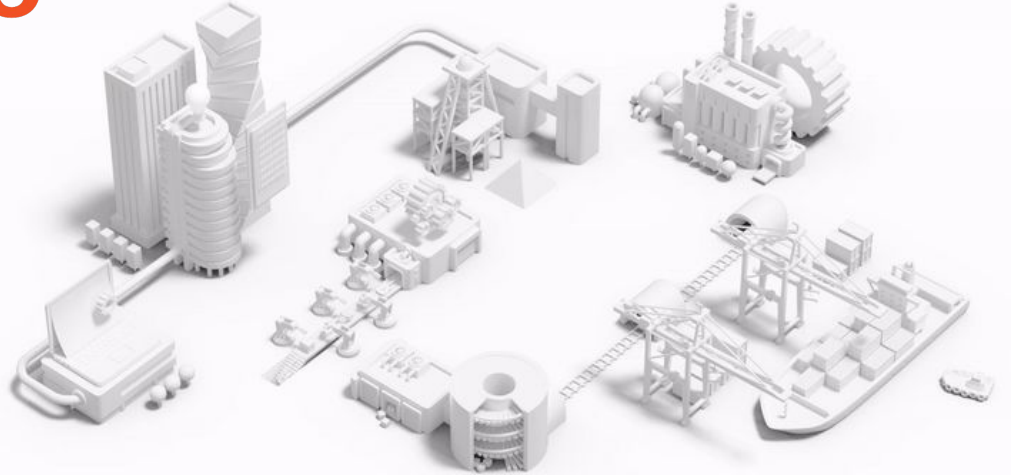




## Artificial Intelligence in the context of Direct Materials



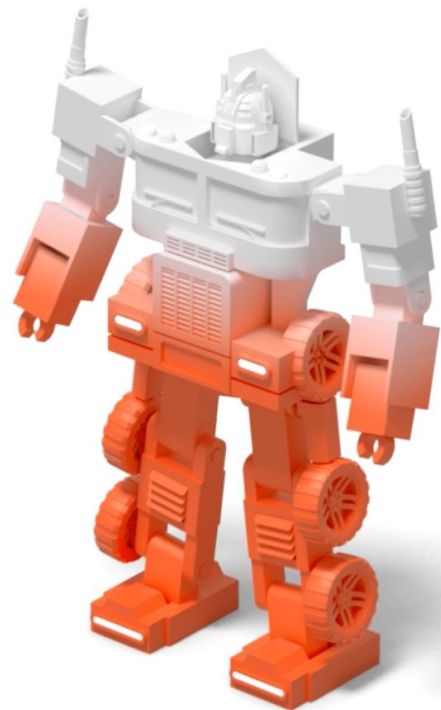
**Contact:** [spencer@lightsource.ai](mailto:spencer@lightsource.ai)  
**Website:** [www.lightsource.ai](http://www.lightsource.ai)

# Agenda

|   |                                   |         |
|---|-----------------------------------|---------|
| ● | <b>Intro to AI</b>                | 8 mins  |
| ● | <b>Gen AI vs. Agentic AI</b>      | 10 mins |
| ● | <b>Applications for AI</b>        | 10 mins |
| ● | <b>Future of Direct Materials</b> | 10 mins |
| ● | <b>Practical Advice</b>           | 8 mins  |
| ● | <b>Q&amp;A</b>                    | 5 mins  |

**AI won't take your job...**

**Someone who knows  
how to use it will.**

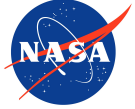


# Intro to AI



# Definitions: What is AI

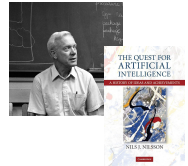
Artificial intelligence refers to computer systems that can perform **complex tasks** normally done by human-reasoning, decision making, creating, etc.



Artificial intelligence (AI): The simulation of **human intelligence** processes by machines, especially computer systems. These processes include learning, reasoning, and **self-correction**.

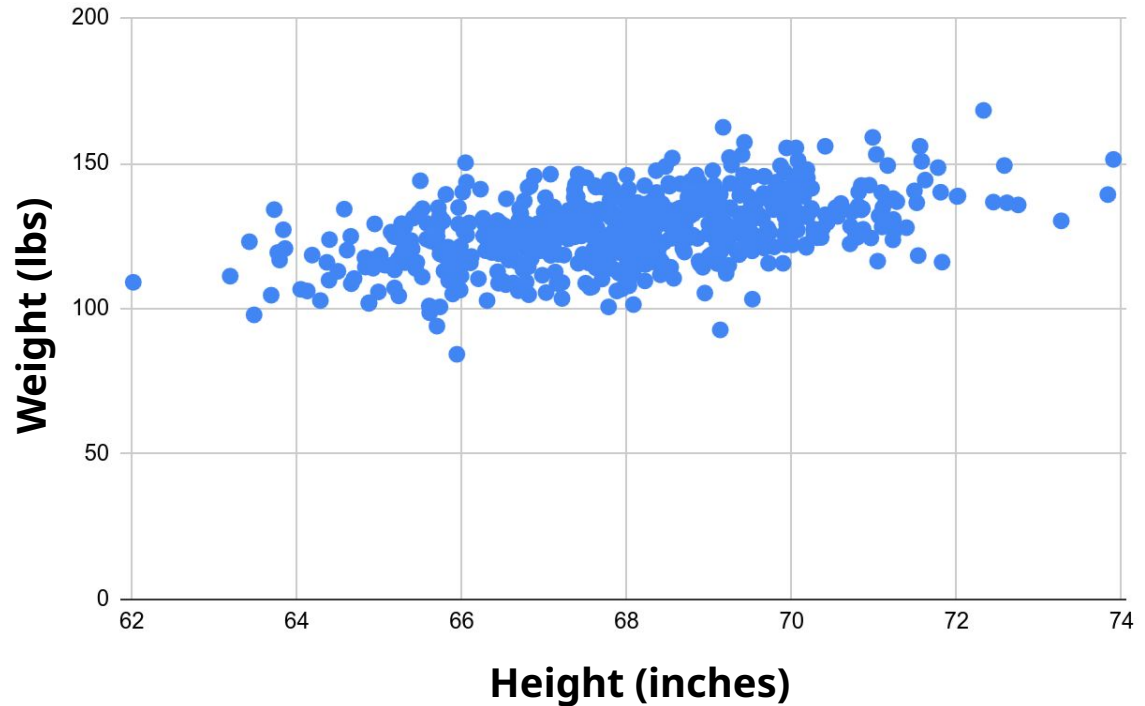
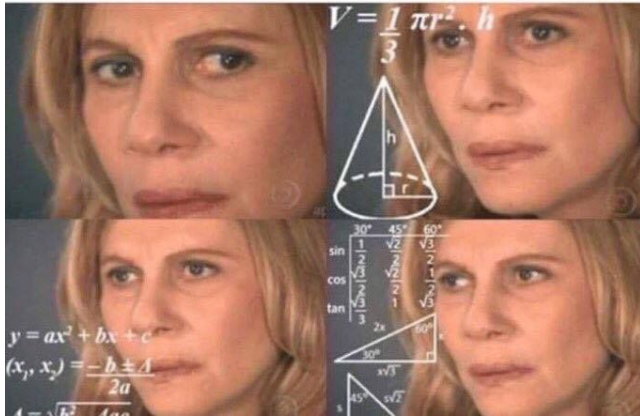


Artificial intelligence is that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with **foresight in its environment**.



