD to determine what performance enablement, performance ensurance, and continuous performance improvement opportunities exist. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Which SOP or AOP steps can be improved, eliminated, or automated? 2. “Which SOP steps must always be performed manually?” 3. “Do workers spend about the same amount of time performing the same SOPs and SOP steps in all locations?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	m.	Use VUR-PRD to measure the problem(s) (cont.)	4. "Are some workers performing SOPs or steps better and/or faster than other workers as measured by VUR-PRD?" 5. "Do quality inspections reflect a defect trend that can be fixed?" 6. "Does the VURPRD compare well with that of other similar businesses or work?"
Phase 3 (cont.)	n.	Analyze the problem(s)	Analyze the organization-related VUR-PRD to determine what performance enablement, ensurance, and continuous improvement opportunities exist. When automated, the system will provide a minute-by-minute, prioritized list of potential opportunities.
Phase 3 (cont.)	o.	Analyze the problem(s)	Analyze the job-related VURPRD to determine what performance enablement, ensurance, and continuous improvement opportunities exist. When automated, the system will provide an ongoing, prioritized list of potential opportunities.
Phase 3 (cont.)	p.	Analyze the problem(s)	Analyze the SOP-related VURPD to determine what performance enablement, ensurance, and continuous performance improvement opportunities exist. When automated, the system will provide a constantly updated and prioritized list of potential opportunities.
Phase 3 (cont.)	q.	Improve the organization	Use the VURPD and analysis to make changes that improve the organization. When automated, the system will provide a prioritized list of potential opportunities.
Phase 3 (cont.)	r.	Improve the job(s)	Use the VURPD and analysis to make changes that improve the job(s).

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	s.	Improve the SOP(s)	Use the VURPD and analysis to make changes that increase performance efficiency and quality.
Phase 3 (cont.)	t.	Control organization	Controlling the organization means handing off a completed needs analysis to the party responsible and accountable for executing its recommendations. In this scenario, the organizational development staff would take over.
Phase 3 (cont.)	u.	Control job(s)	Controlling jobs means handing off a completed needs analysis to the party responsible and accountable for executing its recommendations. In this case, it would be handed off to the industrial engineering or organizational development staff.
Phase 3 (cont.)	v.	Control SOP(s)	Controlling the SOPs means handing off a completed needs analysis to the party responsible and accountable for executing its recommendations. In this case, it would be handed off to the industrial engineering staff.
Phase 3 (cont.)	w.	Are workers motivated to improve?	Being motivated to improve means workers are willing and able to change the way they do things, which would result in better performance. Conversations with the targeted workers and examining their responses to prior changes can indicate their overall willingness to change. VURPRD gathered throughout change events can indicate which workers adapted to the changes fastest and slowest.

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	w. (cont.)	Are workers motivated to improve? (cont.)	While the business's responsibility to motivate workers is mostly limited to compensation, benefits, and upward mobility administration, being able to change is a joint responsibility between a worker and their employer. Employers must devise strategies to facilitate, ensure, and consistently enhance performance. Workers must do their best to use the provided resources to develop new skills or improve existing ones. Note: Being able to change is the responsibility of both businesses and their employees, but the accountability for change belongs to businesses, not workers. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Do workers have the knowledge, skill, and attitude (KSA*) they need to succeed?" 2. "Is implementing change across the targeted worker population difficult, and if so, why?" 3. "What kinds of incentives have been successfully used in the past to motivate the targeted workers to change?" 4. "What change management techniques have been successful in the past, and which ones did not work well?" 5. "Are profit growth initiatives never, sometimes, or always accompanied by change management activities?"

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	w. (cont.)	Are workers motivated to improve? (cont.)	*Note: TL organizations sometimes refer to the “A” in KSA as “abilities” instead of “attitude.” In its original context, the “A” stood for “attitude.” In this case, the right attitude is needed for a worker to be “willing” to do something. The ability to do something is another aspect of motivation. Being able means having the knowledge and skill to acceptably perform a task.
Phase 3 (cont.)	x.	Do critical SOP steps exist?	Critical steps include those mandated by government regulations, as well as other actions that workers must never miss, underperform, or execute in the wrong sequence, since failing to adhere to these could result in significant personal injury or property damage. Examples include all compliance and safety protocols like mixing toxic chemicals, handling super-cold or hot materials, processing food, donning personal protective equipment (PPE), etc. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “What government regulations must the solution include?” 2. “What emergency SOPs exist, including weather, chemical, fire, or other events?” 3. “What support is available for targeted workers who perform critical, error-prone SOPs?” 4. “What incidents have occurred that injured workers or damaged property?” 5. “What critical SOP steps have workers identified?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	x. (cont.)	Do critical SOP steps exist? (cont.)	6. “What support is available for targeted workers who perform critical, error-prone SOPs?” 7. “What incidents have occurred that injured workers or damaged property?” 8. “What critical SOP steps have workers identified?”
Phase 3 (cont.)	y.	Do security risks exist?	SOPs often represent intellectual properties that businesses must protect to maintain their competitive advantage. The information about workers, prospective clients, and clients that businesses capture and store is also a security risk that companies must address. To enable safe access to sensitive SOPs, the SOPs must only be accessible by people with the need to know, when needed, where needed, for just the needed time, on limited IP addresses and devices, etc. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Does the organization need to share any intellectual property electronically or otherwise? 2. “How are SOPs and other possible intellectual property secured?” 3. “How are the SOPs made secure from vulnerabilities that arise over time?” 4. “Is it possible to print sensitive information?” 5. “How is the source code of interventions protected?” 6. “How is the personal information of workers protected and kept current?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	z.	Can the SOP(s) be memorized?	Learning requires memorization. Therefore, SOPs that can't be memorized are unlearnable. Unlearnable SOPs include those a) with more steps than anyone can memorize, b) with steps that change too frequently to memorize, c) those performed too infrequently to memorize, and d) that amount to too many SOPs to learn at once or within the time provided. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Are all the targeted SOPs learnable?" 2. "How do workers currently perform unlearnable SOPs?" 3. "Could the SOP(s) be memorized if they were better written?" 4. "How are workers able to perform emergency/critical SOPs when under stress and likely to miss, underperform, or perform steps in the wrong sequence?"
Phase 3 (cont.)	aa.	Worker(s) can access aids?	Aids can enable performance while greatly reducing the need and cost of training and learning. Unfortunately, many workers cannot access most IA systems as they work. For example, manual workers cannot safely, efficiently, or hygienically access aids that require access to computers, handheld devices, or print. Those workers include all life scientists, engineers, food production and food service workers, healthcare workers, assemblers, home appliance installers, mechanics, etc. For those workers, performance enablement aids like YouTube videos, virtual reality programs, and printed instructions are not viable solutions, and other performance enablement modes must be considered.

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	aa. (cont.)	Worker(s) can access aids? (cont.)	Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Can the target workers stop working to access an aid?” 2. “Can the target workers safely and efficiently hold mobile devices and search for digital content like videos, schematics, chatbots, internet searches and digitized text instructions?” 3. “Can the target workers touch printed aids, computer keyboards, computer mice, or other things that could cross-contaminate and ruin their work?” 4. “When performing an SOP on the job that must be executed perfectly, which is the easiest, most effective, and most likely to deliver the most recent 5. “Do the target workers have disabilities that prevent them from using select aids, i.e., do they have a vision, attention, reading, or other disability that prevents their efficient and effective use of certain aids while working?” 6. “Can providing suitable aids enable the hiring of more people with disabilities?
Phase 3 (cont.)	ab.	Define the motivation problem(s)	Use this step to define the possible worker motivation problem(s). Subsequent steps will allow you to verify the problem(s). Motivation requires both the willingness and ability to do something. Training may address a worker’s ability to perform an SOP, but without their willingness, it may not get completed.

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	ac.	Develop performance ensurance method	Improving performance and increasing profitability require more than performance enablement. Performance must also be ensured and continuously improved. Performance ensurance means businesses are guaranteed that their workers will perfectly perform every step of every SOP they're assigned in the proper sequence, every time, without missing or underperforming any step. This capability is especially important when critical SOPs and SOP steps exist. Training and learning cannot ensure performance, nor can other interventions like compensation increases, attendance incentives, etc. Performance ensurance means businesses are guaranteed that their workers will perfectly perform every step of every SOP they're assigned in the proper sequence, every time, without missing or underperforming any step. This capability is especially important when critical SOPs and SOP steps exist. Training and learning cannot ensure performance, nor can other interventions like compensation increases, attendance incentives, etc. Ensuring performance requires either a) a manager's constant supervision or b) a way to consistently deliver SOPs in the proper sequence while collecting the time workers spend on each step, then alerting a supervisor when the data indicates a step has been missed or underperformed.

