THE EVOLUTION OF PROCUREMENT AND SUPPLY MANAGEMENT TRANSFORMATIONS

REMOVING OBSTACLES TO SUCCESS

MELISSA DREW

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To my teenage daughters, Emma and Ava,
who support me in ways they may never understand

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FOREWORD

Procurement and supply management organizations are experiencing rapid change. Many of these changes are conducted through the ever-present *transformation project*. However, these projects failed 20 years ago, and now—20 years later—they are still failing. Most companies still chase the *shiny object* that seems easy on the surface but are not pausing long enough to ask the right questions. Companies are not taking time to plan for a flexible foundation, and everything stacked on top falls. This is supported by a 2023 McKinsey and Company report that 70 percent of digital transformations failed to reach their target, with root causes including inadequate leadership engagement, insufficient change management, poor planning, and not building the right capabilities.

Does doing the same things over and over again and expecting different results sound like the textbook definition of *insanity*? It should, and to resolve this, you need to dive into Melissa's book. From automation to sustainable sourcing to adaptable leadership, *The Evolution of Procurement and Supply Management Transformations* offers actionable strategies to help you navigate these transformations and drive long-term success. Melissa shows that regularly evaluating supplier performance, risk management, process efficiency, and stakeholder satisfaction provides transparency and fosters stronger collaboration across the organization. She promotes a different way of thinking and what questions to ask for success. It is a must-read for forward-thinking professionals looking to stay ahead and be fully informed in a constantly changing field.

Good luck on your transformation journey!

Mike Cadieux
Founder of Procurement Foundry and
Former Chief Procurement Officer

ABOUT THE AUTHOR

Melissa Drew is an international keynote speaker with over 30 years of data and digital transformation expertise. Her professional career has contributed to her breadth and depth of knowledge working in the private sector, with start-ups, and as a consultant with Kearney, Deloitte, and IBM. She focuses on how emerging technologies impact procurement and supply chain organizations. Ms. Drew was ranked #34 of the Top 100 Women in Supply Chain 2023, was named a Top 25 Global Consultant in 2021, and is a Top 50 Global Thought Leader and Influencer on Supply Chain 2024. She hosts the "Impact of AI and Data" podcast, interviewing procurement leaders worldwide about their perspectives on today, tomorrow, and beyond.

Melissa is a TEDX speaker who has been featured in AI Time Journal, Tech Exec Magazine, and various data and technology podcasts. Recently, she became the founder of the nonprofit organization, The AI Literate Citizen, with a mission to advance AI literacy for global citizens of all ages. Melissa is a guest lecturer at the Rutgers Business School Supply Chain Program on the topic of Emerging Technologies. When not writing or speaking, Ms. Drew mentors others, travels internationally, and tries to keep up with her twin teenage daughters. One of her most outstanding achievements is remaining cancer-free since October 2022.

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Downloads for *The Evolution of Procurement and Supply Management Transformations* include various articles and whitepapers, a policy checklist, and the United Nations 2030 Agenda for Sustainable Development.

CHAPTER 1

INTRODUCTION

This book covers content across many topics and processes within the procurement and supply chain organization and will not dive deep into one area or another. It is intended to:

- Promote a different way of thinking
- Identify what questions to ask
- Understand what is blocking success
- Question traditional methods and make way for the new

The procurement and supply chain organization aims to broaden its influence within the larger organization, create revenue-generating opportunities, and prioritize value. While there is an ongoing discourse about how future technologies can aid in achieving these objectives, it is crucial to recognize that the future is already upon us. The organization must learn to transform immediately and effectively. This book is designed to help identify the areas that are not functioning optimally and eliminate the obstacles that hinder the success of a procurement and supply management organization. After reading this book, the hope is that you will no longer view large-scale transformations as multi-year initiatives but as a continuous process.

When the proper foundation is in place, the organization should only perform minor adjustments when encountering future disruptions, both with positive and negative impacts. When the organization no longer focuses its energy and resources on rebuilding that foundation every few years, the procurement and supply chain team can step out of the crazy circles where it has been stuck. However, a thorough spring cleaning is needed before this can happen. This means removing the irrelevant "stuff" that has not been touched in over 30 years.

Transformation, in its simplest definition, is the ability to change from one state to another to end up in a better place than where you were before. A consensus view from many industry leaders is that a real transformation is a journey; not something that is done once but is a continuous effort. I agree with this up to a point. The statement can be and has been interpreted to mean that continuous transformations are occurring one after the other. A successful transformation should create a sustainable foundation to be leveraged against future disruptions. If you need to perform a second or third transformation project, the first one was not completed correctly. It may have been too narrowly focused or, in most scenarios, not a true transformation.

In the future, the organization will continue to encounter known and unknown disruptions. Some of these disruptions may be perceived as having a positive or negative impact. For this book, the definition of a disruption is *a permanent interruption to an industry or market's current direction*. Therefore, the effect of a disruption will require a permanent change to an organization's strategic direction, goals, and processes. These disruptions are expected to happen more frequently in the future, which is why organizations must be alert and adjust more often.

The organization should not be required to perform multiple, comprehensive transformations whenever a disruption occurs. The ability to adapt more often may be the critical variable that allows for future successes such as strengthening competitive advantage, improving brand loyalty, gaining market share, developing new revenue streams, and creating value. Considering automation during a transformation will reduce the need for rework later, and right-sizing the organization will support a solid but flexible foundation that allows for smaller adjustments when needed.

WHAT IS A DIGITAL TRANSFORMATION?

The term *digital transformation* is used with meaningful purpose. It is the ability to use technology to support transformation goals and yield more robust results. Transforming through digital technologies or moving

information into a digital footprint (digitalization) is also changing how we consume information. How that information is used significantly changes how we interact with internal and external stakeholders. For example, this can lead to reevaluating the current business model to better innovate or create more product variety.

One may say, "That is what the enterprise resource planning (ERP) applications were meant to provide, right?" ERP did shift information into a digital format, but it also created limitations that were not initially expected. It could not generate the desired significance across the entire organization compared to what can be achieved now. ERP is still necessary in a modern organization; however, with the accessibility and adoption of a wider variety of technologies across the enterprise, we can achieve much more significant results faster and with higher confidence.

Since 2005, there have been three main motivators for digital transformations within the procurement and supply management organization: technological changes, shifts in consumer demand, and the COVID pandemic. These external forces caused a reactive response from executive leadership and were used as leverage to build an internal case for transformation. However, the funds for these transformations were short lived because the leverage used in the business case was based on a short-term need rather than a strategic need.

This is a contributing factor to why organizations feel the need to start transformation projects repeatedly and why the term *transformation* has become generalized over the last decade. More recently, this term has been used to reference any project that benefits one or more departments in the short term but rarely features long-term, organization-wide sustainable results. Since 2005, in my experience, very few companies have successfully transformed their organization with a comprehensive overhaul of processes while leveraging technologies for automation that result in a data-driven, cultural, and improved stakeholder experience. When following up with those firms years later, they had completed their comprehensive transformation just once. They made additional adjustments as they reacted to changes in corporate strategies or changes to match consumer demand. Still, those adjustments were minor and could be accomplished in six months or less. These organizations were able to

jump forward in capturing market share, sustaining brand loyalty, and adjusting more quickly when needed.

> If you are doing a second, third, or fourth transformation project, the first one was not done properly.

Around 2007–2008, there was an awareness and desire within the procurement and supply chain organization to shift from on-premise technology architecture (also known as behind the firewall) to cloud technology architecture. Skepticism of cloud technologies and the cost of migrating from an on-premise architecture to a cloud-based solution delayed most companies from immediately adopting these new technologies. Additional concerns included a lack of comfort in pushing organizational data outside the organization and the uncertainty of the security of that data in the cloud. A few companies, labeling themselves as *the bleeding edge*, were comfortable exploring emerging technologies that had not been proven yet. It was these companies who helped pave the way for everyone else.

The first substantial wave of projects started to emerge around 2010. At this time, some organizations at the top percent of the technology adoption bell curve saw themselves as early adopters. Their decisions were motivated by a return on investment, calculated by comparing the cost of development and maintaining technology infrastructures against the financial advantages of cloud-based applications.

At the same time, as software application providers were also shifting to the cloud, the definition of an application developer was slowly replaced with the phrase *configuration*. Configuration could be supported by a business user who could make small changes to the application themselves without the need for information technology (IT) resources or resources from the supplier. Full-time developers with application-specific knowledge were no longer required by the organization's IT department to implement or maintain cloud-based applications. Another financial advantage was that application providers could push updates directly into the application multiple times yearly. This benefit

allowed organizations to match consumer demand in nearly real time instead of waiting one to two years for the IT organization to make similar enhancements.

The second substantial wave was between 2015 and 2017. During this time, there was more accessibility of information combined with increased consumer awareness. This combination created a more educated consumer who wanted to understand the organization's supply chain and procurement practices and what impact this had on them. One example of more accessible information was in 2016 when the U.S. Food and Drug Administration (FDA) updated the nutrition facts label. This was the first significant change to the label since it was introduced in 1994. Consumers now had more visibility into food and beverage ingredients and could start making better decisions about which products they wanted to consume. This had an immediate and sometimes profound impact on sales and profits. As consumer buying behavior changed more frequently, the procurement and supply chain organizations needed to adapt more quickly. Consumer behavior may have been a catalyst for change, but other factors during this time contributed to this second wave of digital transformation:

- **Organizational change in priority:** Although the business case of moving from on-premise to the cloud had been discussed for the prior five years, most organizations were not prepared to devote resources, time, and funding until now.
- **Shift in procurement's value:** Executive leaders were becoming more aware of how the procurement organization could directly impact other parts of the organization and how procurement-driven savings could be reallocated in different company areas. One example was reallocating savings to the marketing department to support a C-suite initiative to rebrand globally. The additional funds were used to create new branding and messaging television commercials.
- **Technology improvements:** Cloud-based applications now included automation across the supplier life cycle, including more data connectivity between sourcing and contracts and visibility into spending. Software applications were improved with an

end-to-end view of process automation through a unified and integrated suite of applications. This connected the awarded suppliers with a contract for the requisitions and invoicing modules. The integrated suite was vital for some companies when moving to cloud-based applications.