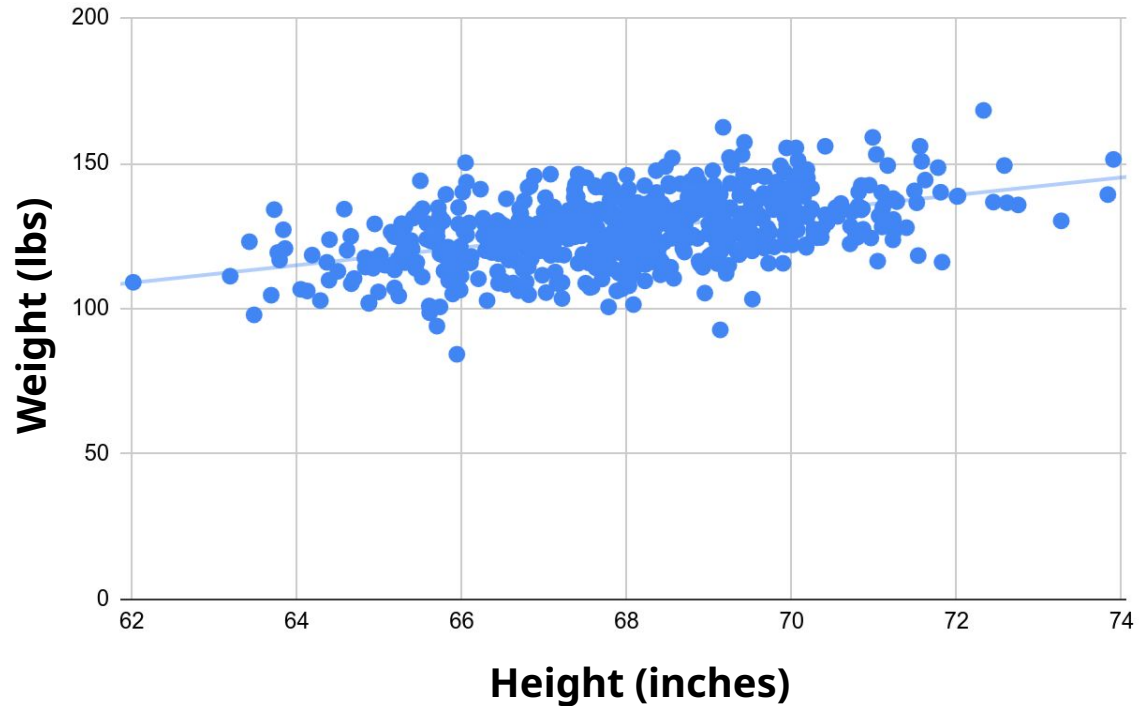
# Models: Making sense of noise

- How do we make sense of data?



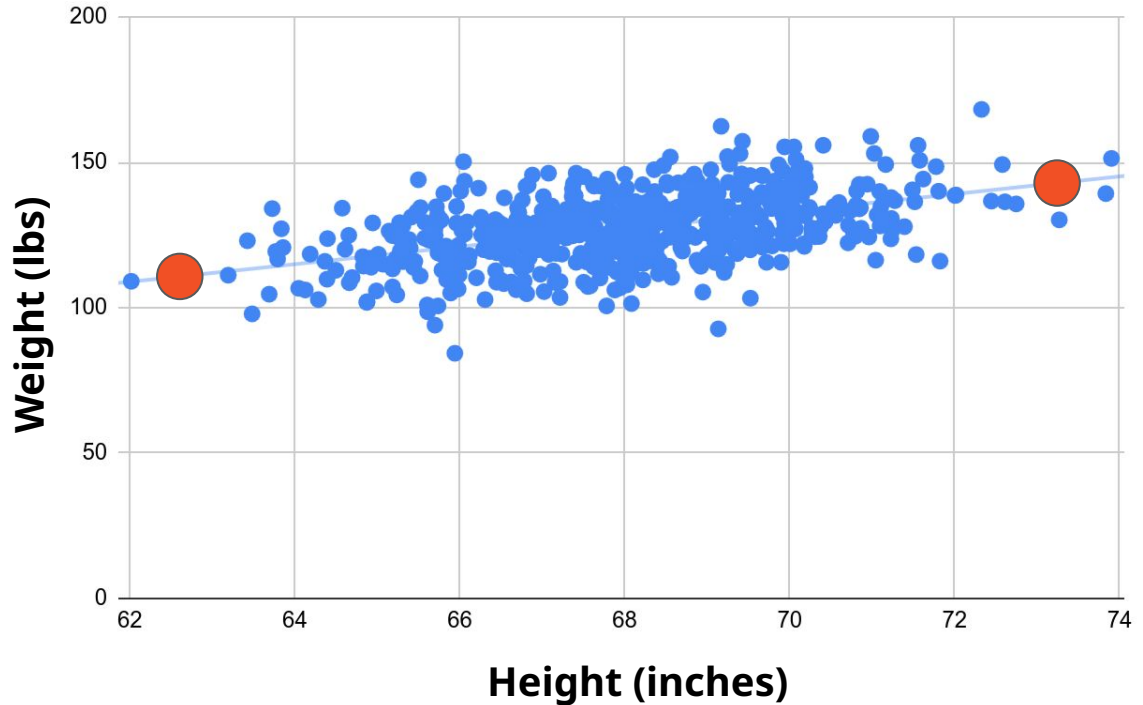
# Models: Making sense of noise

- How do we make sense of data?
- Trendline!







# Models: Making sense of noise

- How do we make sense of data?
- Trendline!
- What weight do we expect for a new person with height 74" ?
- Making predictions!

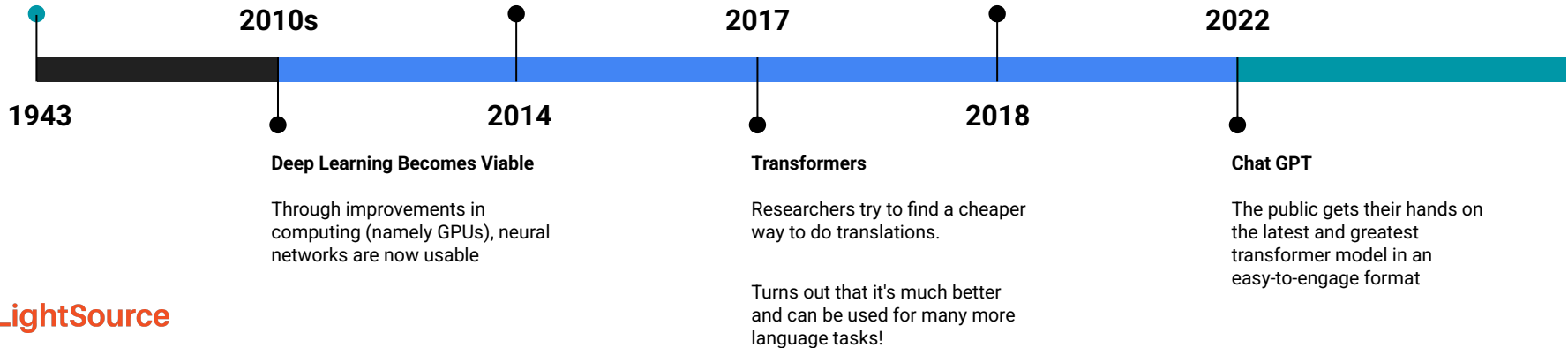


# (Abridged) History of LLMs

|        |   |
|--------|---|
| 1950's |  <b>Artificial intelligence (AI)</b><br><i>Human intelligence exhibited by machines</i>                          |
| 1980's |  <b>Machine learning</b><br><i>AI systems that learn from historical data</i>                                  |
| 2010's |  <b>Deep learning</b><br><i>Machine learning models that mimic human brain function</i>                        |
| 2020's |  <b>Generative AI (Gen AI)</b><br><i>Deep learning models (foundation models) that create original content</i> |