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	ac.	Develop performance ensurance method	Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “How is performance currently being ensured across the target worker population?” 2. “How can the existing performance ensurance method(s) be improved?” 3. “How can performance be ensured if it isn’t already?”
Phase 3 (cont.)	ad.	Develop plan to remove security risks	Initiatives designed to improve profitability can risk business and individual worker data security and lead to losses greater than a prospective intervention’s benefit. This is especially true with interventions that use the internet. Every business, worker, and profit intervention must prioritize security. Eliminating security threats not only means identifying and mitigating existing risks but also regularly reviewing solutions for emerging vulnerabilities. To do this, needs analysts must collaborate with information security experts. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “What existing security issues must interventions protect against? 2. “What new security issues are trending across other industries and businesses that could impact this intervention?” 3. “What are other industries and businesses doing to eliminate or mitigate security issues?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	ae.	Should the SOP(s) be memorized?	Some SOPs have steps so critical that they should never be performed by memory alone. Those SOPs include ones mandated by federal and state laws that could cost workers and business owners alike a hefty fine if not performed exactly to specification. Ensuring every step of every critical SOP is performed perfectly as written is essential when an SOP could cause personal harm or property damage. AIA is one of the most viable options for ensuring performance because it captures performance data at individual worker and individual SOP step granularity. Most performance aids have no mechanism for ensuring or continuously improving critical SOPs. Filling the need to ensure performance requires either constant supervision or a technology that constantly monitors every worker's performance. Of course, constant supervision is impractical. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Are there SOPs and steps that require perfect performance every time and some that don't?" 2. "Are there SOPs or SOP steps that workers must never perform from memory alone?" 3. "How is performance ensured as the target workers perform SOPs that should not be memorized?" 4. "How is the performance of regulatory compliance steps ensured across the target workers?"

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	af	Use VURPRD to measure the problem(s)	Use VURPRD to determine how big the financial impact is. To do this: 1. Use HR data to measure employee turnover, attendance, tardiness, accidents, healthcare costs, sick days, etc. 2. Use sales data to measure sales capabilities. 3. Use inspection data to measure production quality. 4. Use production data to measure waste and the completed piece/service count. 5. Use industry data to compare local performance with the industry averages.
Phase 3 (cont.)	ag	Analyze the problem(s)	Analyze VURPRD to determine how big the financial impact is. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “What is the employee replacement cost?” 2. “Has attendance fallen, and if yes, by how much?” 3. “Is falling attendance isolated to one or more locations?” 4. “Has production and/or service quality fallen, and if yes, by how much?” 5. “Is falling quality isolated to one or more locations?” 6. “Are the number of leavers increasing, and if yes, by how much?” 7. “Is waste increasing, and if yes, by how much, and when did it begin?” 8. “What is causing the turnover, quality decline, increased waste, etc.?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	ah	Is training necessary & sufficient?	Training alone is usually insufficient for enabling performance, especially when the SOPs to be performed are unlearnable. Before choosing training as a performance enablement intervention, needs analysts must decide if training is both necessary and sufficient for the task and target worker. If training is necessary, determine the best training mode by asking which mode is necessary and sufficient, beginning with the least expensive mode and working toward the costliest. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Is a printed job aid necessary and sufficient for enabling performance?” 2. “Is IA necessary and sufficient for enabling performance?” 3. “Is virtual classroom training necessary and sufficient for enabling performance?” 4. “Is on-site classroom training necessary and sufficient for enabling performance?” 5. “Is video necessary and sufficient for enabling performance?” 6. “Is virtual reality necessary and sufficient for enabling performance?” 7. “Is augmented reality necessary and sufficient for enabling performance?” 8. “Is artificial intelligence necessary, sufficient, and cost-effective for enabling performance?” 9. “How long will the targeted issue exist?” 10. “What is the expected shelf life of the proposed intervention(s)?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	ai.	Improve motivation	VURPRD can reveal ways to improve worker motivation, such as updating work assignments that don't align with job descriptions, updating job requirements, and more. Motivation issues across entire organizations often point to leadership problems. Isolated motivation problems in locations reporting to the same manager can indicate management issues. Poor individual motivation may be a worker, leadership, or management issue, or all three combined. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Are the knowledge and skill requirements shown in job descriptions accurate and up to date for each job?" 2. "Do workers receive the same training for the same tasks and jobs?" 3. "Do job postings and job descriptions accurately depict the tasks and scope of work required?" 4. "Given the job description, are all workers qualified for the jobs they were hired for or promoted to?" 5. "Are performance quotas obtainable and clearly communicated to each worker? 6. "Do workers receive all the support they need to accomplish their quotas?" 7. "Are all applicants for the same job asked the same interview questions?" 8. "Do interviewers take notes during interviews, and do those notes reveal possible bias or justify why each applicant was hired?"

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	ai. (cont.)	Improve Motivation (cont.)	9. "Do job applications or notes taken by interviewers contain codes or writing that could conceal interviewer bias?" 10. "Are only valid data used to evaluate worker performance?" Note: Valid measures only include the tasks, responsibilities, quotas, etc., listed in relevant job postings and job descriptions. 11. "Are workers evaluated using bias-free data?" Note: Rater bias can include a heavy emphasis on recent events, singular positive events, likeability, leniency, central tendency, gender/race, etc. 12. "Are worker performance evaluations reliable?" This means that the evaluations should be compiled thoughtfully over an extended period rather than based on just one or two meetings. 13. "Do employees regularly receive fair, honest, and timely performance feedback?" 14. "Is the same VURPD used to evaluate every worker's performance in the same role?" 15. If the workers are unionized, then, "What is the relationship like between union members and management?" 16. If the workers are unionized, then, "Are there special rules that impact intervention choices?" 17. If workers are not unionized, ask, "Has there been or is there now any union organizing activity?" 18. If a union drive is in progress, ask, "Why are workers considering unionization?" 19. "Does every worker have a clear career path, and is each worker committed to their path?" 20. "Is upward mobility demonstrable and dependable?"

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	ai (cont.)	Improve Motivation (cont.)	21. “Do EEO reports indicate that all workers are treated equally?” 22. “Are supervisors qualified to supervise their workers?” 23. “Do supervisors respect their workers and the work their workers perform, and do they have at least enough personal experience performing the work to provide meaningful coaching and advice?” 24. “Do employees receive challenging assignments and upskilling?” 25. “Are employees given assignments below their capabilities?” 26. “Are workers capable of perfect performance?” 27. “Is performance quality declining?” 28. “Do supervisors give each employee the attention they need to continuously improve their performance?” 29. “Are higher-performing employees compensated better than lower-performing employees?” 30. “Are communications regarding the work, co-workers, supervisors, etc. generally negative, positive, or balanced?”
Phase 3 (cont.)	aj.	Can training be developed JIT?	Training interventions require significant resources to produce, implement, evaluate, and maintain. If we cannot implement training before its solutions become necessary and within a reasonable budget, we must choose an alternative. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Can the proposed intervention(s) be developed in time to address the targeted issue(s)?”

PHASE	STEP	TASK	DESCRIPTION
Phase 3 (cont.)	aj. (cont.)	Can training be developed JIT? (cont.)	2. "Can the proposed solution be developed within the available budget?" 3. "If enough budget doesn't currently exist, what is the probability of getting the budget increased or the development timeline extended?" 4. "Can training, augmented reality, virtual reality, classroom training, etc. be developed and delivered within the necessary time and budget?" 5. "What is the expected lifetime of this issue?" 6. "What is the expected break-even date for the solution?" 7. "Will updates to the proposed solution be affordable and quick to implement?" 8. "How often will the proposed solution need to be updated?"
Phase 3 (cont.)	ak.	Control motivation	Controlling motivation means handing off the responsibility of designing, developing, implementing, and evaluating interventions chosen to improve worker motivation. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "What work system interventions are necessary and sufficient to resolve the revealed needs?" 2. "What worker system interventions are necessary and sufficient to satisfy the revealed needs?" 3. "Do the needed interventions already exist, and, if yes, can they be sufficiently updated to meet the newly revealed need(s)?"

PHASE	STEP	TASK	DESCRIPTION
Phase 4		Select Inter-vention	This section uses the information already gathered to reveal ways to resolve the problem(s) that need to be fixed. Thanks to accelerating innovation, there is a constantly changing array of performance enablement, performance ensurance, and continuous improvement solutions, which means the options can be expected to frequently change. Businesses must prepare to enable the performance of a constantly changing array of products and SOPs as a result of accelerating innovation. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Can spaced practice be ensured, and if yes, how and who will be responsible and accountable for it?” 2. “What work system interventions are necessary and sufficient to resolve the revealed needs?” 3. “Do the needed interventions already exist, and, if yes, can they be sufficiently updated to meet the newly revealed need(s)?”