- **Technology confidence:** Cloud-based technologies had been mainstream for around seven years. As more organizations shifted to the cloud, the confidence to use cloud-based applications increased. Executive leaders had more confidence that the technology would and could deliver.
- **Technology competition:** The market now had more application providers from which to choose. The increase in competition naturally reduced application licensing costs and spurred the development of features and capabilities to differentiate between one application company and another.

The transformation wave in 2010 focused on procurement automation; then in 2015, the focus was on procurement optimization. The integrated suite's benefits included improved visibility in spending and controls, increased savings opportunities, and process efficiencies. The average time frame for global transformation initiatives was 18 to 24 months, and fees ranged between $3 and $5 million U.S. dollars.

The third wave began around 2021 to 2022, focusing on procurement intelligence with more value-based results. Examples of these results were higher confidence in data-driven decisions, automating tail-end tactical processes, and self-service capabilities. This third wave combined the negative impacts of COVID-related supply chain delays with technology advancements. Companies were pushed out of their comfort zones. They were now required to evaluate technologies to support daily needs for virtual meetings and global team workshops and define what a home-office employee looks like. Supply chain challenges and delays forced companies to find technologies to answer foundational questions such as "Who and where are the alternative suppliers who can meet our needs?" or "How can I know if this supplier can ship my products to my customers on time?"

More questions required more data and more resources to find answers. Often, the answers were discovered too late to make a difference or were derived with low confidence. The more data collected, the more challenging it became to identify patterns within the data quickly. At the same time, there were more discussions about how artificial intelligence (AI) technologies could help solve this problem. AI technologies could augment human thinking to supplement our limitations by evaluating historically complex data and real-time information.

The term *AI* is used in this book as a general term to house various types of technologies, such as machine learning, natural language processing, deep learning, computer vision, robotic process automation (RPA), and neural networks. These technologies can be used to access large amounts of customer and supplier data to address those questions in or near real time. For example, according to Jaggaer's website, their supply chain application uses "artificial intelligence and machine learning technologies to provide predictive analytics and recommend actions based on real-time data." Its use of neutral networks recognizes existing patterns in supplier behavior combined with real-time supply chain delays to provide insights into reducing risks of production downtimes, delayed deliveries, and increased costs.

As cloud-based applications stabilized, the overall time frame for these projects dropped to between 12 and 15 months with fees ranging between $1 and $2.5 million. However, the organization remained sensitive to the cost of a transformation. This meant critical workstreams like change management or project management were commonly removed from the transformation budget before it started. In other scenarios, the organization selected the lowest-cost supplier when choosing cloud-based applications. Selecting low-cost suppliers often leads to little or no thought to the skills of the project resources or the lack of experience those resources may have with similar projects.

When this happens, low-cost projects focus on the shortest timeline and lean into the technical side of a transformation initiative. The project is reduced to a lift-n-shift, meaning the existing processes and data are automated without considering process efficiencies, simplification, or optimization. A lift-n-shift does not emphasize data quality or

stakeholder experience. Even though this is no longer a transformation initiative, it is still sold that way internally. These types of projects check a few boxes for the executive sponsor. Shortly after the application is live, leadership wonders why they do not see the significant value promised.

The blame is almost always placed on the application without considering other root causes. There is a large gap between the original business case and the results. This gap is caused by a domino effect of the decisions made before the project started, such as reducing the budget, removing critical workstreams, and limiting resources, all leading to a project that should not have been labeled a *transformation*. What was sold to the stakeholder was not the project that eventually occurred.

Another common stakeholder complaint is the lack of a follow-on phase that promises to integrate items from the current project backlog. These backlog items are a combination of processes considered out-of-scope before the project began, combined with business challenges identified throughout the project (i.e., during the configuration phase, integration testing phase, or user-acceptance phase). The cases that follow are specific examples of processes that should have been corrected but instead postponed until a future phase (that never happened):

- When shifting from paper to digital purchase orders, it was discovered that the printed version of the digital purchase order did not include the same terms and conditions already written in the paper purchase orders. These terms and conditions should be added and translated into the local language of the supplier's location. The project team decided to add the terms and conditions in English, but the translations were placed in the backlog to be executed in the next phase.
- When comparing the paper purchase order to the new digital version, the electronic version did not include several fields that had been included in the paper version. These fields were not considered mandatory, but they offered more information about the purchased items for customs agents. Over time, the logistics team noticed when they added more information on the purchase order, the purchases were detained for less time at customs. A few extra fields reduced the overall transportation cycle times, and it reduced the storage costs and other hidden fees at customs. Since

these were not mandatory fields, the project team placed them in the backlog list to add the requirements to the next phase.

- During the validation of the tax reconciliation process on an invoice, it was noticed the invoice was routed to a tax person to correct and approve. The organization should not modify a supplier's invoice. This is out of compliance with internal controls and policies. The correct process was to send the invoice back to the supplier, requesting they revise and resubmit. Instead of automatically updating the process to route the invoice back to the supplier, the project team told the tax department to route the invoice back to the supplier manually and then added this item into the backlog to fix during the next phase.

When these or similar items are encountered, the first question always asked is why these never came up during the requirements phase. The second question is why the business stakeholders did not say anything after the configuration phase. The response is always the same: the stakeholder signed off on the requirements and configuration phase but never mentioned it. Ultimately, the deciding factor compares how much more time and money these changes will add to the project and how significant these changes are to the business. The compromise is to add these into a backlog for a follow-on phase that never occurs. The company is left with an electronic process that does not include the critical elements needed from the original paper or manual processes.

EXAMPLES OF REAL-WORLD SCENARIOS

Real-World Scenario #1

I began working with a client who had implemented a cloud procurement application less than two years before our first meeting. They were unsure if the issues they were experiencing were because of the application they selected, the lack of process improvement during the application implementation, or because they had not included change management as part of the original implementation. After establishing a *listening tour* of key stakeholder groups, superusers, and executives, my last conversation was with the CEO, who had specific concerns

about a requisition for $7.47. This requisition had been escalated to him because no one had approved it. The application had been configured so that when a requisition was not approved within a specific number of days, the requisition would be escalated to the approver's manager. It would continue moving upward in the chain until someone eventually approved it.

The CEO did not believe a requisition of that size should be escalated to him, and I agreed with him. This was also a quick fix because their cloud procurement application had an out-of-the-box option for executives. Once the CEO and other executives were placed in the *Executive Group*, any requisitions would be blocked. The total time to fix this within the application to ensure the CEO did not receive requisitions through an unnecessary escalation process was precisely six minutes.

Most companies would stop there. The immediate issue was resolved with some minor effort. In this specific example, there was still the underlying problem of why the requisition was not approved during the first, second, or third escalation. A band-aid had been applied to fix the symptom, which made everyone feel better. Yet, the requisition went unapproved for more than 45 days and caused additional costs due to project delays. The head of procurement operations commented on the listening tour, "The purpose of implementing an application was to reduce the requisition request to order cycle times, not increase them."

> The root cause of failure is not the application but, most often, the organization's decisions before, during, and after implementation.

Real-World Scenario #2

Resources in the accounts payable department manually coded invoices and wanted to reassess their processes. The company was using a cloud-based eInvoicing solution. When documenting the current process, all electronic invoices were automatically routed to offshore accounts payable resources as the first stop in the approval process. Those resources would manually enter the accounting code before the electronic invoice was routed to the stakeholder(s) for additional approval.

In looking at the original implementation documentation, this organization had defined the implementation of the eInvoicing application as a transformation project. Yet, all they ended up doing was automating the same process they had before, coding the invoice. The only difference was that the accounts payable resources no longer received a physical copy of an invoice but rather an electronic version. Some minor benefits may have been received, but deploying an application to automate the current resource did not leave them in a better place than before. Multiple and manual touchpoints remained without including a business and digital component. This led to increased errors and the lengthening of end-to-end process cycle times. The only difference was that before the project, the company used paper-based invoices; after the project, the company used electronic invoices.

Real-World Scenario #3

A global Fortune 75 organization expanded its supplier management program by manually adding 30 offshore resources to enter supplier data into the ERP system. Adding more resources offshore provided a low-cost option. The offshore resources performed repetitive, tactical tasks, but the organization continued to experience limitations in process standardization. Resources offshore had a higher turnover rate that contributed to an inconsistency in quality. Additionally, manual data entry required more resources to review, validate, and correct data entry errors.

When process changes were necessary because of policy updates, the 30 offshore resources did not immediately adopt those changes. More resources and time were required to communicate, train, and update standard operations procedures for those offshore resources to follow. What started as 30 resources quickly expanded to 45 resources. Adding 15 extra resources to the process did not make the process faster.

Lesson Learned

When a transformation initiative is not a deliberate and proactive decision by the organization, it loses its purpose and value. For a few companies, it has become a checkbox that allows leadership to say they reacted

quickly to external forces. For other companies, it is an afterthought that loses funding before it can start or is deprioritized halfway through the project. For most companies, the transformation initiative is seeing only half of the larger picture. Either the company defines transformation as redesigning business processes with no automation or as a technology-only project where critical business and process decisions are not considered.

For example, when critical decisions are made to one part of the process without understanding the impact of that decision, it can hide potential issues that may not become visible to the organization right away. Not taking the time to understand the effects of other steps in the existing process or how that decision will impact the users six months from now delays potential issues until later. In all these scenarios, the transformation project fails immediately or has signs of failing less than 12 months after completion.

WHY TRANSFORMATION INITIATIVES FAIL

Transformation projects fail for many reasons, but several common obstacles appear across all transformation projects regardless of the industry. The remainder of this book will outline and dive deeper into some obstacles that block success, help you understand the underlying root cause of why transformation initiatives fail, and identify a few alternatives. The following list includes the top 20 variables contributing to failed transformation initiatives that will be explored later:

1. Starting a transformation as a reaction to an external event rather than proactively building a foundation to support future changes
2. Establishing temporary workarounds as long-term solutions
3. Belief that using technology alone will solve the problem
4. Lack of purpose or understanding of why we need a transformation
5. Working with policies established 100+ years ago
6. Not supplementing your team with pockets of expertise
7. De-emphasizing, then prioritizing, then de-emphasizing risk

8. Not questioning the current state; the status quo bias
9. Underestimating the value of culture
10. Inadequate processes that create more work (after automating)
11. Accountability is spread across too many individuals to be effective
12. The definition of success is not evolving to match the frequency of disruption
13. Lack of a bold digital vision
14. Limited opportunities for stakeholder feedback
15. Lack of enterprise collaboration in overlapping initiatives
16. Lack of a front-seat leader
17. Allowing unconscious bias in the workplace
18. Misaligning value with strategic goals
19. Not rethinking how we think
20. Not setting up employees to be successful

Section I

A Window into the Past

CHAPTER 2

EVOLUTION OF THE PROCUREMENT ORGANIZATION

When searching the internet for the earliest recording of procurement, there are references to the Egyptians during the building of the Pyramids. In 2500 B.C., scribes played a clerical role in documenting on papyrus the quantities of materials and the number of workers needed. The scribes tracked each order from when it was requested to when it arrived on site. This example resembles order management, logistics, and supply chain management today. Yet, similar references are made throughout history, including the Roman Empire. SCMglobe.com discusses a modern-day procurement and supply chain management process deep within the Roman empire around 300 A.D. using the example of buying olive oil from North Africa and bringing that product back to Rome.