## Invention of first ML/AI Systems

Simple classifiers that could separate inputs into two groups



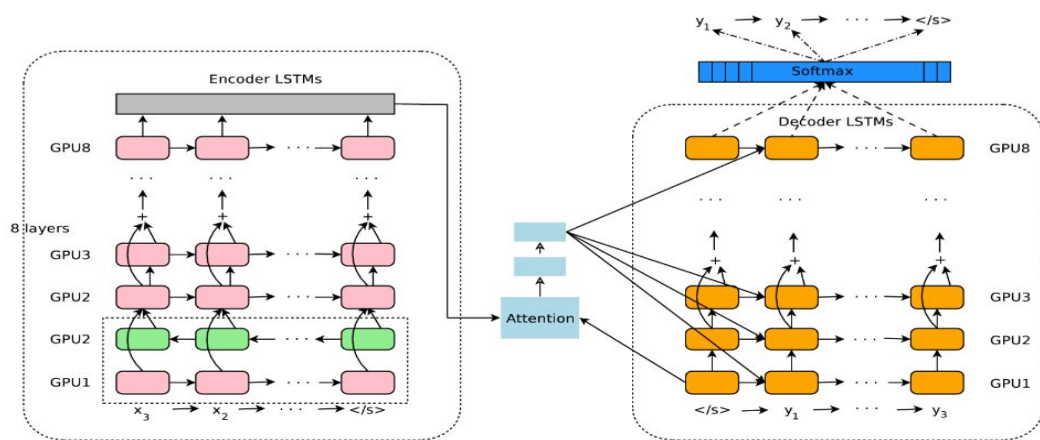
# Google Translate

Detect language **English** Spanish **↔** **Quechua** Hungarian German

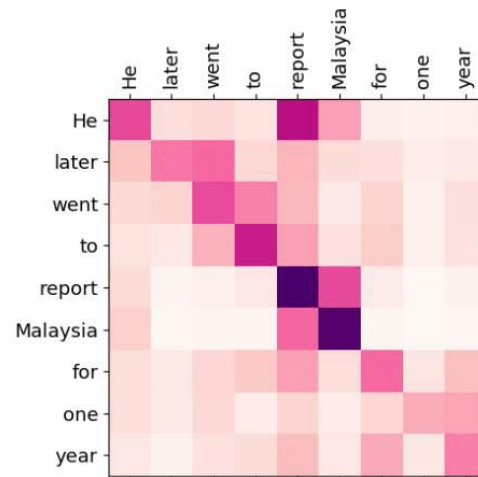
I love procurement software.  
LightSource is the best!

Software de contratación nisqatam  
anchata munani. LightSource  
aswan allinmi!

53 / 5,000



|      |      |      |      |
|------|------|------|------|
|      | I    | love | you  |
| je   | 0.94 | 0.02 | 0.04 |
| t'   | 0.11 | 0.01 | 0.88 |
| aime | 0.03 | 0.95 | 0.02 |



# Transformers

arXiv > cs > arXiv:1706.03762

Search  
Help |

## Computer Science > Computation and Language

[Submitted on 12 Jun 2017 (v1), last revised 2 Aug 2023 (this version, v7)]

### Attention Is All You Need

Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Lukasz Kaiser, Illia Polosukhin

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks in an encoder-decoder configuration. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.

Comments: 15 pages, 5 figures

Subjects: **Computation and Language (cs.CL)**; Machine Learning (cs.LG)

Cite as: arXiv:1706.03762 [cs.CL]

(or arXiv:1706.03762v7 [cs.CL] for this version)

<https://doi.org/10.48550/arXiv.1706.03762>

#### Submission history

From: Llion Jones [view email]

[v1] Mon, 12 Jun 2017 17:57:34 UTC (1,102 KB)

[v2] Mon, 19 Jun 2017 16:49:45 UTC (1,125 KB)

[v3] Tue, 20 Jun 2017 05:20:02 UTC (1,125 KB)

[v4] Fri, 30 Jun 2017 17:29:30 UTC (1,124 KB)

[v5] Wed, 6 Dec 2017 03:30:32 UTC (1,124 KB)

[v6] Mon, 24 Jul 2023 00:48:54 UTC (1,124 KB)

[v7] Wed, 2 Aug 2023 00:41:18 UTC (1,124 KB)

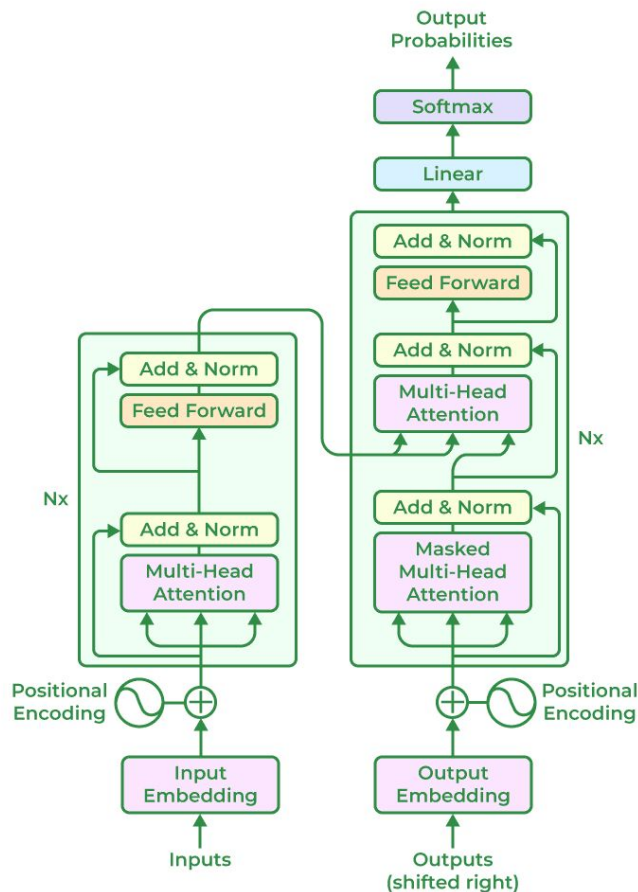
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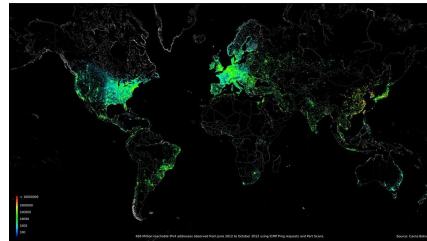
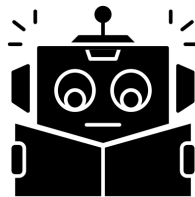


# Generative Pretrained Transformer 3rd version

What am I going to say next

|  |   |
|--|---|
| System Prompt (human-written)                | <i>Legolas and Gimli advanced on the orcs, raising their weapons with a harrowing war cry.</i>  |
| Model Completion (machine-written, 10 tries) | The orcs' response was a deafening onslaught of claws, claws, and claws; even Elrond was forced to retreat. "You are in good hands, dwarf," said Gimli, who had been among the first to charge at the orcs; it took only two words before their opponents were reduced to a blood-soaked quagmire, and the dwarf took his first kill of the night. The battle lasted for hours until two of the largest Orcs attempted to overwhelm Aragorn. When they finally stopped, they lay defeated and lifeless for miles and miles. |

<https://openai.com/research/better-language-models>

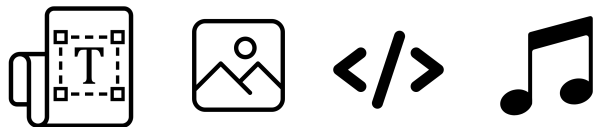




# “Agentic” AI versus Gen AI

# Generative AI

*Reactive*

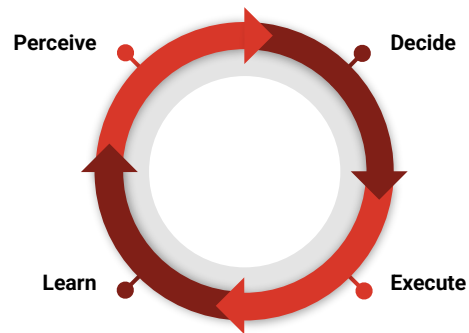


Giant pattern-matching machines, learned from massive datasets. Predicts “what should come next”. Ends with Generation (won’t take more action without your input)

LLMs

# Agentic AI

*Proactive*



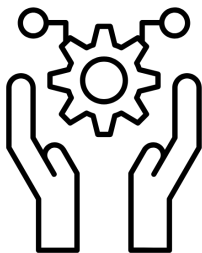
Not reactive, but proactive system. Starts with prompt (Similar to Gen AI). Lifecycle with minimal human interaction

LLMs are the “common foundation”

\* (except diffusion models for images).