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	a.	Enable performance via training	Training is the best option for enabling performance under the stated conditions; however, it cannot ensure performance. To ensure performance, be sure to add a performance ensurance method to the intervention. Ideally, the performance ensurance method will be automated to reduce costs while increasing assuredness.
Phase 4 (cont.)	b.	Enable performance & learning via IA or AIA	Intelligence augmentation IA is the best solution for enabling performance under the stated conditions. Be sure to find or create a delivery system that is necessary and sufficient for the target audience at the lowest possible cost.
Phase 4 (cont.)	c.	Enable, ensure, & improve performance via AIA	Because the targeted workers cannot safely, efficiently, or hygienically access aids delivered via computers, handheld devices, or even printed aids, hands-free operation is both necessary and sufficient, and AIA is the best solution. In most cases, manual workers will not need to view illustrations or visual demonstrations as they work and can perform well from audible cues alone. When AIA is found to be the necessary and sufficient solution, consider one that verbally delivers SOPs on-demand and hands-free and captures the time workers spend on each step along with their continuous improvement feedback.

PHASE	STEP	TASK	DESCRIPTION
Phase 4	d.	Is solution secure from hacks?	Solutions that risk losing sensitive data to thieves and extortionists can only impede profit growth. All interventions must be secure. Solutions that risk losing sensitive data to thieves and extortionists can only impede profit growth. All interventions must be secure.
Phase 4 (cont.)	d.	Is solution secure from hacks?	Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “How is the solution delivered, and what measures have been taken to ensure only targeted users can access it, i.e., those with the need to know?” 2. “Does the solution include software, and if yes, how is accessing the software secured?” 3. “Is the software routinely penetration tested and updated to stay ahead of new vulnerabilities?” 4. “How is the collected data used?” 5. “Is any data collected that is never used?” 6. “How is unused or obsolete data disposed?” 7. “Do the target users have access to their personal data and nobody else’s?” 8. “What data security policies are in place or could be established to make the solution more secure?”

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	e.	Remove security flaws	Once the security risks and issues have been identified, eliminate them. Security measures often include one or more of the following: 1. A data security policy that everyone must adhere to. 2. A process that monitors new vulnerabilities as they impact other businesses, which includes routine penetration testing. 3. Updating policies and solutions as new vulnerabilities arise.
Phase 4 (cont.)	e. (cont.)	Remove security flaws (cont.)	4. Designing proactive security measures into new and existing interventions.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	f.	Is solution climate neutral?	Climate protection is an existential imperative for every business and living thing; therefore, it must receive priority when performing needs analysis. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "What is the ecological cost of each prospective intervention?" 2. "What is the financial cost of each prospective intervention?" 3. "What is the worst thing that could happen to the climate if this intervention were implemented?" 4. "How serious would the intervention's worst-case scenario be?" 5. "What is the probability of the worst-case scenario's occurrence?" 6. "Does the prospective solution create more or fewer greenhouse gases than its alternatives?" 7. "Does the prospective solution remove more pollution from the environment than it creates?"
Phase 4 (cont.)	f. (cont.)	Is solution climate neutral? (cont.)	8. "Are there aspects of the intervention that can be removed, substituted, or otherwise edited to lower the intervention's climate impact?" 9. "Using a reputable carbon footprint measure, what is the intervention's climate score?"

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	g.	Is negative impact needed?	If the intervention is not climate neutral, determine if there's a better option that would protect the climate. The main question analysts or AI should answer is, "Is the intervention necessary, or could another intervention meet the identified needs in a climate-friendly manner?"
Phase 4 (cont.)	h.	Redesign to mitigate or eliminate negative climate impact	If the harmful climate impact is necessary, then redesign the intervention to eliminate as much negative impact as possible. The question analysts or AI should answer is: "How can the intervention be redesigned to eliminate or mitigate its harm to the climate?"
Phase 4 (cont.)	i.	Balance with other cuts across organization	If the intervention harms the environment and cannot be mitigated, offset its impact with cuts to other operations to achieve overall climate neutrality. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Are workers subjected to degrading activities while working?" 2. "Are workers expected to perform at an impossible pace or quality level?" 3. "Are workers expected to perform in unsafe environments?" 4. "Are workers paid relative to their value and contribution to the business?" 5. "Is worker privacy respected as mandated by law and other institutions whenever possible?"

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	i. (cont.)	Balance with other cuts across organization (cont.)	6. “Do work policies leave loopholes for unethical decision-making and actions?” 7. “When layoffs are necessary, do they impact some protected classes or other groups more than others?” 8. “Are performance reviews valid, unbiased, and reliable, and do they use automatically collected performance ratio data?” 9. “Is compensation awarded equitably and based on VURPRD?”
Phase 4 (cont.)	j.	Is the solution ethical?	Ethical decisions often result in a greater sustainable, long-term increase in profit, while unethical choices may lead to higher short-term profit but fail over the long term. Businesses must take care to grow profit through ethical performance enablement, performance ensurance, and continuous performance solutions. Ethical decisions often result in a greater sustainable, long-term increase in profit, while unethical choices may lead to higher short-term profit but fail over the long term. Businesses must take care to grow profit through ethical performance enablement, performance ensurance, and continuous performance solutions.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	j. (cont.)	Is the solution ethical? (cont.)	Ethical decisions are essential to business success, but those decisions are often the hardest for business leaders and managers, who are pressed and rewarded to make quick profits with little other consideration. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Are workers subjected to degrading activities while working?" 2. "Are workers expected to perform at an impossible pace or quality level?" 3. "Are workers expected to perform in unsafe environments?" 4. "Are workers paid relative to their value and contribution to the business?" 5. "Is worker privacy respected as mandated by law and other institutions whenever possible?" 6. "Do work policies leave loopholes for unethical decision-making and actions?" 7. "When layoffs are necessary, do they impact some protected classes or other groups more than others?"

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	j. (cont.)	Is the solution ethical? (cont.)	8. "Are performance reviews valid, unbiased, and reliable, and do they use automatically collected performance ratio data?" 9. "Is compensation awarded equitably and based on VURPRD?"
Phase 4 (cont.)	k.	Is surveillance disclosed?	Good ethics dictate full disclosure of all worker surveillance. Workers must be told how, when, and for what purposes they are being observed, whether manually or electronically. Workers also deserve to know before they are being surveilled for what reasons, for how long, what information is being captured, how that information is used, how it is being retained, etc. Nondisclosure can cause workers to feel their privacy was violated, which could subsequently have a negative impact on their performance. The violation may also be illegal, unethical, or both, thereby exposing the employer to legal action. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "What employee information is captured?" 2. "How are workers notified of what data are being captured and when?" 3. "Are workers given the opportunity to review, appeal, and revise the data captured about them?" 4. "How is employee data secured?" 5. "How is personal data disposed of after being used or made obsolete?"

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	l.	Is upskilling enabled?	While deskilling work can accelerate innovation, it is unethical to use an employee's time and labor without providing upskilling opportunities that can help them obtain a promotion or a better job and compensation in the future. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "Are production jobs and SOPs deskilled?" 2. "Does each production worker have an active upskilling plan?" 3. "How fast does upskilling occur?" 4. "What data provides evidence that upskilling actually occurs?"
Phase 4 (cont.)	m.	Production quotas are fair?	Businesses aim for perfect performance and efficiency, but it is unethical for companies to compel workers to perform at unattainable levels. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "What performance factors determine production-level compensation?" 2. "How are workers paid?" (Piecemeal and time-based are common.) 3. "If there are performance quotas, are their metrics valid and unbiased, and are they based on reliable performance ratio data?"