Trading has been frequented throughout history, as have the fundamental concepts of procurement, logistics, and supply chain. Further examples include the Silk Road trade routes, which connected Asia with the Mediterranean, including North Africa and Europe. These routes were in use until 1452 when the Ottoman Empire boycotted trade with China and closed the routes. In 1492, Columbus' "discovery" of the New World saw an expansion of procuring and trading commodities between the British Empire and items found in the New World.

In 2015, Ardent Partners published an illustration of the evolution of the procurement organization from 1870 to 2015. What made this study more notable than previous chief procurement officer (CPO) studies was the visual diagram outlining distinct phases in the evolution of the procurement organization. It was also the first formal announcement

outlining a shift from the Strategic Phase in 2014 into the Agile Phase (see Figure 2.1).

As a procurement professional who began working in procurement, supply chain, and data management in 1995, I would like to share an alternative perspective. Specifically, starting the Clerical Phase in 1830 instead of 1870 and splitting the Strategic Phase into two distinct groups (see Figure 2.2):

- Transactional Phase (1990s–2006)
- Strategic Phase (2007–2014)

As we explore procurement history, be mindful of what your procurement organization looks like today. Stepping backward can often provide a perspective for seeing the path in front of us more clearly. It offers opportunities to understand how we previously met obstacles, the decisions we made at that time, and the impact of those decisions. We call these *lessons learned*.

These lessons learned, when evaluated properly, provide the tools needed when we encounter similar challenges in the future so that our

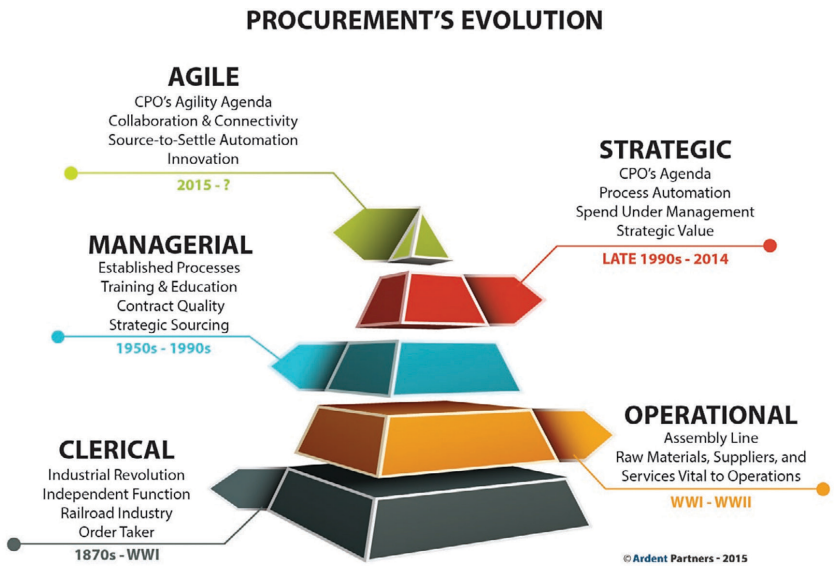


Figure 2.1 Procurement evolution (Ardent Partners 2015)

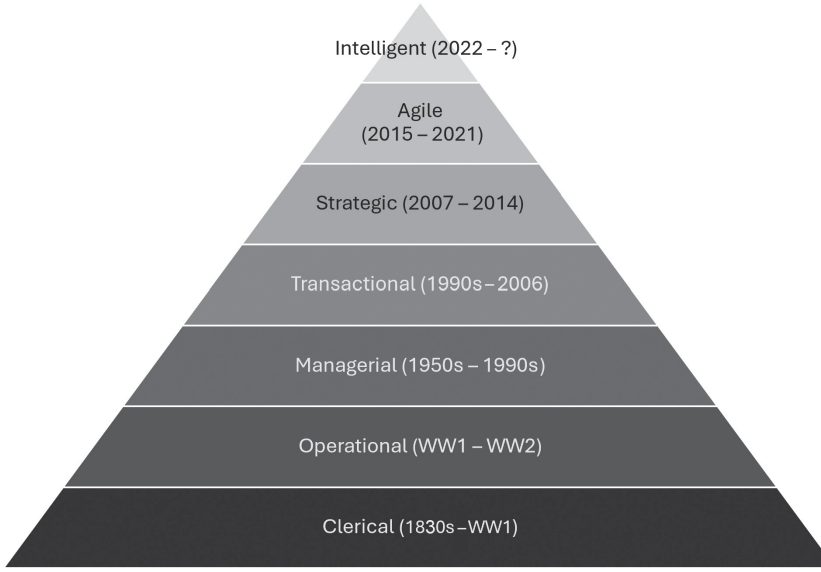


Figure 2.2 Reimagined Procurement evolution

decisions will lead to better results. Without a proper retrospective and reflection, the transformation initiative doesn't yield the intended outcomes. The organization then attempts another initiative to fix the problems from the first one that failed, and it becomes a never-ending cycle. Not being able to move the organization forward is an obstacle of our own making. Sometimes, it is harder to break free when obstacles are created by us than when those obstacles are created by someone else.

The remainder of this section will focus on the evolution of the modern-day definition of procurement and supply chain, starting with the 1830s during the American Industrial Revolution. This was a direct result of the War of 1812 when Britain stopped shipping goods to the United States. This marked the beginning of industrialization within the United States, first in the textile industry and then in other manufacturing areas.

> Stepping back to reflect can provide a clearer path to moving forward.

CLERICAL PHASE (1830–WORLD WAR I)

In 1832, Charles Babbage referenced the formal role of purchasing in his book *On the Economy of Machinery and Manufactures*. He said the book was written because of "10 years of visiting workshops and factories in England and on the continent to acquaint myself with the various resources of mechanical art." Many references from this book can be directly translated into activities still relevant to modern-day procurement and supply chain organizations.

Babbage's book focuses on the division of labor in the organization. In Section 252, he states, "In one of the most difficult arts, that of mining, great improvements have resulted from the judicious distribution of the future; and under the arrangements which have gradually been introduced, the whole system of the mine and its government is now placed under the control of the following officers." Of the 10 officers listed, number nine, is "a materials man selects, purchases, receives, and delivers all articles required."

In Section 253, the introduction of competition combined with the subdivision of labor (the ten officers listed) "renders it necessary for each producer to be continually on the watch, to discover improved methods by which the cost of the article he manufactures may be reduced . . . and also affords them a better chance of suggesting to the manufacturer changes in the fashion of his goods, which may be suitable either to the tastes or finances of his customers."

In the chapter titled "On the Cost of Each Separate Process in Manufacture," Babbage outlines the importance of understanding the end-to-end process and, more specifically, the costs associated with each process step to improve processes and reduce costs over time. In modern-day procurement, this would be a means of process improvement. The goal is to simplify each step in the process or the end-to-end process to reduce process cycle time and directly reduce overall cost.

Finally, Section 254 focuses more on the impact of process improvement. It provides a specific example: ". . . if a method could be contrived of diminishing by one-fourth the time required for fixing on the heads of pins, the expense of making them would be reduced by about thirteen percent." It is impressive that a book published in 1832 references

a dedicated procurement individual focusing on the total cost of ownership and improving processes to reduce costs and meet customer demands.

Later, in 1887, Marshal M. Kirkman authored the book *The Handling of Railway Supplies: Their Purchase and Disposition* while he was the Chicago & North Western Railway controller. According to the preface, "the purchase, care, and use of railway supplies influences directly the cost . . . and affect, therefore, the reputations of officers and the profits of owners."

Kirkman's book takes a very tactical view of purchasing, covering all aspects from purchasing supplies, requisitions, supervision, receipt and inspection of material, storage, fuel, and the disbursement of materials and inventories. However, he only briefly introduces the idea of corrupt practices and the negative impact of a distributed purchasing model. He cites, "a person hired for his skill as a blacksmith is not likely to possess the qualities necessary to enable him to cope successfully with the veteran merchant in purchasing goods that a blacksmith requires." Kirkman's perspective was that the skills of purchasing goods for a blacksmith were quite different from the skills needed as a blacksmith and, therefore, should not be the same person. This involves a different department with skilled resources who can successfully cope with more experienced suppliers. The term *distributed purchasing model* did not exist in the 1870s. Still, Kirkman's book does provide a perspective on having separate resources for those who purchase supplies for the business and those who consume those supplies.

By 1887, Babbage's "materials man" from 1832 had a formal title with expanding roles and responsibilities. In Chapter 3, Kirkman references "the office of the purchasing agent (whose) duties not only familiarize him with all new devices, but his observation enables him to point out those most likely to lessen expenses or add to the efficiency of a property." This statement not only outlines the purchasing agent as an individual who considers improvements continuously but also includes learning about and understanding innovation (i.e., all new devices).

Kirkman also states, ". . . to be able to buy its supplies at the lowest possible figure is enormous value to a company, and a capable purchasing

agent, it is probable, can save his employer a greater sum through the exercise of experience and intelligence than any other officer" where "one of the most effective avenues for accomplishing this will be to publicly and generally invite bids from manufacturers, and others for supplies for a considerable period ahead." In the late 1800s, the concept of competitive bidding and "looking forward" to consider prior purchasing while estimating future demand was used to outline the early beginnings of a procurement and supply management department. In Kirkman's eyes, a purchasing agent was no longer an entry-level individual but an experienced one who gained knowledge or intelligence over time and should become more valued than other officers. Having this level of experience meant the development of a purchasing department with a group of individuals who acquired knowledge over time and were no longer seen as short-term contractors.