# Generative AI

Reactive

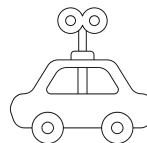


- Review
- Refine
- Direct

## Skills Required:

Ability to work with tools to accomplish tasks

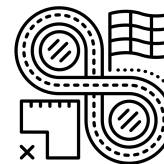
LLMs



RPA-like systems

# Agentic AI

Proactive



“Chain of thought reasoning”

- Break down task into logical steps
- Internal dialogue

For example: organizing ISM:

1. Understand conference requirements
2. Research available venues
3. Check availability of venues
4. Invite speakers
5. Sell tickets

## Skills:

system-design thinking

# What are the different ways that AI can (and cannot) be used in an application?

**Non-deterministic tasks**

(e.g. generative LLMs)



**Deterministic tasks**

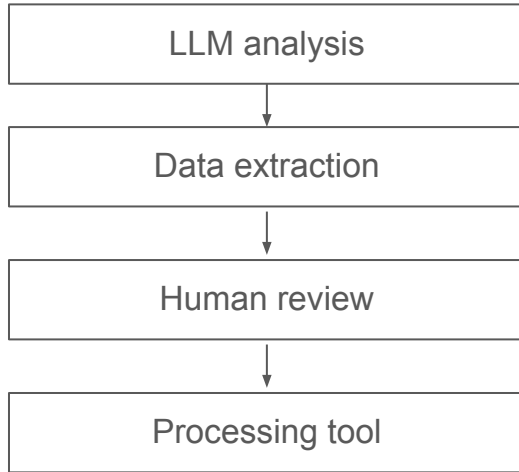
(e.g. traditional code execution)

**Agentic**

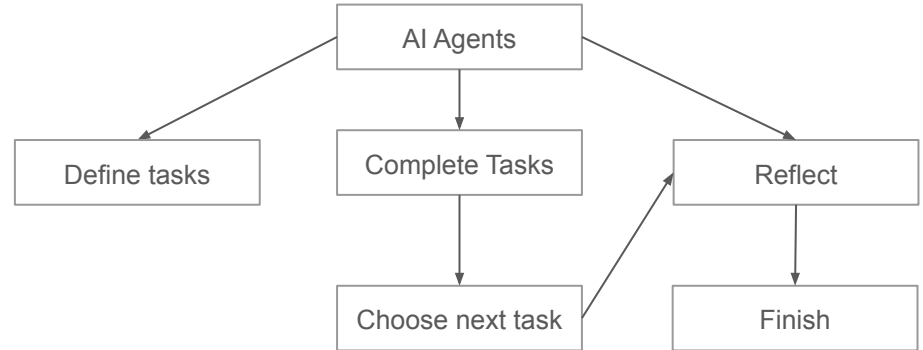


# Two Paradigms: Agentic workflow vs. AI Agents

## Agentic workflow



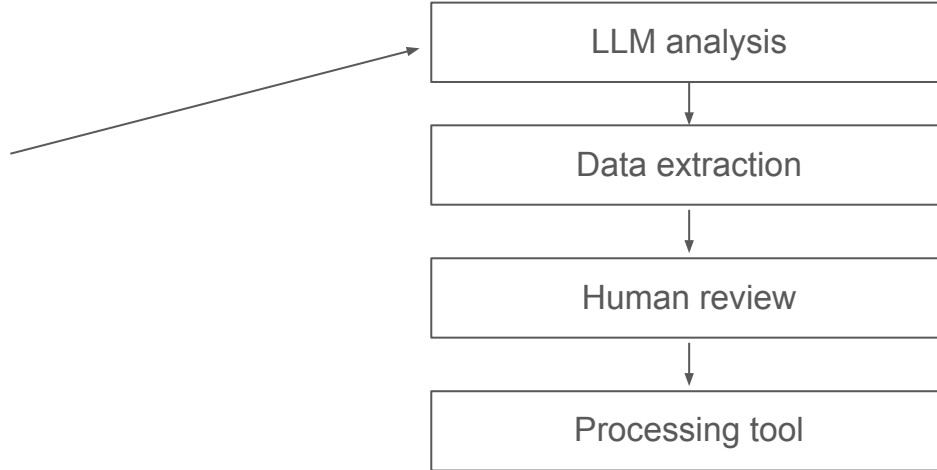
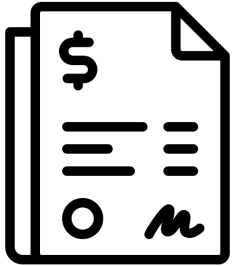
## AI Agents



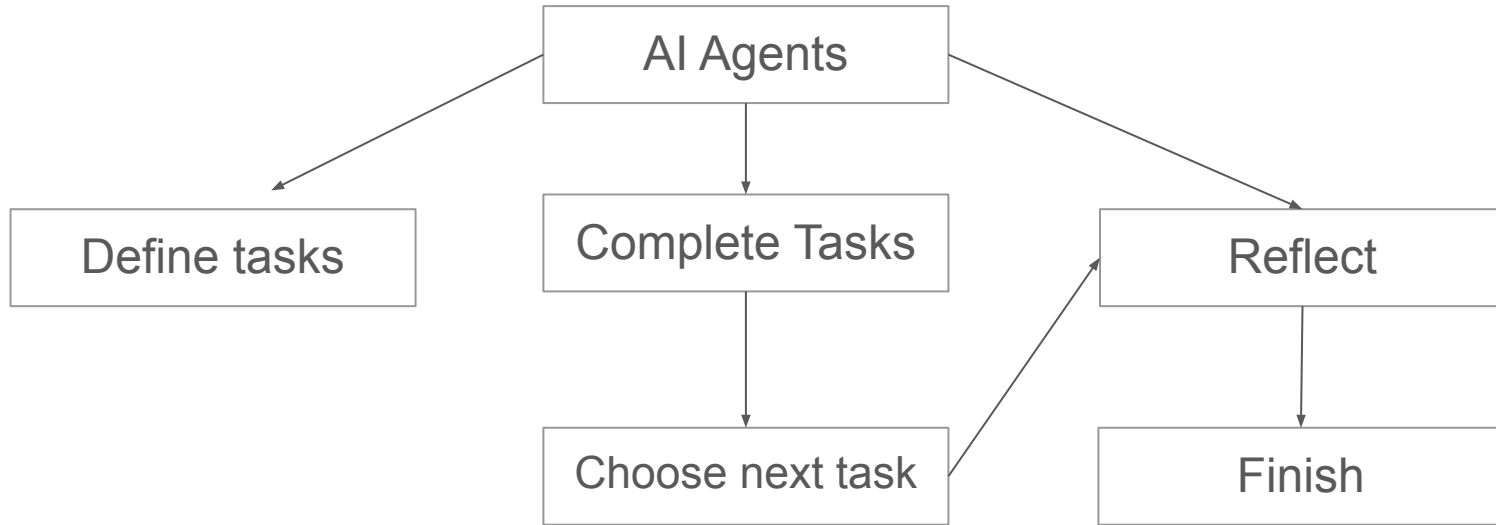
# AI Applications in Practice

# Workflow Example: Processing an Invoice

## Agentic workflow



# Agentic AI Example: “Develop an app for notifying me of contract expiration dates”





# Applications: When to use a workflow tool vs. AI Agent

## Agentic Workflow:

- Deterministic Outcomes
- Well Defined Tasks

## AI Agents:

- Autonomous Problem Solving
- Complex Task Automation
- Unpredictable Environments