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	m. (cont.)	Production quotas are fair? (cont.)	4. "How do 'off days,' such as those occurring when a worker has an illness or is dealing with stressful situations, get calculated into the performance quotas?" 5. "What is the employer doing to enable workers to perform at the targeted level?""What support is available for workers who want to improve their performance?" 6. "What support is available for workers who want to improve their performance? 7. "How are workers notified that their performance is unsatisfactory and will lead to disciplinary actions aimed at improving performance or ending the worker's employment if not improved?" 8. "How are employees notified of their termination?" 9. "What compensation and benefits are provided to terminated employees, and for how long?" 10. "Is termination compensation equal across all employee levels, or are some given 'golden parachutes'?"
Phase 4	n.	Is compensation equitable?	Equitable compensation is ethical compensation. Consider these aspects of ethical and equitable compensation: De-skilling SOPs and jobs can help accelerate product development change by making SOPs and jobs easier to perform. De-skilled work is also easier to monitor, analyze, and continuously improve, but it doesn't help workers gain the new skills they'll need for future jobs.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	n. (cont.)	Is compensation equitable? (cont.)	It is unethical for businesses to underpay workers or fail to pay a living wage for any reason. 1. It is unethical to use central tendency or other biases to overpay poor performers while underpaying outstanding performers. 2. It is unethical to overcompensate executives and shareholders while undercompensating front-line workers. 3. It is unethical to use five or just one standard deviation in performance reviews. Standard deviations represent naturally occurring events, and there's nothing natural about employing workers. For example, The number of workers in each standard deviation would be around 5 - 15 - 60 - 15 - 5. If the business screens out all but the best of the random 100 people interviewed, then it could be argued that performance reviews would be based on just three standard deviations. If employers hired poor workers but later terminated them, they might only use two standard deviations for performance review. However, evaluating performance using only five or one standard deviation is unethical, as it is statistically impossible for all workers to consistently perform in the top standard deviation; additionally, the interview process likely eliminated the lowest 20% of applicants, which effectively removes the bottom one or two rating categories.

PHASE	STEP	TASK	DESCRIPTION
Phase (cont.)	n. (cont.)	Is compensation equitable? (cont.)	Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Is there a 10x or greater difference in pay between the highest-paid employee and the lowest-paid employee?” 2. “Is there a profit-sharing plan for each employee that ties compensation to business profit?” 3. “Are some workers compensated significantly more than others in the same role with little to no valid, unbiased, or reliable data to justify the difference?” 4. “Are any job descriptions written with unrealistic keywords, such as those with lower educational requirements than are realistic and thereby pay lower compensation?” 5. “Does performance-based compensation form a central tendency curve or any curve other than the natural curve when aggregated? 6. “Are there or have there been compensation complaints lodged with HR or management or lawsuits filed?”
Phase 4 (cont.)	o.	Are job descriptions correct?	Work/jobs/tasks must be properly classified. This is especially important when using automated compensation calculators. Improperly classified work can lead to lower, unfair wages. Misclassification can negatively impact pay rates, efficiency expectations, and quality standards. wages. Misclassifying jobs to reduce worker compensation is unethical.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	o.	Are job descriptions correct?	Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Do job descriptions accurately list the responsibilities for each position?” 2. “Are leaders expected to perform management tasks?” 3. “Are managers expected to perform production tasks?” 4. “Are production workers expected to manage other production workers?” 5. “Are the skills listed in job descriptions accurate for each position?” 6. “What data was used to create the job descriptions?” 7. “Have the job descriptions changed over the past year? Three years? Five years?”
Phase 4 (cont.)	p.	Is worker privacy ensured?	Covert, excessive, or unnecessary worker surveillance is unethical. This includes holding workers to such strict start and end work times and break times that they must devote some of their time to the business just to avoid being out of compliance. It also includes banning personal phones and monitoring personal communications, financial transactions, and most other private activities that have no impact on worker performance. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “What is the scope of worker surveillance?” 2. “Does the surveillance scope exceed what’s necessary and sufficient?” 3. “How is surveillance data used?”

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	p. (cont.)	Is worker privacy ensured? (cont.)	4. “How is the data stored, for how long, and how is it safely destroyed after exceeding its usefulness?” 5. “How is surveillance disposed of after its usefulness expires?” 6. “Do workers have access to the surveillance data?” 7. “Are all surveillance activities valid, applied without bias, and focused on performance ratio data?” 8. “Are workers given the right to appeal findings based on surveillance data?” 9. “How many employees have been reprimanded for tardiness?” 10. “Are tardiness incidents randomly occurring across the entire business, or do they tend to happen more in certain locations?”
Phase 4 (cont.)	q.	Is worker safety ensured?	It is unethical to require workers to work unsafely. Without adequate controls, workers may be compelled to execute Standard Operating Procedures (SOPs) at an unachievable pace, potentially leading to their fatigue and personal injury. Workers cannot ethically or legally be required or allowed to work without personal protective equipment (PPE), to operate defective equipment, or to otherwise work unsafely.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	q.	Is worker safety ensured? (cont.)	Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Does the business require workers to follow all safety rules?” 2. “Does the business provide clean PPE to workers?” 3. “Is the business operating under a court-imposed consent decree?” 4. “How many consent decrees have been imposed on the business in recent times?” 5. “What is the business’s safety and accident record?”
Phase 4 (cont.)	r.	Is data transparently shared?	It is unethical for businesses to collect worker data, including the time they spend on process steps and their continuous improvement feedback, without meaningfully sharing that data with the targeted workers. “Meaningfully sharing” suggests that surveillance data should be shared with workers so they can analyze their performance, self-identify performance improvement opportunities by anonymously comparing their performance with that of their peers, and individually take control of their personal performance and/or request support from others. Workers must have on-demand access to their performance data so they can track their performance, improve their performance, prevent performance review

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	r. (cont.)	Is data transparently shared? (cont.)	surprises, and keep evaluations honest. When democratizing performance data, care should be taken to protect the privacy of other workers through data aggregation and anonymization. To anonymize data while making it accessible to all workers, worker names can be replaced with avatars and made available to those with a “need to know” via system roles and logins. For example, workers should only see other workers represented as avatars and only when the number of workers is high enough to prevent identification through the process of elimination. Supervisors should only see the real names of their direct reports. Administrators should be able to see all real names or avatars, whichever they choose. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Is worker performance data made available anonymously to all who need to access it?” 2. “How are personal performance data secured while providing democratized and anonymized access?”
Phase 4 (cont.)	s.	Fully disclose all surveillance methods	Surveillance of employees without their consent is unethical. Workers must be told when and where surveillance is in use, and surveillance equipment needs to clearly signal when it’s active.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	s. (cont.)	Fully disclose all surveillance methods (cont.)	To do this: 1. “Ask, how many consent decrees have been imposed on the business?” 2. Inform workers of monitoring methods and notify them when their performance is under review. Secure written authorization from workers to implement surveillance techniques. 1. Use lights, sounds, vibrations, pop-up text, and other methods to indicate when devices are capturing worker data. Note: Most modern devices, including cellular phones, earphones, microphones, IA, AIA, web browsers, etc., have these indicators built in.
Phase 4 (cont.)	t.	Create upskilling capability	It is unethical for businesses to allow workers to leave a job without gaining new skills. To upskill workers: 1. Collaboratively create an upward mobility plan for each worker and ensure their commitment to this personal development plan. 2. Create a new skill acquisition plan and schedule for each worker. 3. Use AIA or similar technology to track new skill acquisition and performance quality. 4. Immediately begin new skill acquisition after workers prove their mastery of a prerequisite skill.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	u.	Set realistic production quotas	A quota is a performance outcome that must be met, and the only viable performance expectation is for workers to 'do their best.' Setting realistic production quotas requires a good understanding of what performance levels are achievable and a benchmark to compare actual performance with. Quotas are set to represent the highest anticipated performance outcome of individual workers relative to the work system's capacity and an individual worker's capabilities. Consider these points when setting performance quotas: 1. Use VURPD to build realistic production quotas based on the standard deviation target performance falls within, individual worker capabilities, and 'stretch' incentives that provide financial rewards to workers who improve their performance. 2. Set the criteria for high, medium, and low performance quotas. 3. Use a daemon to continuously and automatically measure worker performance at the lowest possible granularity. 4. Sort performance results into standard deviations to establish a mean performance interval or median for each SOP and SOP step to compare each worker's performance with. After establishing ethical quotas, 1. When a worker's performance continually exceeds the highest quota, continue paying incentives, or their performance could decline.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	u. (cont.)	Set realistic production quotas (cont.)	2. Monitor performance to ensure objectives are attainable in the time provided. 3. At the end of a performance review period, adjust the quotas if/when they are unattainable or too easily attained by most of the workers.
Phase 4 (cont.)	v.	Create fair compensation plans	It is unethical for businesses to underpay any worker for any reason. To ensure fair compensation: 1. Reduce the pay gap between the business's highest- and lowest-paid workers. 2. Ensure contractor wages reflect the risks of being self-employed, the cost of benefits otherwise provided by an employer, and the value of the contractor's input to the business. 3. Offer a profit-sharing plan that shares the business's financial success or losses. This plan should accurately reflect the business's health by increasing during profitable years and decreasing during unprofitable years.
Phase 4 (cont.)	w.	Correct the job descriptions	It is unethical to misclassify jobs and tasks for the purpose of lowering labor costs. Workers deserve to be paid a fair, living wage. Solutions include ensuring: 1. Job descriptions accurately list the responsibilities associated with each position. 2. Leaders do not rely on their management skills. 3. Managers do not rely on their production skills.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	w. (cont.)	Correct the job descriptions (cont.)	4. Production workers perform fewer uncompensated management tasks than compensated production tasks. 5. Temporary assignments fit the legal description of temporary work and are compensated at the level matching the temporary job's requirements. 6. Only VURPRD is used to determine how tasks and compensation are assigned to jobs. 7. Compensation is up-to-date and competitive across the industry and region they're paid within and free of bias. 8. Gifts, tips, and other discretionary compensation are paid in addition to base compensation.
Phase 4 (cont.)	x.	Build worker privacy features	It is unethical for businesses to share private information about workers without the worker's prior written consent. An easy way to share performance data and maintain worker privacy is to aggregate the data and anonymize the individual worker identifiers using avatars or other means. Actions to take may include: 1. Providing secure performance database access to all who have a legitimate need to use it. 2. Using avatars ensures workers know which data is theirs while keeping it anonymous to others. 3. Aggregating data to allow its sharing without exposing the real names of workers.
Phase 4 (cont.)	y.	Revise solution to ensure worker safety	It is unethical to require workers to perform dangerous jobs without providing PPE.