OPERATIONAL PHASE (WORLD WAR I–WORLD WAR II)

There were no significant changes to procurement operations after Kirkman's book in 1887, except in small pockets of industries like textiles, railroads, and mining manufacturing. In the early part of the 20th century, two groups contributed to advancing a purchasing organization: the United States War Department and the National Association of Purchasing Agents (N.A.P.A.).

During World War 1, between 1914 and 1918, purchasing and logistics were formalized and evolved into a central activity. The manufacture of consumer goods shifted to support the military. The Council of National Defense, established by Section 2 of the Army Appropriation Act of August 29, 1916 (39 Stat. 649), paved the way to coordinate industries and resources for national security and welfare. It quickly established a National Defense Advisory Commission divided into seven committees, each focusing on a different area(s) impacting the war:

1. Raw materials, metals, and minerals
2. Munitions, manufacturing, and industrial relations
3. Engineering and education

4. Labor
5. Medicine and sanitation
6. Supplies
7. Transportation and communications

These committees categorized items based on similarities in their purchasing behavior. For example, procuring and shipping labor differed from procuring and shipping raw materials or finished goods such as munitions. Private organizations eventually mimicked these categories, further expanding and breaking them into smaller subcategory groupings, which set the foundation for category-based purchasing.

Key Milestones Between 1917 and 1946

Between 1917 and 1946, a series of events occurred that by themselves did not do much to advance the forward momentum of a procurement organization. However, when viewed over time, each event contributed in one way or another to the eventual development of a formal and centralized department coordinating all efforts to procure, pay, and distribute materials for the war effort:

- On December 28, 1917, Storage and Traffic Services was established (General Order 167) to supervise the transport of troops and supplies and the storage of supplies.
- On January 11, 1918, the War Department's finance activities centralized the Purchase Service in the Office of the Chief of Staff to supervise the acquisition of supplies and munitions and coordinate army procurement.
- On February 9, 1918, the Purchase Service in the Office of the Chief of Staff was redesignated as the Purchase and Supply Division
- On April 16, 1918, multiple offices were consolidated to form a centralized Purchase, Storage, and Traffic Division (General Order 36).

There was also a noticeable overlap in purchasing activities across military divisions during this time. For example, on November 15, 1918, the supply functions of the Medical Department of the U.S. Army were transferred to the Office of the Director of Purchase and Storage.

The Purchase, Storage, and Traffic division merged with the Office of Finance at the end of World War I.

Between World War I and World War II:

- On July 14, 1920, the War Department was reorganized, with most operational purchasing responsibilities shifting to the Office of the Quartermaster General.
- On August 16, 1921, Supply and Transport planning functions were reassigned to the newly established Supply Division (G-4).

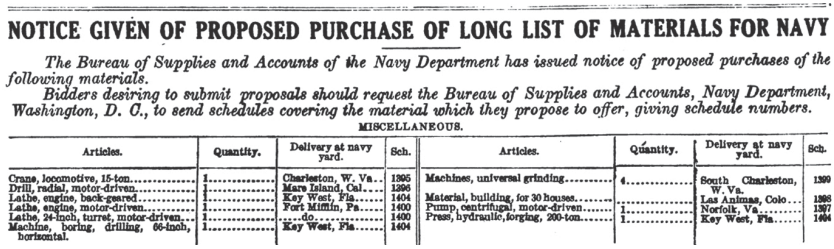
During World War II:

- On March 9, 1942, the Operational functions of the Supply Division (G-4) were renamed the newly established Services of Supply Division.
- On June 11, 1946, the Services of Supply Division was redesignated as the Service, Supply, and Procurement Division.

Examples of the centralized efforts to consolidate purchasing and provide transparency to the public can also be seen in the *Official Bulletin*, a daily newspaper from 1917–1919, under the order of the President by the Committee on Public Information, first published on May 10, 1917, just one month after the United States entered World War I. This publication brought visibility into procurement, bidding, and contract activities. It also illustrated a purchasing department with resources fully dedicated to these activities. Throughout the war, this was widely read by the public and potentially influenced the private sector to strengthen its purchasing function as an essential department outside the military.

For example, just three months after its first publication in the *Official Bulletin*, the Bureau of Supplies and Account of the Department of the Navy issued a list of proposed items needed for purchase and how bidders (or suppliers) could access the complete list of the schedule of materials. Two examples are shown in Figures 2.3 and 2.4.

In the *Official Bulletin* from February 1919, the word "Purchase" is introduced as part of the office title: Office of Director of Purchase and Storage (see Figure 2.5). Also in Figure 2.5, the notice highlights a dollar threshold for a purchase order of $25,000, a threshold that has been carried forward through the decades from 1919 to the present.



NOTICE GIVEN OF PROPOSED PURCHASE OF LONG LIST OF MATERIALS FOR NAVY

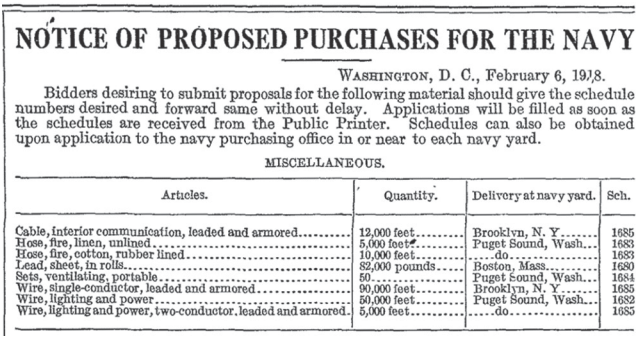
The Bureau of Supplies and Accounts of the Navy Department has issued notice of proposed purchases of the following materials.

Bidders desiring to submit proposals should request the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., to send schedules covering the material which they propose to offer, giving schedule numbers.

MISCELLANEOUS.

Articles.	Quantity.	Delivery at navy yard.	Sch.	Articles.	Quantity.	Delivery at navy yard.	Sch.
Crane, locomotive, 15-ton	1	Charleston, W. Va.	1395	Machines, universal grinding	4	South Charleston, W. Va.	1399
Drill, radial, motor-driven	1	Mare Island, Cal.	1396				
Lathe, engine, back-geared	1	Key West, Fla.	1404	Material, building, for 30 houses		Las Animas, Colo.	1398
Lathe, engine, motor-driven	1	Fort Mifflin, Pa.	1400	Pump, centrifugal, motor-driven	1	Norfolk, Va.	1397
Lathe, 24-inch, turret, motor-driven	1	do	1400	Press, hydraulic, forging, 200-ton	1	Key West, Fla.	1404
Machine, boring, drilling, 66-inch, horizontal.	1	Key West, Fla.	1404				

Figure 2.3 An example of an official bulletin notice of proposed purchases



NOTICE OF PROPOSED PURCHASES FOR THE NAVY

WASHINGTON, D. C., February 6, 1918.

Bidders desiring to submit proposals for the following material should give the schedule numbers desired and forward same without delay. Applications will be filled as soon as the schedules are received from the Public Printer. Schedules can also be obtained upon application to the navy purchasing office in or near to each navy yard.

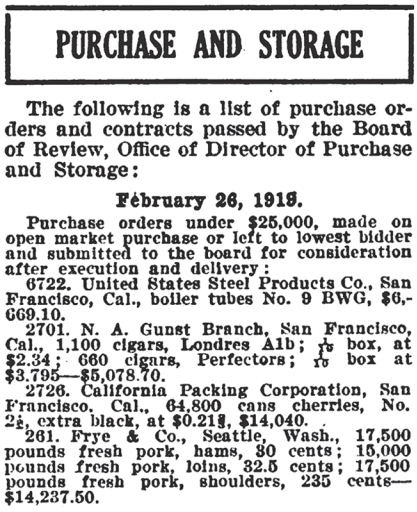
MISCELLANEOUS.

Articles.	Quantity.	Delivery at navy yard.	Sch.
Cable, interior communication, leaded and armored	12,000 feet	Brooklyn, N. Y.	1685
Hose, fire, linen, unlined	5,000 feet	Puget Sound, Wash.	1683
Hose, fire, cotton, rubber lined	10,000 feet	do	1683
Lead, sheet, in rolls	82,000 pounds	Boston, Mass.	1680
Sets, ventilating, portable	50	Puget Sound, Wash.	1684
Wire, single-conductor, leaded and armored	90,000 feet	Brooklyn, N. Y.	1685
Wire, lighting and power	50,000 feet	Puget Sound, Wash.	1682
Wire, lighting and power, two-conductor, leaded and armored	5,000 feet	do	1685

Figure 2.4 A second example of an official bulletin notice of proposed purchases

This provided a real acknowledgment that the government saw the value in a department dedicated to purchasing activities with a management role that had oversight. This reference also mentions purchase orders under $25,000, illustrating that not all purchases were equal. Depending on the dollar amount, purchase orders under a specific threshold followed a different path or policy. Additionally, an example of receiving and opening sealed bids was mentioned in the *Official Bulletin* on March 18, 1919 (see Figure 2.6). This concept is still used in modern-day procurement with local, state, and federal agencies.

Around the same time, in 1915, the N.A.P.A. was founded as a not-for-profit educational association serving professionals and organizations with a keen interest in supply management, education, training, qualifications, publications, information, and research. Before 1915, local purchasing



PURCHASE AND STORAGE

The following is a list of purchase orders and contracts passed by the Board of Review, Office of Director of Purchase and Storage:

February 26, 1918.

Purchase orders under $25,000, made on open market purchase or left to lowest bidder and submitted to the board for consideration after execution and delivery:

6722. United States Steel Products Co., San Francisco, Cal., boiler tubes No. 9 BWG, $6,669.10.

2701. N. A. Gunst Branch, San Francisco, Cal., 1,100 cigars, Londres Alb; 1/5 box, at $2.34; 660 cigars, Perfectors; 1/5 box at $3.795—$5,078.70.