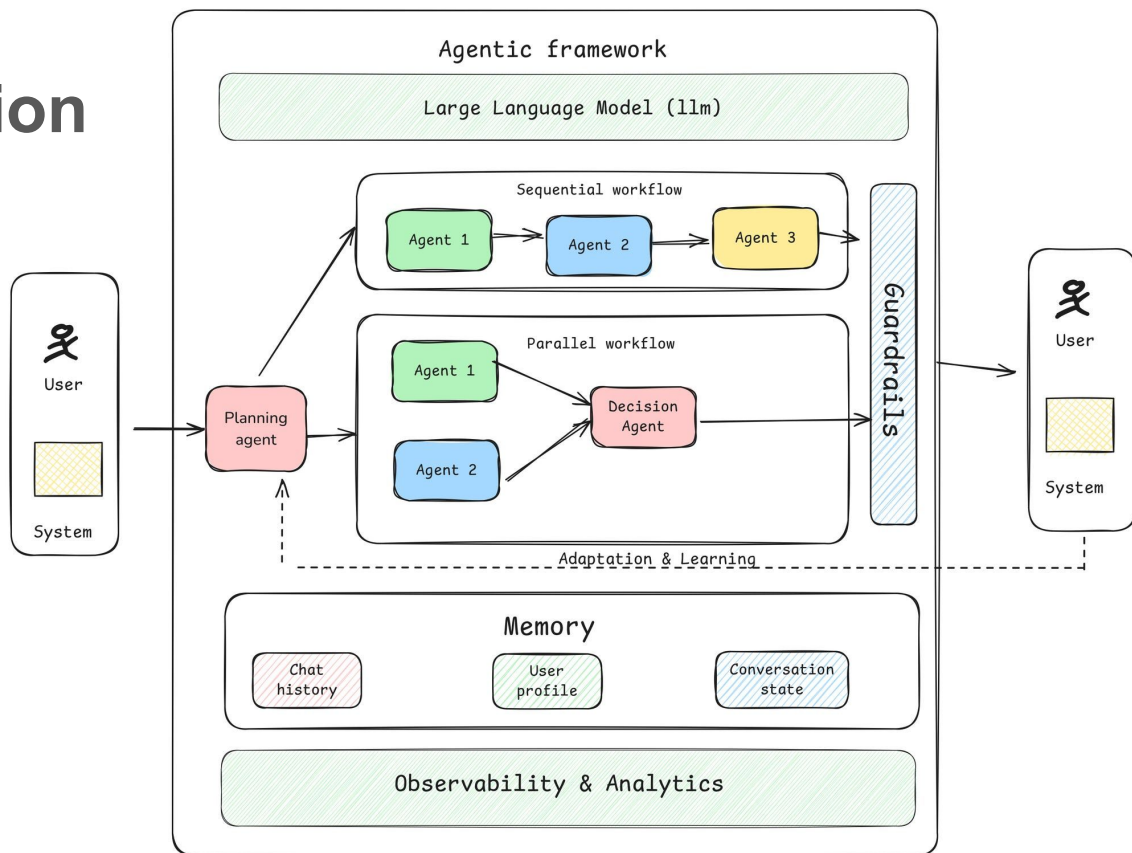
“WYSIWYG”

“Be prepared for incorrect outcomes”

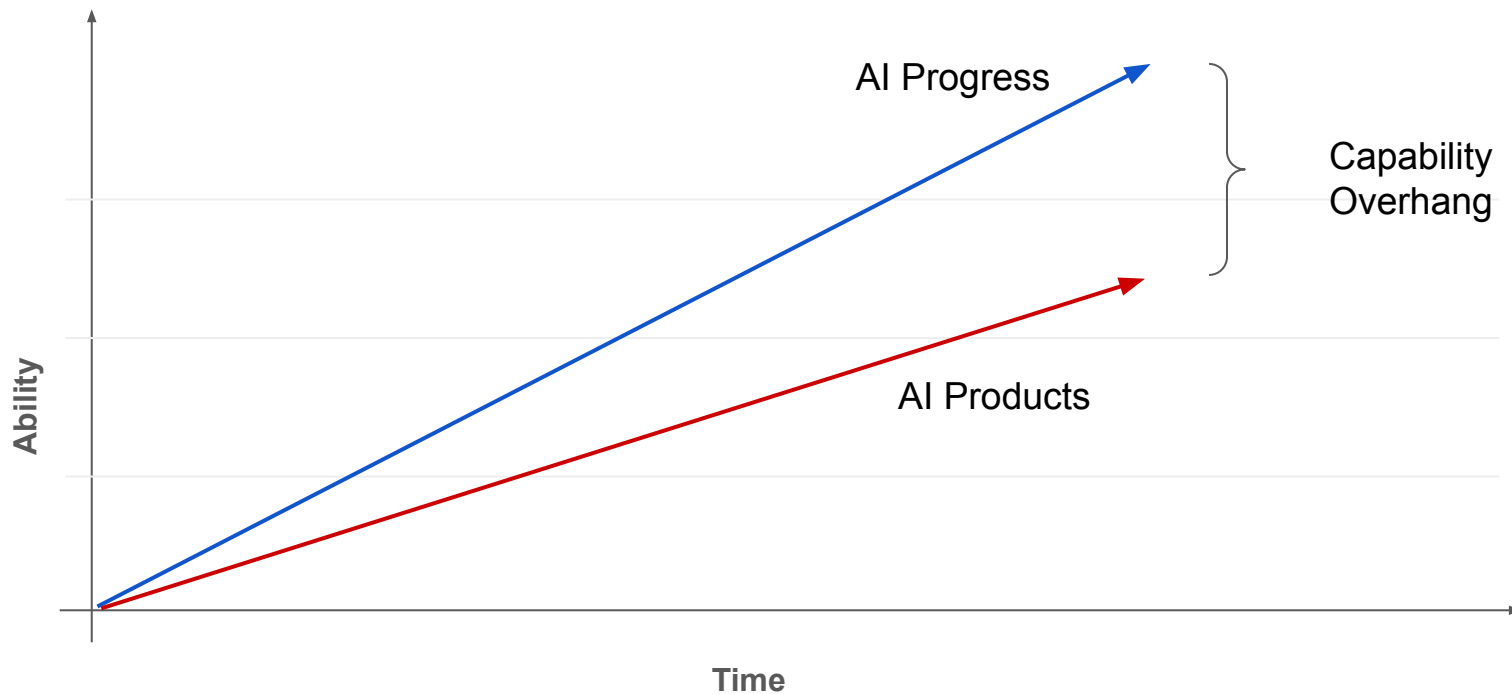


# Flavors of Agent: Increasing Sophistication

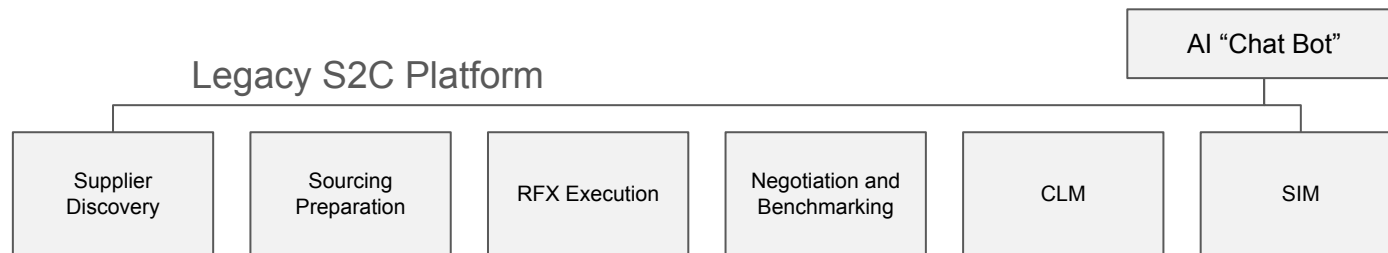
1. Simple Reflex Agents
2. Model-Based Agents
3. Goal-Based Agents
4. Utility-Based Agents
5. Learning Agents