PHASE	STEP	TASK	DESCRIPTION
Phase 4 (cont.)	y. (cont.)	Revise solution to ensure worker safety (cont.)	To accomplish this, 1. Do not allow workers to perform dangerous jobs without support or PPE. 2. Be sure performance standards and quotas are always attainable by all workers to whom they're assigned. 3. Revise SOPs and jobs if/when injuries occur, when property is damaged, and when near misses occur in either situation.
Phase 4 (cont.)	z.	Democratize and anonymize all data & reports	Democratizing performance data and reports enables workers to take responsibility for their performance and keeps managers honest when evaluating performance and calculating compensation. Anonymizing performance data and reports allows workers to access sensitive data without exposing individual worker identities. To do this: 1. Aggregate collected performance data, then sort and display it across five standard deviations. 2. Create a process that allows workers to access their personal performance ratio data via an anonymous identity that can only be revealed to themselves, system administrators, and immediate supervisors. 3. Use avatars to represent workers while protecting their identities.

PHASE	STEP	TASK	DESCRIPTION
Phase 5		Forecast intervention's break-even date and ROI	Forecasting a break-even date and ROI ensures that the issue(s) and intervention(s) under analysis justify the resources under consideration for investment. It also prevents additional work from being performed when building a solution that will not pay off.
Phase 5 (cont.)		Forecast intervention's break-even date and ROI (cont.)	Questions analysts must ask or AI algorithms must be programmed to answer include: 1. "What is the break-even date for this prospective intervention?" 2. "What is the expected ROI for this prospective intervention?" 3. "Will the intervention be delivered in time to address the identified need(s)?"
Phase 5 (cont.)	a.	Use VURPD to set benchmarks	Gather key performance ratio data, cycle times, and defects before selecting a solution; gather the same data after the solution has been implemented; and then use the difference over time to calculate the break-even date and return on investment. Note: Sometimes the easiest data to capture and compare financially are cycle times and errors.
Phase 5 (cont.)	b.	Calculate ROI: Net income / Costs * 100	Use VURPRD to calculate the ROI on interventions. The formula is Net income/ Costs*100

PHASE	STEP	TASK	DESCRIPTION
Phase 5 (cont.)	c.	Does ROI predict or exceed hurdle?	Nobody wants to finish or pay for an intervention that has no chance of improving profitability. So, before choosing any profit growth intervention, a needs analysis must present an estimated break-even date and ROI for every option. If an ROI can't be projected during the needs analysis, the project may waste resources. The logical intervention choices are those with the shortest break-even periods and the greatest profit potential. However, there are times when investing in an intervention must favor those with longer break-even periods, such as when old technologies need to be replaced, albeit the profit potential must continue to be ranked with all other prospective interventions. We must make exceptions to the break-even and ROI rules when those situations arise. 1. "In rank order, what are the best options for growing sustainable profit?" 2. "How long will it take to implement each prospective solution?" 3. "How much will each opportunity cost?" 4. "What are the pros and cons of each option?" 5. "What are the risks and issues associated with each con?" 6. "What is the probability of each risk happening?" 7. "What is the severity of each risk if it happened?" 8. "How long will it take for the intervention to break even?" 9. "What is the expected ROI of the prospective intervention, and how long will it take to achieve?" 10. "How does the investment compare to alternatives?"

PHASE	STEP	TASK	DESCRIPTION
Phase 5 (cont.)	c. (cont.)	Does ROI predict or exceed hurdle? (cont.)	11. “Is there a technological or other priority investment that projects a longer break-even date but promises a greater long-term ROI?”
Phase 5 (cont.)	d.	Executive override?	Whether performed manually or automatically, needs analysis follows the ADDIE process, with Analysis being the first step. Manually performed needs analysis is supposed to begin with a request for a needs analysis, but more often than not, it begins with an executive’s demand for a specific solution, like training. An AI-driven needs analysis doesn’t require a request, as the AI operates as a daemon, constantly evaluating worker and work system needs, prioritizing them by break-even date and ROI, until it’s instructed to stop. It’s important for the needs analyst(s) to understand the source and type of request. When an executive rejects a needs analysis or insists upon a specific intervention like training, then needs analysts must be sure to document the decision and make clear that the decision-maker will take responsibility and accountability for the intervention’s outcome. This step should be removed after ANAM is automated and able to continuously analyze performance and recommend profit improvement opportunities without human interference.

PHASE	STEP	TASK	DESCRIPTION
Phase 5 (cont.)	e.	Abandon initiative	If a) VURPRD cannot project a break-even point or ROI for an executive-requested intervention, or b) the executive who requested the initiative will not continue supporting the requested initiative, or c) the projected ROI of the prospective solution fails to meet the investment hurdle for long-term investments, then the issue is not a priority and should be abandoned.
Phase 5 (cont.)	e.	Abandon initiative (cont.)	This step is executed automatically after implementing an AI-driven needs analysis process; however, certain powerful executives might continue trying to override the system. Should certain executives repeatedly override the system, a high-level inquiry should investigate the reasons behind this.
Phase 6	a.	Get approval of the analysis	Upon completing the analysis, either manually or present the recommendations, including the projected break-even dates and ROI for executive approval. If the analysis was completed automatically, then present the list of prospective needs and recommended solutions to an executive for final selection and project creation.

PHASE	STEP	TASK	DESCRIPTION
Phase 6 (cont.)	b.	Was it approved?	The analysis and intervention selection require separate approvals either via a responsible manager or leader or via the AI algorithms. Questions analysts must ask or AI algorithms must be programmed to answer include: 1. “Has the needs analysis been wholly or partially approved?” 2. If the analysis has not been fully approved, then ask, “What part(s) of the needs analysis require more attention?” 3. “Has the recommended intervention been fully or partially approved?” Because interventions can include needed changes to the work and/or work system, they may be partly approved. For example, the need may be confirmed and agreed upon by management and
Phase 6 (cont.)	b.	Was it approved?	leadership, and the work system changes may be agreed upon, but the worker system may not be approved. In these cases ask, “What part(s) of the analysis or recommended intervention have been approved, and which have not been approved?”
Phase 6 (cont.)	c.	Pass analysis to designers	After the analysis and recommendation(s) have been approved, pass both to professionals who are responsible and accountable for designing the intervention(s).

PHASE	STEP	TASK	DESCRIPTION
Phase 6 (cont.)	d.	Revise analysis as necessary	Revise the analysis as advised by the approving executives.
Phase 6 (cont.)	e.	Return to 1a	This round of needs analysis is finished. When performed via AI, the system will recycle to continue analyzing structures and solutions, whereas a manually performed needs analysis would wait for a new request. By using a daemon approach to needs analysis, an AI-driven needs analysis system operates far more efficiently and at lower costs over time than a manual system. This is especially true when certain decision-makers are made redundant and removed from highly paid decision-making roles.

Notes

1. https://www.marketone.com/articles/silos-stifling-growth-revenue-opportunity-b2b-enterprise-companies-solution

2. Barrett, B. W. and H. (2025, May 14). 2% of CHROs think their Performance Management System Works. Gallup.com.

3. https://www.gallup.com/workplace/644717/chros-think-performance-management-system-works.aspx#:~:text=Employees%20tend%20to%20share%20this,fair%20or%20inspire%20better%20performance.

4. https://www.isfet.org/pages/addie-model

5. https://asq.org/quality-resources/dmaic

6. Media, B. D. (2020, November 1). 2020: End of the information age and beginning of the age of IOT. Medium. https://medium.com/@boundless_ke/2020-end-of-the-information-age-and-beginning-of-the- age-of-iot-67023adcc348

7. EU Regulation Baker McKenzie. (2023, December 13). EU reaches agreement on Landmark AI Regulation: Insight. EU Reaches Agreement on Landmark AI Regulation.