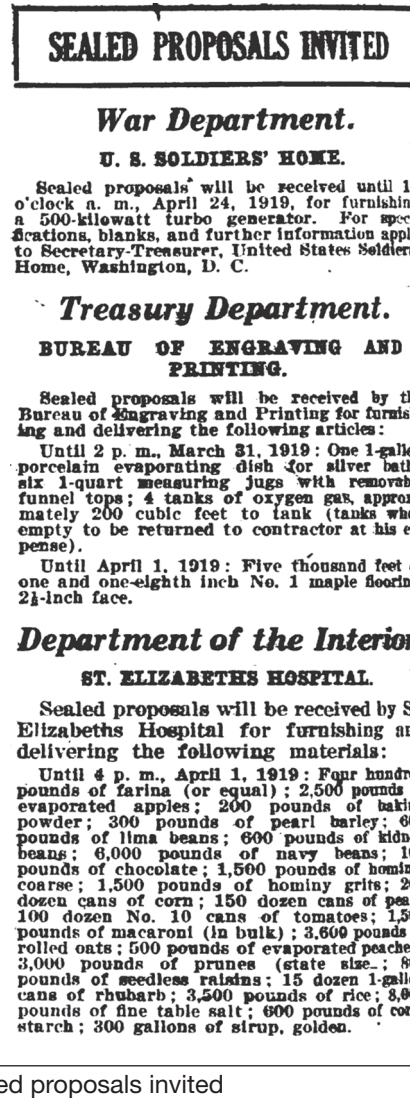
2726. California Packing Corporation, San Francisco, Cal., 64,800 cans cherries, No. 2½, extra black, at $0.21½, $14,040.

261. Frye & Co., Seattle, Wash., 17,500 pounds fresh pork, hams, 30 cents; 15,000 pounds fresh pork, loins, 32.5 cents; 17,500 pounds fresh pork, shoulders, 235 cents—$14,237.50.

Figure 2.5 Office of Director of Purchase and Storage

associations had formed in at least ten major cities in the United States, including one of the most active groups in Buffalo, New York (founded in 1904). The plan was to organize nationally to grow the profession and further improve the value of the purchase organization within a company. It was not until 1915, after developing a national organization, that things moved forward more quickly. The N.A.P.A. had three strong affiliates when it held its first convention in New York in 1916, with 100 of its 250 members in attendance. That year, the N.A.P.A. launched a magazine called *The Purchasing Agent*.

The N.A.P.A. was vocal about the War Department's lack of consolidated procurement processes. Specifically, in the editorial section of Volume 5, Issue 2 (February 1918), of *Purchasing Agent* magazine, titled "War Department Centralization," the N.A.P.A. was not shy about offering its opinion on how the War Department could improve: "The methods the War Department employs in purchasing supplies, demanding the maintenance of five separate purchasing divisions, have been criticized during the past few weeks . . . Secretary of War Baker has shown his desire to bring about more efficient buying in the War Department by creating a Director of Purchases. It remains to be seen how much real



SEALED PROPOSALS INVITED

War Department.

U. S. SOLDIERS' HOME.

Sealed proposals will be received until 10 o'clock a. m., April 24, 1919, for furnishing a 500-kilowatt turbo generator. For specifications, blanks, and further information apply to Secretary-Treasurer, United States Soldiers' Home, Washington, D. C.

Treasury Department.

BUREAU OF ENGRAVING AND PRINTING.

Sealed proposals will be received by the Bureau of Engraving and Printing for furnishing and delivering the following articles:

Until 2 p. m., March 31, 1919: One 1-gallon porcelain evaporating dish for silver bath; six 1-quart measuring jugs with removable funnel tops; 4 tanks of oxygen gas, approximately 200 cubic feet to tank (tanks when empty to be returned to contractor at his expense).

Until April 1, 1919: Five thousand feet of one and one-eighth inch No. 1 maple flooring, 2½-inch face.

Department of the Interior.

ST. ELIZABETHS HOSPITAL.

Sealed proposals will be received by St. Elizabeths Hospital for furnishing and delivering the following materials:

Until 4 p. m., April 1, 1919: Four hundred pounds of farina (or equal); 2,500 pounds of evaporated apples; 200 pounds of baking powder; 300 pounds of pearl barley; 600 pounds of lima beans; 600 pounds of kidney beans; 6,000 pounds of navy beans; 100 pounds of chocolate; 1,500 pounds of hominy, coarse; 1,500 pounds of hominy grits; 200 dozen cans of corn; 150 dozen cans of peas; 100 dozen No. 10 cans of tomatoes; 1,500 pounds of macaroni (in bulk); 3,600 pounds of rolled oats; 500 pounds of evaporated peaches; 3,000 pounds of prunes (state size); 800 pounds of seedless raisins; 15 dozen 1-gallon cans of rhubarb; 3,500 pounds of rice; 8,000 pounds of fine table salt; 600 pounds of cornstarch; 300 gallons of sirup, golden.

Figure 2.6 Sealed proposals invited

coordination will result . . . but the fact they have been taken is evidence the administration realizes the necessity for at least reasonable centralization of war purchases."

The editorial continues to call for "one executive possessing real buying authority, but it realizes that this development cannot be brought

about in a day." However, the editorial ended positively: "The War Department should be credited with the good it has accomplished up to the present time under adverse conditions."

Other issues of the *Purchasing Agent* magazine discuss procurement ethics (January 1919), the development of a formal purchasing course (January 1921), and the advantages of standardization (January 1925).

Key milestones throughout the 1920s and 1930s continued to illustrate the value and importance of the purchasing agent through the influence of the N.A.P.A.:

- In 1920, the N.A.P.A.'s ethics committee developed a *Purchasing Agents Creed*, a predecessor to the Principles and Standards of Purchasing Practice.
- In 1923, the N.A.P.A. created the National Business Survey, polling members on their industry sector knowledge and consolidating the results into a national report. This survey eventually changed its name to the Report on Business.
- In January 1925, an issue of *Purchasing Agent* mentioned a purchasing course at the University of Chicago facilitated by John C. Dinsmore, a purchasing agent at the University. The course description reads, "Functions of the purchasing department in the modern industrial organization. The course deals not only in the theory and ethics of modern purchase methods but also discusses standards, analyses, sources of supply, and price tendencies."
- In 1928, the N.A.P.A. developed the *Standards for Buying and Selling*. Along with the *Principles and Standards of Purchasing Practice* of 1923, these two guides to ethical conduct remained relevant for decades.

MANAGERIAL PHASE (1950s–1990s)

The priorities during World War II, which set the initial focus on purchasing, were no longer applicable post-war. During the war, there was a direct link between the need to procure items to support the war effort. Unfortunately, the role of procurement was prioritized for this specific need because when the war was over, so was the perception that

procurement professionals were needed as part of the normal day-to-day operations of an organization. Bruce D. Henderson commented about purchasing during this time, noting that purchasing was neglected in most organizations because it was unimportant to mainstream problems. He said that some executives found it hard to visualize a company becoming more successful than its competitors because of its superior procurement.

Purchasing was not seen as a valuable contributor to the organization as executives considered other priorities, such as marketing, sales, and profit. This viewpoint did not last too long. Those returning from World War II took advantage of the GI Bill, which provided a larger pool of educated consumers. The concept of buy now, pay later with the first revolving credit card in 1958 issued by Bank of America enabled consumers to purchase and pay over time. This increase in consumer spending required organizations to reconsider stocking inventory to ensure the product was on hand when the consumer wanted to buy.

There were still many competing priorities, and the purchasing organization was also competing for attention. For example, the finance department prioritized cost reduction while increasing profit margin. At the same time, the need to communicate product differentiation to consumers strengthened the voice of the marketing department. In parallel, in the mid-1960s, television improved its reach into most consumer's homes. Marketing and advertising quickly gained executive sponsorship over the finance department because of its direct link to consumers, sales, and revenue.

In 1968, the N.A.P.A. changed its name to the National Association of Purchasing Management (NAPM) to better reflect the evolution of the purchasing group as a fundamental management function supporting corporate goals. The association continued to be a prominent voice for the role of purchasing in modern-day manufacturing organizations. Yet, it was not gaining much traction, as seen in Dean Ammer's 1974 article in the *Harvard Business Review*.

Ammer's article included comments about the negative perception of purchasing that could be overcome through accomplishing active purchasing, which is measured in terms of meeting overall company objectives and contributing to bottom-line profitability. He noted that the

purchasing executive should be part of nonpurchasing decisions, for the entire organization loses when purchasing is not part of the organization's consensus on major decisions. Finally, Ammer suggested that the function should have sufficient stature to report to top management or a division manager. However, according to his survey, this only happened in 37 percent of the responding firms.

Other external forces during this time included the impact of the Vietnam War (1955–1975) and, more notably, the Organization of the Petroleum Exporting Countries oil embargo (1973–1974). The manufacturing organization was beginning to recognize the direct and indirect impacts of global economic and political forces, of which the United States did not have significant control over the outcomes—specifically, the direct and indirect impacts on sales and revenue. Within a very short time, there was acknowledgment of the need for improving efficiencies, particularly in purchasing, transportation, inventory storage, control, and management.

Also, the ability to coordinate and exchange information through electronic mail (i.e., email) beginning in the 1970s allowed organizations to purchase products outside their local geographic regions with opportunities to consider multiple suppliers. In the 1990s, purchasing had finally become a separate department within the larger enterprise that operated in multiple countries or was buying from suppliers in multiple countries. The purchasing department, however, continued to report to the finance department because of the overlapping theme of cost reduction.

TRANSACTIONAL PHASE (1990s–2006)

The Transactional Phase marked a significant jump forward for the procurement organization with dedicated resources, a well-defined procurement department, and a single individual to oversee procurement-only functions. In most manufacturing and nonmanufacturing organizations, the procurement department remained under the finance department and reported to the CFO (chief financial officer). It maintained its primary purpose: to issue an order or piece of paper to secure supplies, services, or materials. This order was an agreement to purchase from

a supplier in exchange for a cost the buyer and the supplier agreed on. Once the organization confirmed the receipt of the supplier's invoice, based on the mutually agreed upon cost documented on the purchase order, the order was paid based on the payment terms.