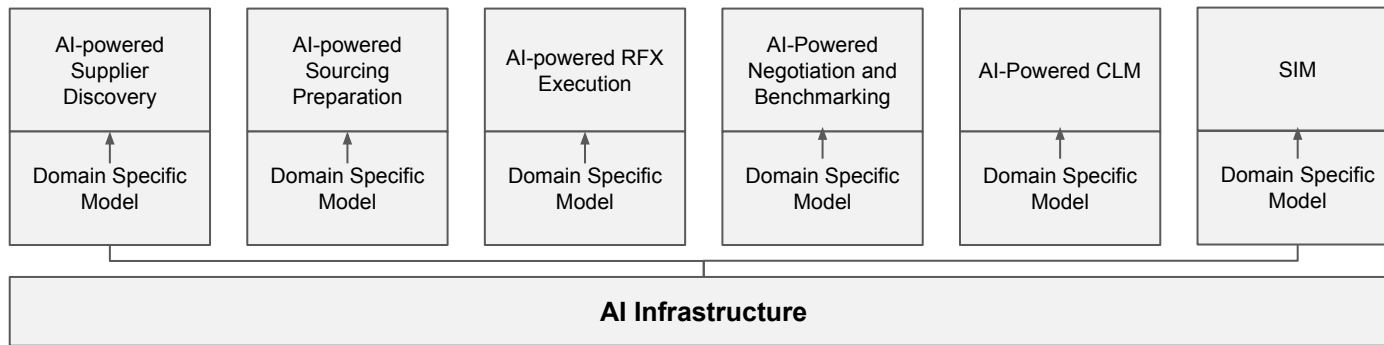
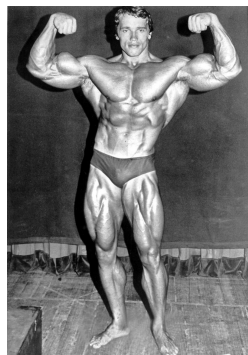
# AI “Capability Overhang”



## AI-Washing: Adding a Chat Bot veneer on top of standard tools



## AI-Native: Embedding Purposeful AI to Achieve Goals



# **Future of Direct Materials**

## Our Mission:

**Elevate Direct + Strategic  
Indirect procurement teams  
with world-class software tools.**



**Direct:**

“What a company buys to put into its product.”

VS

**Indirect:**

“What a company buys to consume itself.”

**Direct**

Repeatable or  
“Strategic” Indirect

Tactical Indirect

Expense Spend “Tail”

**Direct**

**Indirect**

 **LightSource**

Car parts, chemicals, PCB components, ingredients...



Logistics, packaging, facilities mgmt, marketing, IT, corp travel



Office supplies, MRO, professional services, temp labor, subscriptions



... everything else. Either ad hoc or one-off



## Company

### San Francisco-based

headquarters, with offices in **Boulder**, CO and **Seattle**, WA

**30+**

Enterprises use LightSource for strategic sourcing today

**2,800+**

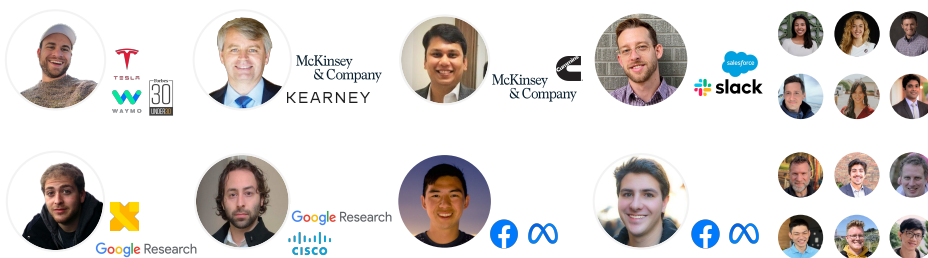
Suppliers onboarded and collaborating with their Customers

**100+**

Countries represented across 4 continents

## Leadership Team

### Engineering and procurement experts from the world's leading companies



### Funded by iconic venture and private equity investors

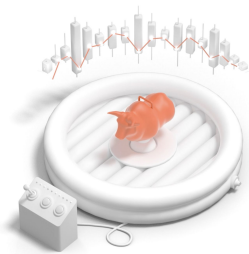


## Customers





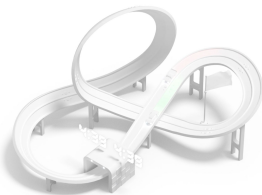
# Procurement teams using the right tools deliver incredible impact:



**3 - 15%**

**YoY reduction of spend**

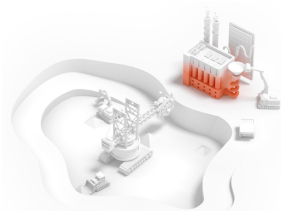
Meaningful margin contribution and growth, with both improved visibility and the controls to effect change.



**2x**

**faster sourcing cycles**

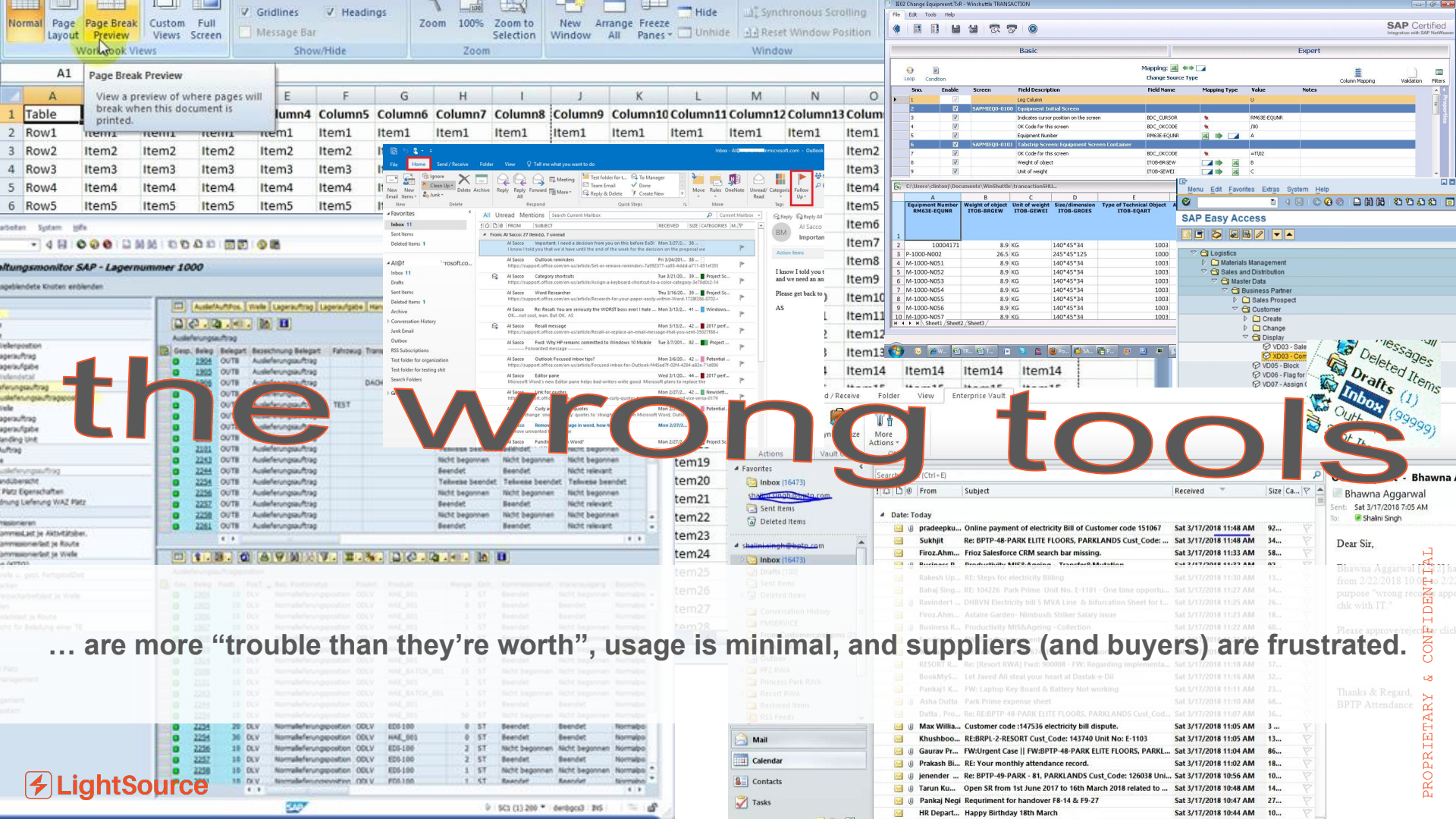
Process excellence – enhancing efficiency, agility, resiliency  
→ 20-30% higher FTE productivity.