8. Banathy, B. (1968). Instructional Systems. Palo Alto, California: Fearon Publishers.

9. Senge, P. M. (1990). Fifth discipline. Doubleday Business.

10. https://www.forbes.com/sites/jacobmorgan/2015/07/15/the-5-types-of-organizational-structures-part-4-flatarchies/?sh=7a2445ac6707

11. Hanner, C. (2022, October 10). A brief history of union-busting. Unit Guide. https://guide.unitworkers.com/a-brief-history-of-union-busting/

12. Vilbert, J. (2024, February 6). Technology creates more jobs than it destroys. Foundation for Economic Education. https://bit.ly/4cVuhJo

Notes (cont.)

13. Legal Information Institute. (2020, December 1). Right to work state. Legal Information Institute. https://www.law.cornell.edu/wex/right_to_work_state

14. Artz, M. (2023, October 31). The Impact of Janus on the Labor Movement, Five Years Later. https://www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/labor-and-employment-rights/impact-of-janus-on-the-labor-movement/

15. ingleton, L. (2023, January 25). Gap between rich and poor has increased more quickly in the US than in Europe: Imperial News: Imperial College London. Imperial News. https://www.imperial.ac.uk/

16. Langley, K. (2023, May 9). The growth of employment in the face of Technology, protests, fear, uncertainty, and doubt. ExO Insight.

17. Dills, C. R., & Romiszowski, A. J. (1997). Instructional development paradigms. Educational Technology Publ.

18. Greenhouse, S. (2024, February 29). We must start preparing the US workforce for the effects of ai – now | Steven Greenhouse. The Guardian. https://www.theguardian.com/commentisfree/2024/feb/29/ai-workers-layoffs-surveillance

19. Coombs, C. (2019, August 9). How Amazon stacks the deck against workers fighting to keep their jobs. The Daily Beast. https://www.thedailybeast.com/how-amazons-performance-reviews-are-stacked-against-workers

20. Alphabet's Waymo lays off more employees, third time this year. The Economic Times. (2023, October 18). https://economictimes.indiatimes.com/tech/technology/alphabets-waymo-lays-off-more-employees-third-time-this-year/articleshow/104514932.cms?from=mdr

Notes (cont.)

21. USPTO. (n.d.). U.S. Patent Statistics Chart Calendar Years 1963 - 2020. U.S. Patent Statistics Summary Table, Calendar Years 1963 to 2020, 05/2021 update. https://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm

22. Nyaga, C. (2020, November 1). 2020: End of the information age and beginning of the age of IOT. Medium. https://medium.com/@boundless_ke/2020-end-of-the-information-age-and-beginning-of-the-age-of-iot-67023adcc348

23. Center for Health, Environment & Justice. (2024, May 6). Love canal. The Center for Health, Environment & Justice. https://bit.ly/3R-WZzr2

24. Schneirov, R. (n.d.). The pullman strike. Northern Illinois University Digital Library. https://digital.lib.niu.edu/illinois/gildedage/pullman

25. Verlinden, N. (2024, May 13). 9 ways to avoid adverse impact in your HR practices. AIHR. https://www.aihr.com/blog/adverse-impact/

26. Rosenthal, R., & Jacobson, L. (1968). Pygmalion in the classroom: Teacher expectation and pupils' intellectual development. Holt, Rinehart and Winston.

27. Eden, D. (1992). Leadership and expectations: Pygmalion effects and other self-fulfilling prophecies in organizations. The Leadership Quarterly, 3(4), 271–305. https://doi.org/10.1016/1048-9843(92)90018-b

28. Dodge, Y. (2010). The concise encyclopedia of statistics (2010th ed.). Springer.

29. American Psychological Association. (2018, April 19). Apa Dictionary of Psychology. American Psychological Association. https://dictionary.apa.org/validity

Notes (cont.)

30. Dowsett, C. (2018, April 9). It's time to talk about organizational bias in Data use. Medium. https://towardsdatascience.com/lets-talk-about-organizational-bias-in-data-use-92ba83bb2c59

31. Dowsett, C. (2018, April 9). It's time to talk about organizational bias in Data use. Medium. https://towardsdatascience.com/lets-talk-about-organizational-bias-in-data-use-92ba83bb2c59

32. McRaney, D. (2012, March 27). Maslow's Hammer. Psychology Today. https://www.psychologytoday.com/us/blog/you-are-not-so-smart/201203/maslows-hammer

33. Wiki, C. to P. (n.d.). Emotional bias. Psychology Wiki. https://psychology.fandom.com/wiki/Emotional_bias

34. Hiter, S. (2023, October 25). Types of performance review biases & how to spot them. TechnologyAdvice. https://technologyadvice.com/blog/human-resources/performance-review-biases/

35. Gleeson, B. (2022, October 12). The silo mentality: How to break down the barriers. Forbes. https://www.forbes.com/sites/brentgleeson/2013/10/02/the-silo-mentality-how-to-break-down-the-barriers/?sh=52ee79b58c7e

36. Ebbinghaus, H. (1964). Memory: A contribution to experimental psychology. Dover Publications.

37. PDCA (Plan Do Check Act). MindTools. (n.d.). https://www.mindtools.com/as2l5i1/pdca-plan-do-check-act

38. American Society of Quality. (n.d.). Six sigma definition - what is Lean Six Sigma? | ASQ. https://asq.org/quality-resources/six-sigma

39. Bouchrika, I. (n.d.). The ADDIE model explained: Evolution, steps, and applications | research.com. The ADDIE Model Explained: Evolution, Steps, and Applications in 2024. https://research.com/education/the-addie-model

Notes (cont.)

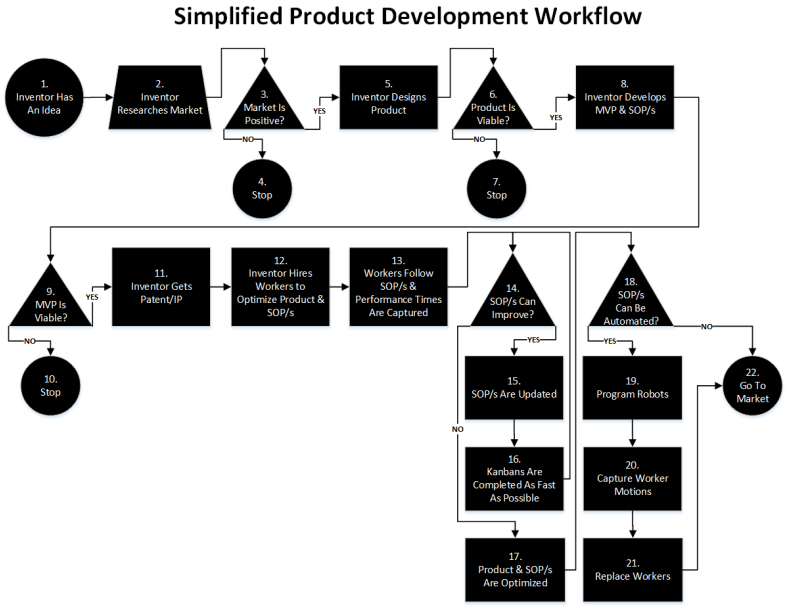
40. Climate change is costing the world $16 million per hour: Study. World Economic Forum. (2023, October 23). https://www.weforum.org/agenda/2023/10/climate-loss-and-damage-cost-16-million-per-hour/