The transactional or tactical sourcing methodology used during this time remains mostly a reactive approach to address an immediate need. This phase was most notable for the following:

- Purchase orders were the primary method of buying
- Enterprise resourcing planning (ERP) was the primary application to generate purchase orders
- Policies supporting a purchase order for all goods and services
- Cost was the primary variable when comparing suppliers
- More frequent use of requests for proposals
- The *spend cube* defined data collection
- The term *strategic sourcing* was used
- Attention to indirect spending was improving
- Supplier and organization relationships were most often confrontational
- The highest-ranking procurement resource was at the VP level
- The procurement VP commonly reported to the CFO
- Introduction of the purchasing card
- Procurement and IT (information technology) resources were challenging ownership of procurement processes
- Advancements during this phase set the path for early-stage process automation

There were numerous improvements and leaps forward during this time, many of which resulted in efficiency gains within the purchasing process. Others became the foundation for understanding the impact of evaluating total spending. Still, other improvements may have been ineffective, but they have led the way for future improvements, and three warrant more discussion:

- The blanket purchase order
- Spend cube
- Migrating from ERP to procure-to-pay (P2P)

The Blanket Purchase Order

During this time, the concept of no-PO/no-pay was used to signal to the supplier and to the internal business stakeholders that without a current purchase order number on an invoice, the supplier would not receive payment. Depending on the organization's payment terms, once the invoice tied to a purchase has been received and approved, it may take another 45 days before the supplier receives its payment. This was before electronic invoicing, and it was common to see stacks of paper invoices being routed through the organization to collect a physical signature. Even if the payment terms were 45 days, approving the invoice and entering the information into the ERP system took longer.

Consider this real-world scenario: in one of my projects, my role was to walk the steps of the invoice from beginning to end to understand where process improvements could be made. I discovered that people sorted invoices and walked them to a department for the first signature. A stack of invoices was delivered to a central department bin. At some point over the next 24 hours, a department resource would pick up the stacks of invoices and deliver them to an individual's desk, placing them on a tray called *IN*. From there, the invoices stayed in that tray on the individual's desk until they were processed. Mostly, the invoices were not a priority or were forgotten. At other times, the invoices continued to be stacked on top of the prior stack. This meant the older invoices were now at the bottom of the tray. Still, other times, the desk person would receive a phone call to find an invoice and move it to the top of the pile as it was urgent.

When the invoices were signed, they were placed into a different bin on the individual's desk labeled *OUT*. A couple of times a day, someone would walk through the office, pick up anything found in the *OUT* tray, and take them back to a central department location. The paper invoices were then placed in a department tray labeled *internal department* where they waited for another individual to pick them up and drop them off in another department for approval. When all the approvals were completed, the invoice was placed in a different department tray labeled *A/P*, where they would travel to the accounts payable department to be further processed and entered into the ERP system.

In one company, it was explained to me how common it was to pick up damaged invoices because the department bins were often next to the coffee machine (see Figure 2.7). It was supposed to be convenient for the department staff to have all the department bins and coffee machines in the same area, but it ended up causing more harm than good. If the invoice details could not be read, the invoice had to be returned to the accounts payable department to be reprinted and rerouted for approval. The approver was supposed to document this and return the damaged invoice to the accounts payable department for a reprint. Often this did not happen. When I asked the interdepartmental messenger what happens when they pick up a damaged invoice by mistake, the response was, "My job is to deliver this stack of invoices to the next department. Even if I thought it was a damaged invoice, I will take it to the next department for approval. The approver is responsible for marking the invoice as damaged and placing it into the *AP* bin for pick up by that messenger." What a mess!

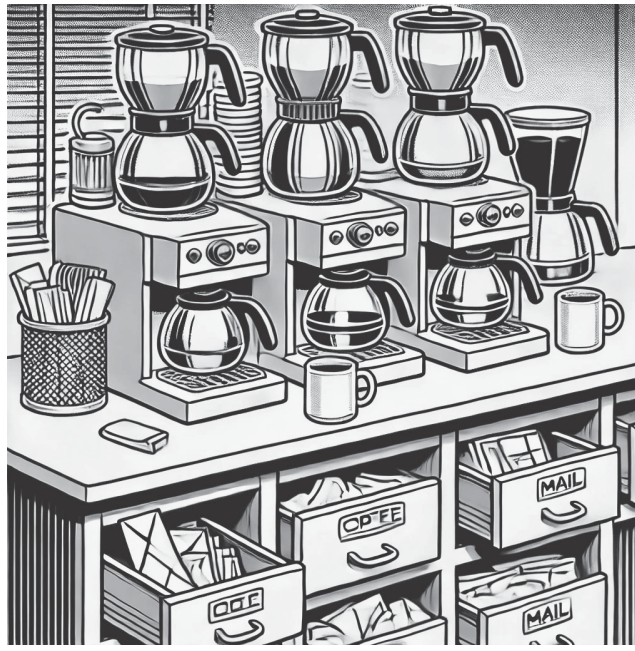


Figure 2.7 Coffee in the mailroom

While interviewing resources in another company, one anonymously told me that invoices were frequently lost or misplaced. For example, occasionally, the interdepartmental messengers would stop to use the restroom and leave the invoices there by mistake. Sometimes, the stack of invoices was still in the bathroom when he/she returned, but other times, someone else would pick them up, and it was never known where those invoices ended up. At the same company, because some departments were so far apart, the interdepartmental messenger would arrive to discover no invoices to pick up. If this happened repeatedly in a department, the messenger would decide not to walk to that department daily. As you can imagine, this led to further delays in paying the supplier regardless of any payment term arrangements already negotiated.

As a result, the supplier's workaround for receiving faster payments was to generate and send more invoices. For example, instead of sending an invoice once per month, the contract may outline that invoices would be issued twice or every two weeks. For the business stakeholders, this meant they created purchase orders more frequently and most often for the same price as the last purchase order. The approvers were approving more invoices, which meant more paper and a slower response time in the approval process. The purchase order was created, approved, and physically mailed, faxed, or emailed to the supplier. The business stakeholders needed a solution to minimize their data entry efforts for multiple purchase orders for the same amount going to the same supplier every two weeks. In the ERP system, this workaround was to create a *blanket purchase order*.

A blanket purchase order is an open-ended purchase order that does not close until the contract is finished or all the work is completed. It is advantageous when a supplier requires multiple invoices over a long period. Once the blanket purchase order is created, the supplier can issue invoices against the same purchase order number until no funds remain or the date on the blanket purchase order has passed. There were many disadvantages to using a blanket purchase order, including, but certainly not limited to:

- Year-end reconciliation of budgets became more challenging
- A disconnect between the work completed and no invoice from the supplier

- Lack of understanding of actual money spent compared to the departmental budget

It was and is still common that if the monies allocated for the departmental budget were not used, the finance department would absorb them and redistribute them to another over-budget project. Many business stakeholders didn't want to lose their funding. They would rather keep the funds tied to their department and move unused funds to a project in their department, not elsewhere. It became a real problem with blanket purchase orders remaining open 6–12 months after the work was completed.

Finally, blanket purchase orders caused the procurement organization problems in understanding exactly what was purchased. They required someone to review every invoice issued that may or may not have some information on the work performed. The supplier created invoices and rarely included the same level of detail documented on the purchase order. If understanding this was necessary, someone reviewing the invoices would need to pull the purchase order referenced on the invoice. This was time-consuming, with an inconsistent process depending on the individual tasked with the job. It was never 100% reliable that all the money was discovered.

The Spend Cube

The spend cube was a concept created to aid the procurement department in understanding total spend. It was the foundation for how companies began understanding how to find patterns in the data across three primary areas: spend, supplier, and business unit. Its objective was to know who purchased what from whom or, more specifically, to answer the following questions:

1. What did we purchase? (i.e., category of spend)
2. Who did we purchase from? (i.e., the supplier)
3. Who made the purchase? (i.e., the business unit or department)

The goal was to provide the procurement department with a database (often an MS Access database or SQL) of information they could sort through and understand their addressable spend. The term *addressable*

spend looks at all the revenue collected, reconciles it with financial statements, and subtracts areas of spend that could not be sourced or negotiated, or where the procurement department could not have an impact. These may include removing salaries, taxes, penalties, bank fees, and utility payments. Additionally, the spend cube helped overcome other preexisting challenges with data, such as:

- General ledger (GL) codes were often too broad or generic, with two to five words as a description
- Invoices coded incorrectly by accident or on purpose
- Spend data or purchasing details were stored across multiple systems
- The accounts payable department could not provide the transactional detail needed to understand what exactly was purchased
- Commodity or materials codes in the ERP were not supportive of indirect spend
- GL codes did not match the sourcing categories used by procurement professionals

Many consulting firms working for Fortune 500 companies included the development of the spend cube as part of their basic services. It became the foundation of a procurement assessment phase, where the results identified opportunities for savings or improvement. This phase would last several months because the consulting teams cleaned up the data manually as they collected it, often categorizing the data for the first time into sourcing category groups (see Figure 2.8).

Once the data was collected, one dedicated resource, such as myself, would typically format, harmonize, clean, and classify the data using the global standard code—the United Nations Standard Products and Services Code (UNSPSC). Working around 70–90 hours a week for nine weeks, I would manually scrub the data. Procurement organizations could see for the first time if they were buying the same item across multiple suppliers, or how much money was spent in one sourcing category or subgroup (i.e., office supplies), or if business units were buying from the same suppliers.