**Happier**

**buyers (and suppliers)**

More productive and collaborative supplier relationships. Greater strategic engagement with internal stakeholders.



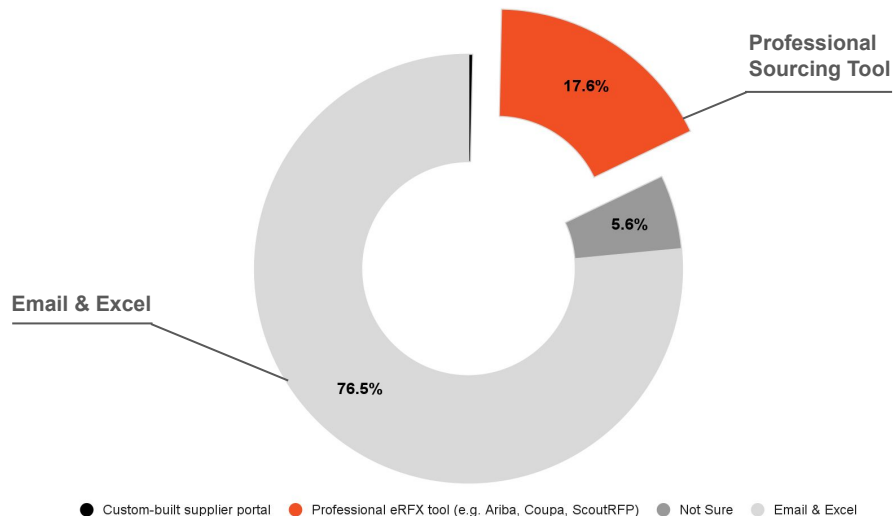
... are more “trouble than they’re worth”, usage is minimal, and suppliers (and buyers) are frustrated.



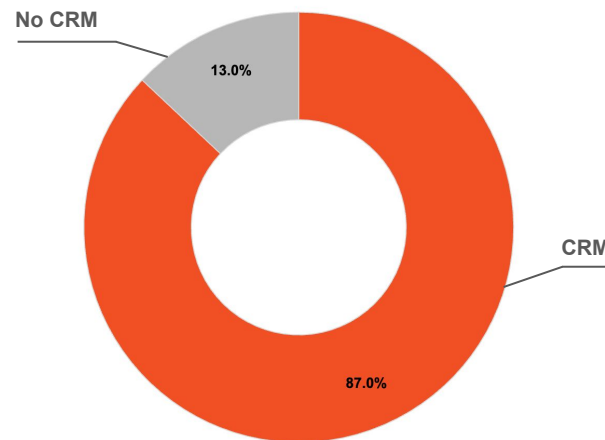
PROPRIETARY & CONFIDENTIAL

# 25 years after the introduction of the first e-Sourcing software, Email & Excel are still the #1 tool used by Procurement

## Procurement



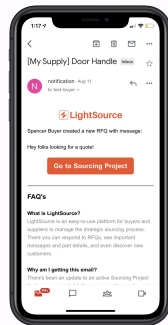
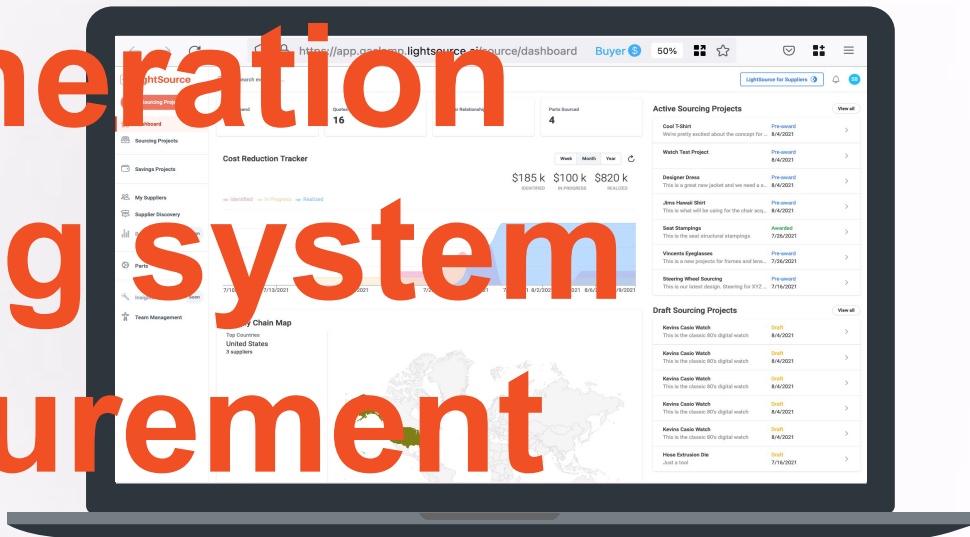
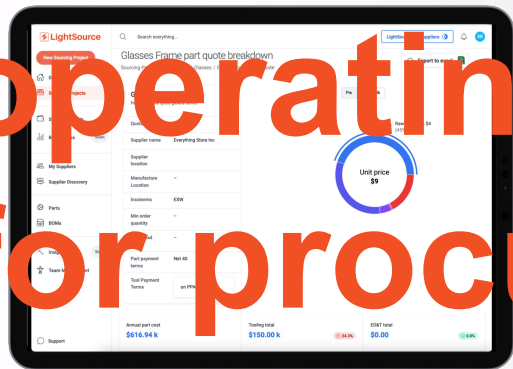
## Sales



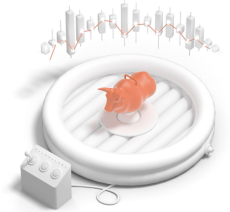
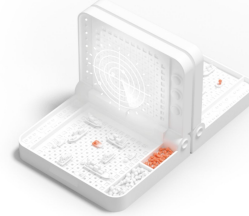
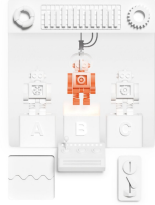