41. Environmental Protection Agency. (2024, January 1). EPA. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

42. Watershed.com. (n.d.). Everything you need to know about carbon accounting. Watershed. https://bit.ly/4cEn1Ss

Appendices

Appendix A



Appendix B

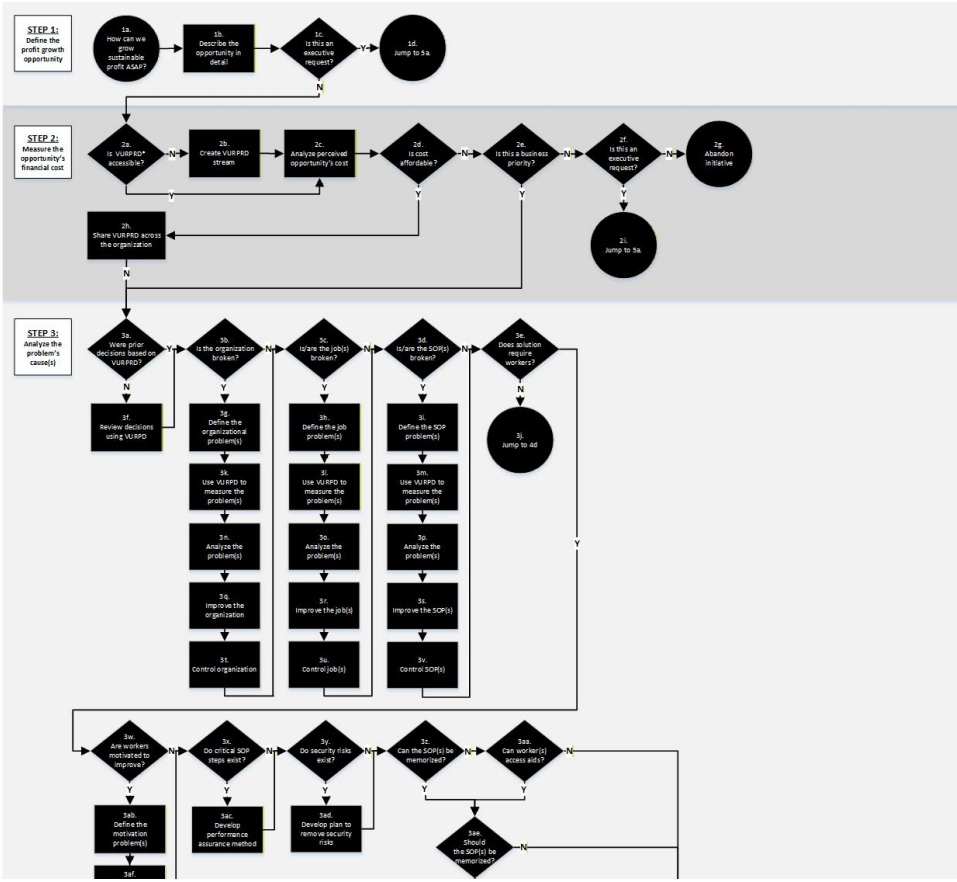
This is the ANAM flowchart.

Use this URL or the QR code below to access a printable version of the model:

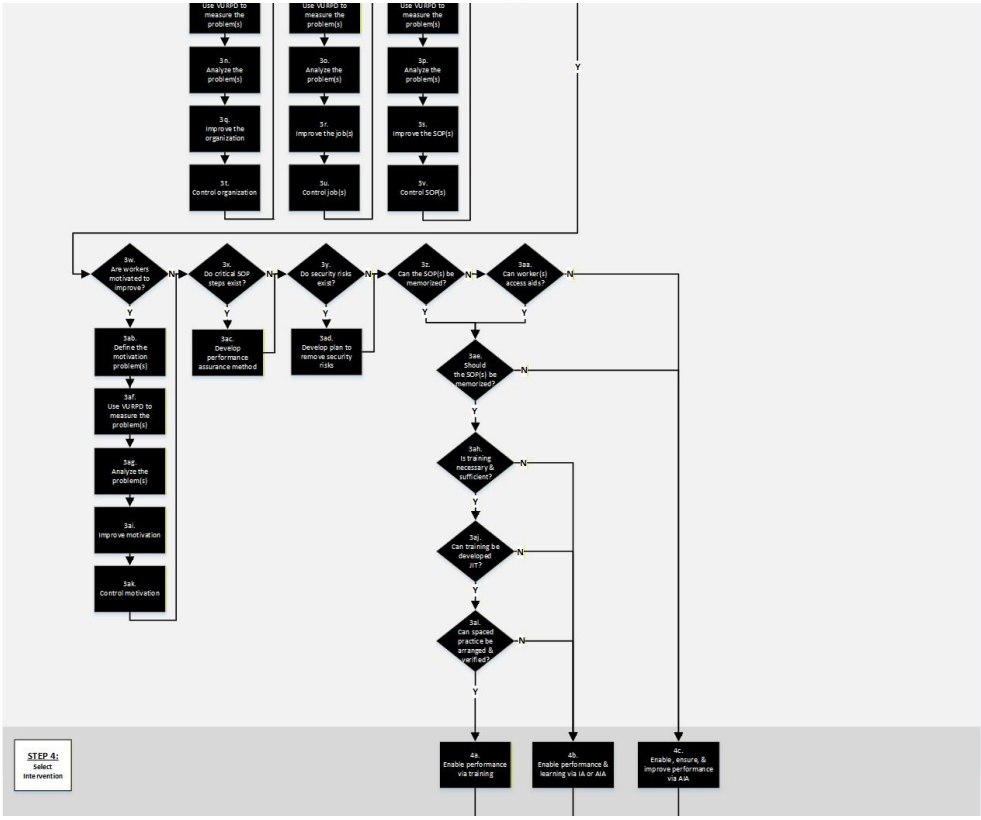
https://docs.adytonusa.com/ANAM01082026.jpg

SCAN ME

Adyton's Needs Analysis Model



Appendix B (cont.)



Glossary

There is great confusion, lack of consensus, and misunderstanding across important terms and concepts that are used in workplaces. This contributes to errors, higher costs and longer completion times when implementing changes. When examining the distinctions between the current and future states of needs analysis, it is essential to establish a common nomenclature. The following definitions apply to key terms and concepts used in this book.

Term	Description
Goal	A goal is a desired result. Every business worldwide has just 1 goal. It is to rapidly grow sustainable profit. Defining the single business goal is important because business functions, including training and learning, often set multiple goals based on the purpose of their function. For clarity, the goal of training is not training, marketing is not marketing, and sales is not sales. Businesses worldwide have just one goal, and it is to rapidly grow sustainable profit.

Term	Description
Standard	A standard refers to the minimum acceptable performance or quality to be achieved. With respect to worker performance, minimum standards commonly define the line between termination and continued employment, success, and failure. Ironically, minimum standards are communicated to workers in great detail and specificity, whereas maximum standards or excellence are rarely defined. When we communicate minimum standards but not excellence, it sends a message to workers that minimum standards hold greater importance than excellence. Determining excellence is far more crucial than defining the state and repercussions of failure when the objective is to quickly increase sustainable profit.
Expectation	An expectation is the strong belief that something will happen in the future. Businesses commonly use the term to describe minimum standards, but there is only one expectation that can lead to rapid, sustainable profit growth, and that is the expectation that workers will “do their best.” Instilling this expectation leads workers to believe that their best work will bring rewards they value, including higher compensation, greater upward mobility, and longer tenure with their employer.
Need	Something that is required to rapidly grow sustainable profit, conserve resources, or prevent losses is called a “need.” Needs may be related to the worker system, which only includes improved worker knowledge, skill, and attitude, or the work system, which encompasses work policies, equipment, materials, and everything not covered by the worker system.

Term	Description
Perfect Performance	Perfect performance is performance without error. It's applied as a performance benchmark to both the worker and work systems across all workers, technologies, policies, equipment, supplies, etc. It is important to differentiate perfect performance from performance expectations. Perfection is always objective and always 100% of what is being measured. On the other hand, expectations are always subjective and may be any amount of something. For example, a drill press may operate perfectly over decades, while a worker may commit zero errors one day, 25 the next, and 100 errors at the end of some weeks. Which would you use to gauge an employee's performance: the consistency of perfection or the constantly fluctuating average of their mistakes? With respect to the Pygmalion Effect, which would motivate workers to do their best? Worker performance needs a benchmark to measure future performance against, and that benchmark must be an objective, not subjective, number. Therefore, perfect performance is the proper benchmark for measuring both the work and worker system performance.
KSA	KSA refers to knowledge, skill, and attitude. KSA encompasses the worker system and is the target and scope of all traditional training and learning programs. KSA is part of the worker system.
Training	Training refers to the process of short-term memorization. Short-term memory is proven by scores from tests administered before the first hour after training passes. The objective of training is to facilitate short-term memorization; therefore, training should be considered a short-term "performance enabler." Short-term memorization only enables workers to perform the tasks they were trained on for short periods of time after training, which is generally not long enough to enable workers to perform newly trained tasks while on the job.

Term	Description
Learning	Learning is a process that facilitates the memorization, recall, and flawless execution of assigned tasks without assistance or support while on the job. Learning requires long-term memorization and is truly a “performance enabler.” Long-term memorization can enable workers to perform the tasks as they were trained so long as nothing changes in the work environment; however, learning cannot ensure workers perform as they were trained, and it can’t continuously improve performance without an additional intervention.
Performing	Performing is when workers and work systems combine to accomplish tasks that result in flawless products or services.
Performance	Performance is the outcome of successfully completing a task. Performance is typically measured using ratio data, including total SOP completions, costs, cycle times, waste, and errors across both work and worker systems.
Training Organization	The training organization is a work group that bears the responsibility and accountability for training and short-term memorization. Training organizations measure their success using data from surveys, Likert scales, and scores from tests administered before the first hour after training interventions end. Training organizations typically do not provide the practice required for long-term memorization or learning, nor do they measure post-training performance beyond the first hour after training concludes. For those reasons, training can’t contribute much, if anything, to a business’s goal of rapidly growing sustainable profit.