On the surface, those nine weeks of hard work created visibility into who purchased what, from whom, and how many times. This was a

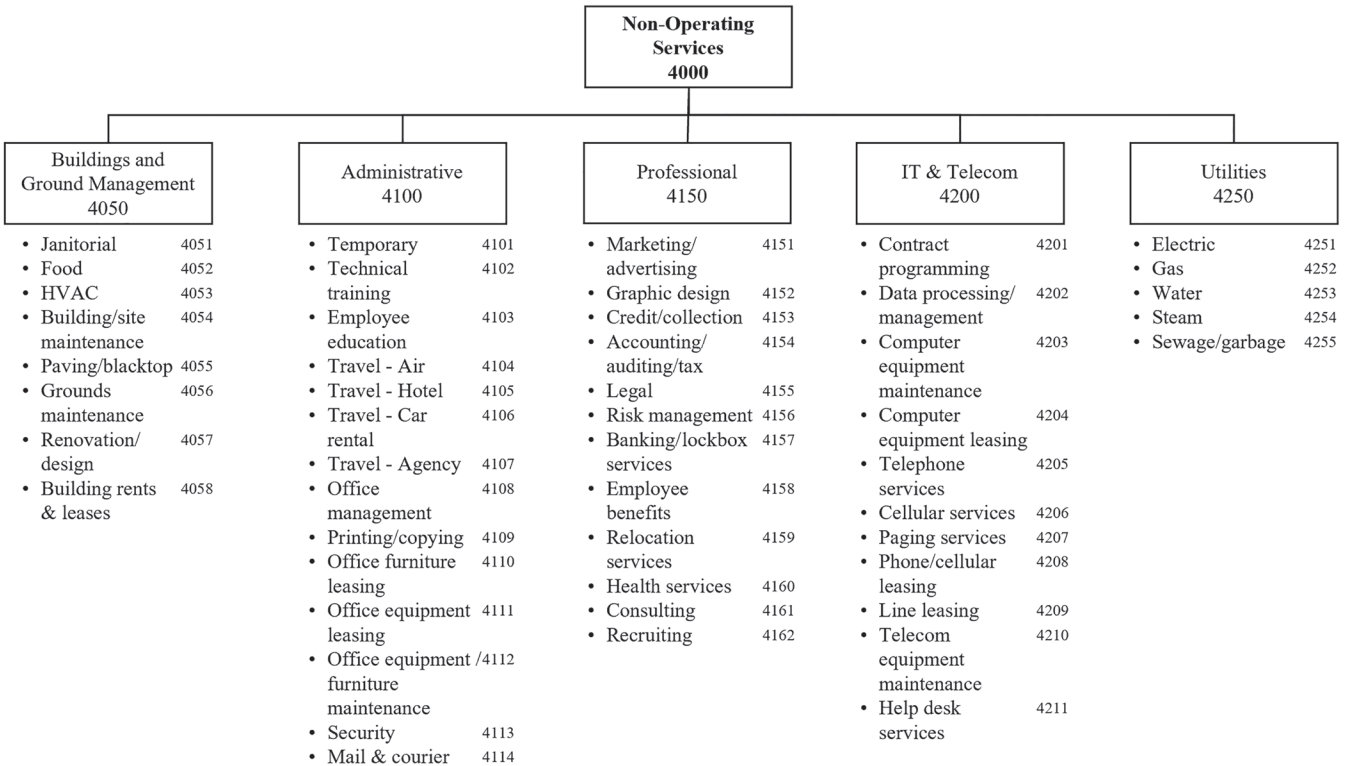


Figure 2.8 Procurement category taxonomy

good thing in a snapshot, but this manual process also brought a few disadvantages. Once the task was completed, the results were reviewed with the organization. The final deliverable for the assessment phase was a database with the raw data and cleansed data. PowerPoint slides offered insights and an implementation wave strategy documenting which sourcing categories the procurement team should tackle first.

This database had a time limitation. After 6 months, the cleansed data was no longer relevant, and the procurement organization was frustrated that it could not continue with the great work completed during the assessment phase. There was no way to repeat the assessment without devoting a lot of time and resources or through hiring a consulting firm to return and do it all again.

In addition, the assessment phase was flawed. The data classification was completed manually 100% of the time. This meant I would review every line of data from the organization and consider each line of purchase while also considering the supplemental data for that purchase. For example, to classify a line of data to the correct UNSPSC, all of the data had to be taken into context: the supplier name, the item description, the GL account, the ERP material code, etc.

Other considerations also had to be explored, such as whether this was a product or service or if the item was related to a capital project. If it was a separate purchase, it would be classified differently. Because this process was manual, I could not consider myself or the results of my work 100% accurate. Working 70–90 hours a week meant little sleep and that my decisions may not have always been consistent. Over time, as a consultant doing many of these each year, I had the UNSPSC, the Supplier Industry Code (SIC), and the National American Industry Classification System (NAICS) codes memorized for suppliers used most often. The U.S. government created SIC codes in 1937. They are four-digit codes for classifying a company's primary industry based on the company's highest revenue category. When Staples was first founded, its code was Stationary. SIC codes can be updated because they reflect the highest revenue category. If you are unsure about a supplier, specifically a start-up supplier, the SIC codes provide a good reference.

The U.S. Census Bureau assigns one NAICS code to each establishment based on its primary activity (generally the activity that generates

the most revenue for the establishment) to collect, tabulate, analyze, and disseminate statistical data describing the economy of the United States. The codes are broadly defined and do not provide much value in understanding more information about a supplier. The U.S. Census Bureau created the NAICS codes for economic reporting and supplier purchasing classification.

The primary challenge with this approach was all of the knowledge I had collected and memorized was in my head. I was a highly valued resource, but when the project was over, all of the knowledge I brought with me and all the knowledge I learned left with me.

Migrating from ERP to the Cloud

Some newer technologies offered applications that connected directly to the end user. This means end users can access the buying solution directly and not have to depend on centralized resources in another department. For example, by 1990, the research firm Gartner coined the term *enterprise resource planning*. This new industry term was used to signal that many organizations, not just manufacturing, were now using technology to increase the efficiencies of their entire operations. In 1993, Microsoft released Excel v5.0 for Windows, including VBA (Visual Basic for Applications)—as noted in *The History of Microsoft Excel—Microsoft | Excel Help*. In Excel, the capability of macros made it easier for the general user to create formulas. This opened almost unlimited possibilities in automating repetitive tasks, specifically in crunching numbers and improving the time it took to assess data and present it to business stakeholders. Excel had become the standard application for developing proposal requests within the procurement department.

In 1999, Ariba went public with its Ariba Buyer application, which provided a new web-based interface for end users to create and approve purchase orders more efficiently than the ERP system. In 2000, Gartner introduced the idea of ERP II, referencing internet-enabled systems that could pull data from other sources, including front-office applications like customer relationship management (CRM). All the technological changes during this time were installed on-premise or behind the organization's firewall. This meant the application must be installed and maintained by the organization, not the application provider.

Budgets for these projects were held by the IT department because that part of the organization was the most impacted by these types of endeavors. These projects were staffed with more IT than procurement resources because IT resources were needed to install and integrate Ariba Buying with the ERP system during the project. Additionally, the IT department needed to hire resources with specific skill sets for the application just purchased. As a result, the IT department also had to increase its long-term budget for resources responsible for installing software patches, troubleshooting application issues, and providing developer resources to make changes to the application.

These on-premise solutions were sold at a very high cost, commonly purchased only by Fortune 100 companies who were considered financially stable and could afford such an investment. Advantages did include some savings in licensing fees, where a user who previously required an ERP license to create a purchase order was now bundled into the new buying application. The user license shifted to the volume of spending pushed through the Ariba Buying application. Since the organization installed and maintained this application, there was also a sense of greater security as individuals outside the internal network could not access these on-premise applications.

Disadvantages included more significant capital investment in procuring additional servers and other hardware components before installing the application. If the company was growing, the ability to scale quickly could be stalled due to the requirement of purchasing additional hardware and resources to develop the new systems. Finally, on-premise solutions, particularly in the financial or healthcare industries, must comply with regulatory agencies, and these firms are responsible for maintaining that compliance across all systems they own.

The procurement organization didn't see a lot of value. These early applications focused on the purchase order, receiving, and invoice processing, but with a better user interface and additional capabilities that the ERP systems didn't have. The procurement department became more involved when it recognized the results of the spending cubes were directly connected to how the data was entered into the purchase order by the end user. A distributed process to enable any end user to

create a purchase order did achieve shorter cycle times from purchase order to supplier payment. It also created a new challenge in the consistency of data entry. The procurement department began to exert more influence on the buying process and take ownership to outline policies on how data was entered into these systems.

By 2006, significant changes began to emerge regarding how other departments viewed the procurement organization. The procurement technology landscape was to be forever changed because cloud technologies were becoming more accessible due to lower cost structures for cloud computing and, therefore, cloud procurement. This enabled procurement to create a different narrative about its value and potential. It was the milestone that ushered procurement into the next phase of its evolution.

STRATEGIC PHASE (2007–2014)

The Strategic Phase of the procurement organization saw changes in how the organization viewed the relationship with the supplier and a more proactive approach through category management and planning. As a result, a dedicated department called "Strategic Sourcing" was established under the procurement organization, and evaluating the total cost of ownership, instead of just the purchase price, was becoming the standard method for approaching proposals. Additional changes also occurred during this phase:

- There was a shift from on-premise to cloud-based procurement and supply chain applications.
- Cloud procurement applications were used in sourcing, contracts, buying, and invoicing.
- Catalogs and purchase cards expanded how the internal user bought goods and services.
- Cost plus other variables were considered in a total cost of ownership approach when comparing suppliers (i.e., shipping, customs, storage, tariffs, and switching costs).
- Negotiating longer term contracts with line-level (item) savings became the norm.

- Dedicated resources performed tactical activities, such as data entry, calculating total cost analysis across multiple suppliers, and analyzing cost versus savings.

Cloud technology was the primary contributing factor that allowed the evolution into a strategic procurement organization because it provided new capabilities to the application providers that directly impacted the procurement organization. These factors included the following:

1. The organization no longer owned or maintained the hardware, which pushed the responsibilities of maintaining regulatory compliance onto the application provider.
2. Expanded application development into non-transactional products and processes (sourcing, contracts, and supplier performance) and improved workflow.
3. Multi-tenancy, a single instance of a software application utilized by multiple customers, became available. Software patches were automatically pushed to the customer and did not rely on their IT resources to schedule, test, and update. This improved the customer experience since the internal user no longer had to wait for IT resources to prioritize, schedule, test, and eventually push an update.
4. Global users could now access an application without latency or delays, which improved performance. Often, users who were further away from the server where the application was installed would see significant delays in processing. For example, if the server was in California, users in India would notice a lag when clicking a button to see the results. The further from the server, the more lag time was observed.
5. Improved productivity was realized since global users could work on the application simultaneously. Previously, as users logged into an on-premise application, the application became slower. It used to be so common that users would purposely modify their daily routine to stop working on specific applications at the same time that users in other time zones started working.
6. Changes in the application life cycle provided more frequent product changes that were now available across all customers

simultaneously. For example, if Customer A customized their on-premise application, Customers B and C might also find it valuable. There was no method for sharing customizations that might benefit other customers.

7. Removing the requirement for servers and additional IT resources reduced the overall cost of the application to the customer. Customers no longer needed to hire procurement application developers to maintain data, apply software patches, and require developers (unique to that procurement application) to support customization and ongoing changes.
8. Cloud computing paved the way for competition by reducing the cost of entering the market. For example, Coupa was founded in 2006 using cloud technology.

Other key milestones contributed to the Strategic Phase of procurement. They were selected because they contributed to the foundation of what we know today. The following companies either built the foundation of cloud architecture, were among the early adopters of cloud technology, became a voice highlighting the potential value, or helped to educate users on cloud technologies and architecture:

- 2006: Amazon introduced its Simple Storage Service, followed by Elastic Compute Cloud. These products pioneered the ability to deliver *infrastructure-as-a-service* at a cheaper and on-demand pricing basis. This paved the way for global users to experience no delays due to distributed data centers and realized cost reductions in the capital investment of servers and hardware. IT resources were no longer needed, but special capabilities were required to maintain applications.
- 2007: Coupa launched a *software-as-a-service* product called Coupa On-Demand for small and midsize businesses. The original barriers to entering the procurement application market were gone, allowing more competition.
- 2007: IBM partnered with Google to promote cloud computing in universities, donating hardware and providing a curriculum to teach cloud computing to students.
- 2008: Google released the beta version of Google App Engine. The App Engine was a *platform-as-a-service*, one of the first of

its kind. It provided a fully maintained infrastructure and a deployment platform for users to create web applications using a common language. This was another technological advancement supporting improved user interfaces. It led to a shift from needing specialized developers to make back-end application changes and moving toward front-end capabilities to make configuration changes.

- 2008: Gartner saw an opportunity for cloud computing "to shape the relationship among consumers of IT services, those who use IT services and those who sell them."
- February 2010: Microsoft released Microsoft Azure to compete with Amazon Cloud Computing, which was previously announced in October 2008.
- March 2011: IBM announced the IBM Smart Cloud framework (to compete with Amazon Web Services), linked to its Smarter Planet campaign launched in November 2008. IBM claimed that technology could make an industry smarter.

During this time, companies were not immediately jumping at the opportunity to shift from on-premise solutions to cloud solutions, noting security as one of the fundamental reasons. I recall many times when I was introducing cloud-based applications to Fortune 200 companies. Dealing with the security issue meant spending 2–3 months talking with the IT departments about cloud user security, data security, and the change from development to configuration. IT departments would push back hard and become obstacles to moving forward out of fear for job security. Often, I would be asked to list other companies in their industries who were taking steps toward the cloud and coordinate calls with their IT departments. Projects were stalled for 3–6 months until this was sorted.

It should not be surprising that if a company wanted to promote the safety of a cloud-based architecture, it should also provide resources that could address some of the industry's concerns to support a quicker path to adoption. That is precisely what IBM did in April 2011. They founded the Cloud Standards Customer Council as an end-user advocacy group to accelerate the adoption of cloud services. The Council created guidelines for companies to use in charting their path to cloud

adoption, outlined options to remove barriers due to security concerns, and contributed to the development of organizational standards. This foundational framework helped move cloud adoption more quickly. As more Fortune 50 companies adopted cloud-based technology, other companies would follow suit. If a Fortune 50 company could overcome the negative perceptions of data and end user security issues, so could they.

AGILE PHASE (2015–2021)

In 2015, Ardent Partners published their annual CPO Rising Study—The Agility Agenda. The study received feedback from 318 CPOs across 25 industries, plus interviews with 26 CPOs, of which 21 also responded to the survey. What was notable about 2015 was the formal announcement that the procurement organization was shifting out of the Strategic Phase and into the Agile Phase. Ardent Partners summarized, "The procurement teams that adeptly connect their tools, resources, and expertise to support the evolving needs of the business will succeed above all others. Agility will define the next wave of procurement success."

In 2015, Agile was used primarily in software development as an iterative process to develop smaller application capabilities to reach a faster production state. With cross-functional collaboration throughout the software life cycle, this continual improvement of processes enabled companies to release new application capabilities more frequently, with the expectation that each release brings improvement. Therefore, the agile process never ends until the application is considered end-of-life and terminated.

The 2015 CPO Rising study used this concept to summarize the overall theme from CPO feedback. It noted that an agile procurement organization translates into the "ability to quickly leverage alternative suppliers for a given commodity, part, or service in the event of a supply disruption or new business requirement." Current procurement practices of revisiting their supply base once every three to five years were no longer in alignment with expectations of corporate goals. Brands now needed to adjust more often to meet the behavioral changes of consumers who were becoming more educated. For example, information online helped educate users on the potential health concerns of certain

food ingredients, such as artificial sugars and synthetic colors. Using alternative, healthier ingredients is often more expensive for manufacturers, but companies must adapt to maintain sales once consumers possess that knowledge. Some examples of brands changing ingredients in 2015 include:

1. Nestlé announced it would remove artificial colors and flavors without affecting product quality or increasing prices. Pressure from consumer behavior was the primary factor. This decision affected over 250 products across 10 brands, including the popular Butterfinger, Nestlé Crunch, and Baby Ruth candy bars. Instead, Nestlé planned to use ingredients from natural sources. For example, Butterfinger bars would now contain annatto, which comes from seeds found in the fruit of the Achiote tree, as the replacement for red dye #50 and yellow dye #5. Additionally, Nestlé Crunch bars began using natural vanilla instead of the artificial variety.
2. Kraft removed all artificial flavors, preservatives, and synthetic colors, including yellow dyes #5 and #6, and used paprika, annatto, and turmeric instead.
3. Pepsi announced it would stop using aspartame, commonly sold under the brands Equal and NutraSweet, as the sweetener in Diet Pepsi and other Pepsi products and replace it with sucralose, an artificial sweetener commonly known as Splenda. Pepsi executives referenced the driving factor as the consumer perception that aspartame is unsafe.

"Waste and Opportunity 2015," a report from *As You Sow* and the Natural Resources Defense Council, analyzed the packaging practices of 47 fast food chains, beverage companies, and consumer goods and grocery firms. The report was forthright about calling out major global brands and highlighting leaders and laggards. This report was just one of many that inspired consumers to reevaluate what was essential and change how they spent their money and who they spent it on. This renewed sense of consumer empowerment impacted how brands made and packaged goods.

For example, suppose consumers prioritized avoiding filling landfills and reducing plastics in the ocean. In that case, they may either share

their concerns with the specific brand out of loyalty or spend their money elsewhere. The choice to spend their money elsewhere does not go unnoticed. Recognizing a decline in sales is often the loudest metric for any company. The new agile procurement organization was coined to increase the organization's ability to adjust to consumers' changing needs.

The overall top strategies for all procurement organizations noted in the 2015 study were:

1. Improve collaboration with line-of-business leaders (42%)
2. Improve the use of technology (40%)
3. Implement stronger policies and processes (39%)

These strategies sparked a renewed interest in the procurement business and digital transformation initiatives with objectives to:

- Shift procurement and supply chain processes to cloud-based technologies
- Simplify and standardize processes
- Automate to reduce the end-to-end process cycle time
- Enable sharing of procurement information across global employees

Unfortunately, what did not change in 2015 was the pressure to find and drive more savings. This meant the procurement organization would be measured primarily by annual savings numbers or how much money the department could save the company. The focus on savings was a large obstacle and hindered CPOs from achieving the objectives outlined in the 2015 study (see Figure 2.9). Each year, the savings goals were increased or set higher than the year before.

Between 2015 and 2021, the procurement organization took a few steps forward by leveraging procurement cloud technologies to automate some processes, but automation alone could not fully realize its goals. In 2021, the following gaps still existed:

- Lack of confidence in procurement and supply chain data
- Lack of visibility in evaluating supplier risks
- Inaccuracies in data, limiting the ability to make actionable decisions

- Slow growth in foundational skills for procurement professionals to be effective
- Lingering tactical-level tasks and activities
- Limitations in understanding how to utilize digital technologies to their fullest potential

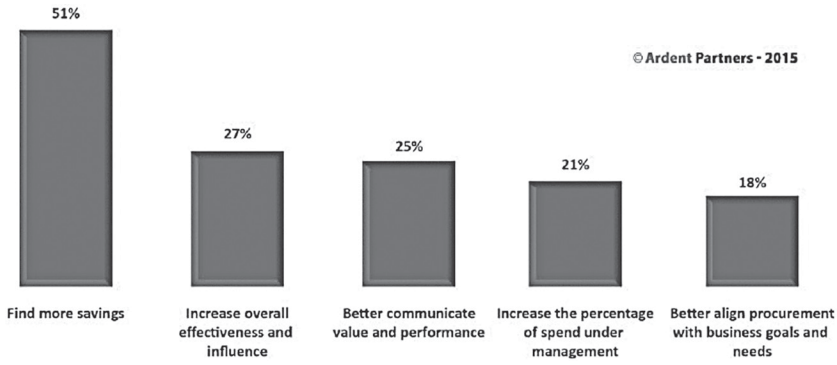


Figure 2.9 Prioritize savings above all

INTELLIGENT PHASE (2022–TBD)

The underlying shift in focus and data priority drives the Intelligent Phase. In other words, to use data to make better-informed decisions. Recognizing that data is not just about the right data at the right time but also about being able to pull that data when the decision is most impactful to the organization. Terms like *data competency*, *data literacy*, and *data culture* are standard in this phase. Other factors contributing to the Intelligent Phase are:

- The advancement of technology architectures and subsequent reduction in cost so more organizations utilize them
- Improvements in silicon chip processing power and speed to support artificial intelligence (AI) technologies that can analyze petabytes of data (or one million gigabytes)
- The acceptance of global remote collaboration because of the COVID pandemic to better cooperation and diversity of thought
- The use of application program interfaces connecting to more data sources to supplement large enterprise applications

The term AI used in this book is not about robots thinking for themselves or driverless taxis but the augmentation of the human thought process by assisting in day-to-day activities such as solving complex problems and performing repetitive tasks. The goal of this phase is to shift resources into more value-added roles. At the same time, technologies take over repeatable tasks, analyze large amounts of data quickly, reduce human bias, and improve the decision-making process in a shorter period. You might think, "Um . . . yeah, we heard this before. That same goal was supposed to be a benefit in the Agile Phase, so what is different?" The answer is that now we can access the technology and capabilities to back up that statement.

> Procurement and supply chain professionals are working with technologies that were not accessible five years ago and will more than likely work with technologies five years from now that do not yet exist today.

The goal is to set up a procurement organization for ongoing success that is scalable and sustainable to any future disruptions. More specifically, the procurement organization cannot continue to evolve without the combination of both business and digital transformation. One cannot truly sustain without the other.