Term	Description
Learning Organization	The learning organization is a work group that takes on the responsibility and accountability for workers' long-term memorization, including their flawless recall and flawless execution of assigned tasks while on the job, without any support or assistance. Learning organizations provide the practice required to convert short-term memorization to long-term memorization. Learning organizations measure their value using mathematical calculations that compare pre-learning performance with post-learning performance, including cycle time reduction, error reduction, return on investment, break-even date, and the growth of sustainable profit.
Performance Organization	Performance organizations (PO) are work groups that assume the responsibility and accountability for all needs analysis and project management within a company. The PO's goal is to rapidly grow sustainable profit through performance enablement, performance ensurance, and continuous performance improvement. The PO is a merger of multiple traditional business units, including TL, industrial engineering, organizational development, etc. Performance organizations are measured by the break-even dates and ROI of the interventions they manage. Note: Business organization structures will flatten by reducing the number of their decision-makers. Many of the legacy managers, directors, and CXOs will be transferred and report to the PO and fulfill the PO's performance ensurance responsibility. Job titles will include needs analyst, project manager, industrial engineer, organizational development specialist, and frontline supervisor. They'll lead PO initiatives, which are projects focused on performance enablement, ensurance, and continuous improvement.

Term	Description
Performance Enablement	Performance enablement is anything that enables the flawless execution of an SOP. It may vary depending on the SOP and worker ability. It may include coaching, training, learning, IA, AIA, videos, audio, or any variety of support or aid made available to workers before, during, or as they perform their assigned tasks.
Continuous Performance Improvement	Continuous performance improvement means growing sustainable profit by constantly improving performance across both, the work and worker systems. Continuously reducing cycle times, improving quality, and reducing errors are key measures of continuous improvement.
Performance Ensurance	Ensuring every step of an SOP is performed perfectly as specified and correctly sequenced. Performance ensurance is measured by the quality and quantity of the services and products delivered while on the job. Human supervision is a performance ensurance method, albeit a weak one, largely due to supervisor unavailability, the high cost of providing constant human supervision, and human bias. Businesses can ensure performance by a) Delivering SOPs to workers step-by-step, in the same sequence every time, as they work; b) Comparing the amount of time workers spend on each process step with the minimum amount of time expected to be spent or the mean performance interval; and c) Operating as people work to allow error correction in near real-time.

Term	Description
Responsible	Being responsible means ensuring tasks are completed. Trainers are responsible for delivering training and enabling short-term memorization. Operations managers are typically responsible for ensuring workers perfectly perform assigned tasks without support or aid while on the job. The responsibility of learning belongs to those who ensure trainees receive the post-training practice and support they need to develop targeted KSA. For example, production workers are responsible for making perfect products and delivering perfect services. Operations managers are typically responsible for providing the practice and support workers need to memorize their assigned tasks. Training professionals are responsible for designing, developing, implementing, and evaluating training.
Accountable	Being accountable means ensuring the goal and objectives are met. Operations managers are generally accountable for providing the post-training practice learners need to learn SOPs when SOPs can be memorized. Operations managers are also accountable for perfectly built products and flawlessly delivered services. Training organizations are only accountable for training and short-term memorization.
SOP	A Standard Operating Procedure (SOP) is a step-by-step instruction used to make a product or deliver a service. SOPs are also referred to as processes, instructions, workflows, etc. Typically, best practices serve as the foundation for SOPs, which undergo continuous improvement until they reach optimal levels. SOPs are best considered as temporarily static and are measured by performance cycle times, errors, product or service quality, and worker and customer feedback.

Term	Description
Perfect Performance	Perfect performance is performance without error. It's applied as a performance benchmark to both the worker and work systems across all workers, technologies, policies, equipment, supplies, etc. It is important to differentiate perfect performance from performance expectations. Perfection is always objective and always 100% of what is being measured. On the other hand, expectations are always subjective and may be any amount of something. For example, a drill press may operate perfectly over decades, while a worker may commit zero errors one day, 25 the next, and 100 errors at the end of some weeks. Which would you use to gauge an employee's performance: the consistency of perfection or the constantly fluctuating average of their mistakes? With respect to the Pygmalion Effect, which would motivate workers to do their best? Worker performance needs a benchmark to measure future performance against, and that benchmark must be an objective, not subjective, number. Therefore, perfect performance is the proper benchmark for measuring both the work and worker system performance.
SOP	A Standard Operating Procedure (SOP) is a step-by-step instruction used to make a product or deliver a service. SOPs are also referred to as processes, instructions, workflows, etc. Typically, best practices serve as the foundation for SOPs, which undergo continuous improvement until they reach optimal levels. SOPs are best considered as temporarily static and are measured by performance cycle times, errors, product or service quality, and worker and customer feedback.
IA	Intelligence augmentation is a system that enhances human intelligence with little to no memorization, training, or learning. IA requires people and is typically launched with a question or command. Pocket calculators, internet searches, smart speakers, chatbots, digital coaches, job aids, etc. are all examples of IA.

Term	Description
AIA	Advanced intelligence augmentation is IA with the added ability of capturing the time workers spend on each process step they perform along with their continuous improvement feedback. The data captured by AIA systems is essential to needs analysis, including AI-driven needs analysis. AIA is the only way to gather accurate and fair performance data, making it a crucial component of any AI system, including those that analyze needs.
AI	Artificial intelligence is a computer program that is designed to mimic human decision-making. AI does not require human interaction; it launches automatically. It does not require a person or a question to be launched. AI is intended to grow sustainable business profit rapidly by replacing human decision-makers with computers that can make better decisions faster, cheaper, and without the bias, greed, and self-interest that taint decisions made by humans. The data exploited by AI limits the value of needs analysis.
AI	An artificial intelligence agent is computer software that uses AI to sense its surroundings, think, plan, and act to accomplish complicated AOPs. It frequently integrates various AI models and tools without continual human intervention, functioning as a stand-alone digital assistant.
Robotics	Robotics is a combination of AI and mechanical devices designed to mimic human decision-making and actions. Robots may operate autonomously, or they may require a human prompt, and they can often replace manual workers. The quality of AI data and the machinery it uses to mimic human actions limit the value of robotics.
Opportunity	This refers to the potential for developing a new way to rapidly grow sustainable profit. It could be a new business policy, equipment, worker KSA, etc.

Term	Description
Risk/Issue	Both refer to factors that may prevent or limit sustainable profit growth. An issue refers to a detrimental situation that has already occurred and requires resolution or mitigation. Every adverse event that could or will happen and needs to be resolved or mitigated is considered a risk.
Probability	The likelihood that something will happen. There's a 90% probability of rain tomorrow.
Willingness	There is a desire to take action. Example: She was willing to work late.
Ability	Ability refers to the innate or acquired knowledge, skill, and mindset necessary to accomplish a task. Example: He can assemble furniture
Motivation	The presence of the willingness and ability to do something; both are essential. Example: He knew how and wanted to assemble all of the furniture.
Capability	The potential of gaining the knowledge, skill, and attitude that's required to do something. Example: He had assembled similar types of furniture; therefore, he has the capability of assembling others.
AOP	An Agenting Operating Procedure (AOP) is a framework for AI agents, functioning similarly to Standard Operating Procedures (SOPs) for human employees. They combine the flexibility of natural language instructions with the precision of code to automate complex, multi-step workflows with minimal human intervention.
Intervention	The act of interfering with the outcome of a business condition or process so as to prevent harm or improve functioning.

Term	Description
Techno-societal Fragility	Techno-societal fragility refers to two important conditions. The first is the amount of change a society can manage before performance and output decline. The second is the delicate reliance of societies on technology. For instance, an electrical or internet blackout would severely impact societies that rely on those technologies for medical care, water, sewage, air travel, winter heating, vehicle fuel, etc.

Index

About the Author

William Crose has a bachelor's degree in education and a master's degree in instructional design, which he earned under professor and multiple lifetime achievement awardee Dr. Robert Brinkerhoff.

In addition to being a first-time author, Bill has over 30 years of experience leading, managing, and developing instructional systems across healthcare, hospitality, energy, retail, banking, and other industries. He holds multiple patents for learning technologies, created the world's smallest FCC-certified Wi-Fi earphone, and is the founder of Adyton, maker of the world's first hands-free, advanced intelligence augmentation (AIA) system that enables, ensures, and continuously improves performance, called Pythia.™