# LightSource

# The next-generation operating system for procurement teams



# Foundational Activities



**What** to buy

**Whom** to buy  
from

**How** much to  
buy for

**Tracking**

**Payment**

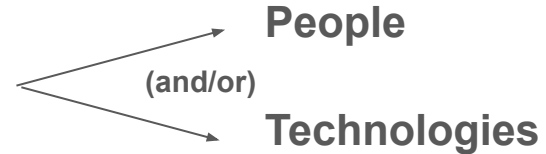
# Foundational Activities

**X**

## Spend Landscape

**=**

## Process Required



# Illustrative Example: Process by Activity



**What to buy**



**Who to buy from**



**How much to buy for**



**Tracking**

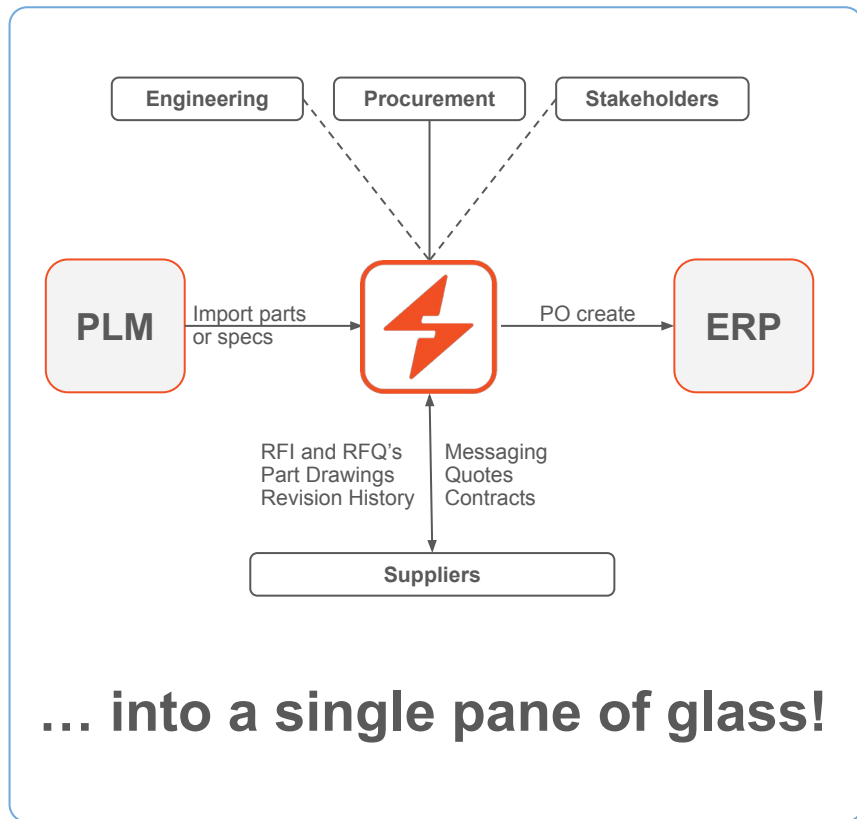
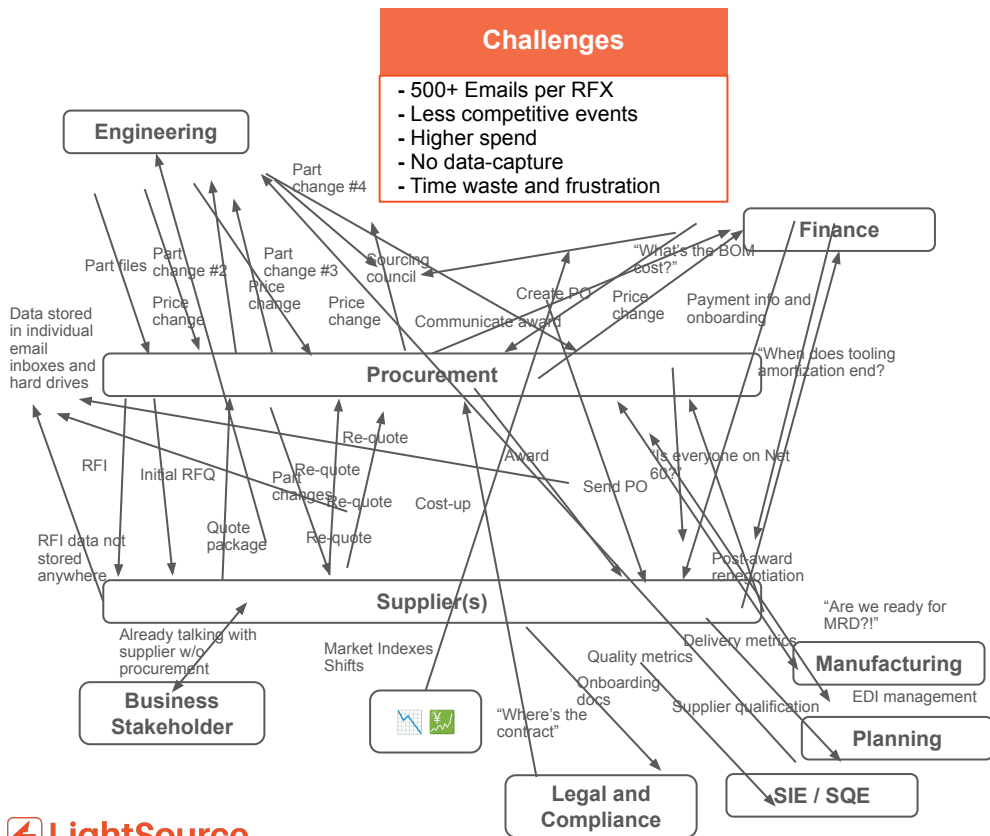


**Payment**

| <b>Direct</b>   | EDI / Demand Planning | RFX w/ Supplier Discovery | Strategic Negotiation in each instance   | Material Planning + Logistics  | ERP (or P2P)           |
|-----------------|-----------------------|---------------------------|--|--------------------------------|------------------------|
| <b>Indirect</b> | Requisition Intake    | Approved Vendors with MSA | Framework Pricing (or Rapid negotiation) | Requisitioner managed delivery | P2P or (sometimes ERP) |
| <b>Tail</b>     | Maverick Needs        | Preference of Individual  | Expediency                               | Requisitioner managed delivery | Purchase Card          |



# LightSource helps bring Sourcing chaos



# LightSource is a comprehensive Sourcing Solution without the need for system integration

## AI-Powered Source to Contract (S2C)

## ERP (or P2P)

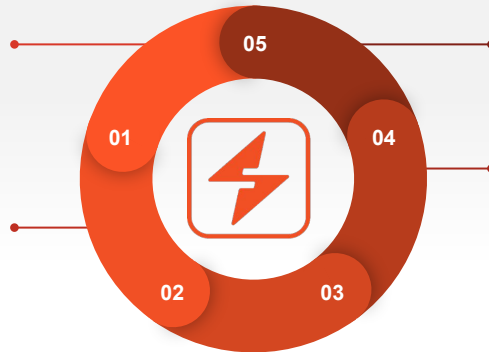


### Supplier Discovery, Onboarding, and SRM

Find new suppliers, enrich understanding of incumbent suppliers, and track supplier performance through scorecarding and experience management tools

### Agile Sourcing (RFx)

The only RFI, RFC, RFP system built on the agile-methodology. Enhance sourcing velocity and category insights by leveraging platform content including supply base information, best-in-class bid sheets and benchmarks



### Supplier Sub-tier Quoting

Allows suppliers to use LightSource for their own sub-tier sourcing, in the process identifying savings that can be shared with or passed-on to their customers

### Communication and Document Mgmt (CLM)

All sourcing project communication and documentation (including spec details, NDAs, SLAs and contracts) is executed and captured on the platform and available for future sourcing cycles

### Cost Engineering (Should-cost)

Should-cost modeling as well as public market benchmarks and indexes support credible target-setting and honest negotiation.

# Global Reach LightSource is actively used in 100+ countries

LightSource is the *only global procurement platform* locally accessible in Mainland China (with a deployment at [www.lightsource.cn](http://www.lightsource.cn))

Through a partnership with AWS China and a China Unicom (6rd largest mobile carrier in the world), the LightSource front-end site is deployed within mainland China, and without restrictions from the “Great Firewall”

Suppliers and Customers based in China are able to access LightSource reliably (a) without the use of a VPN and (b) within the bounds of local laws.

LightSource Internet Cloud Provider (ICP) License: 京ICP备2021009027号-17



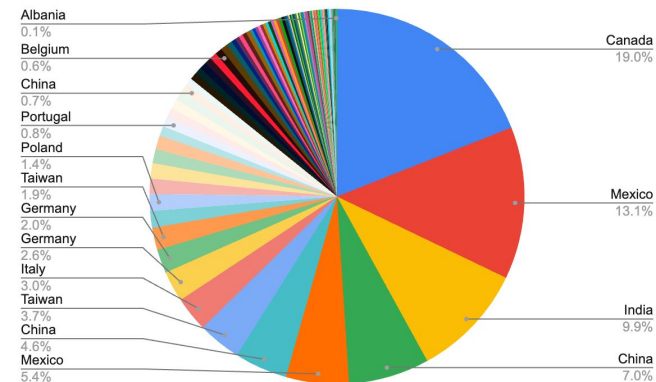
**LightSource is a global company** With locations in San Francisco (Headquarters), Boulder CO, Seattle WA, Germany, and Vietnam – available to serve customers 24/7.




## LightSource Companies by Country

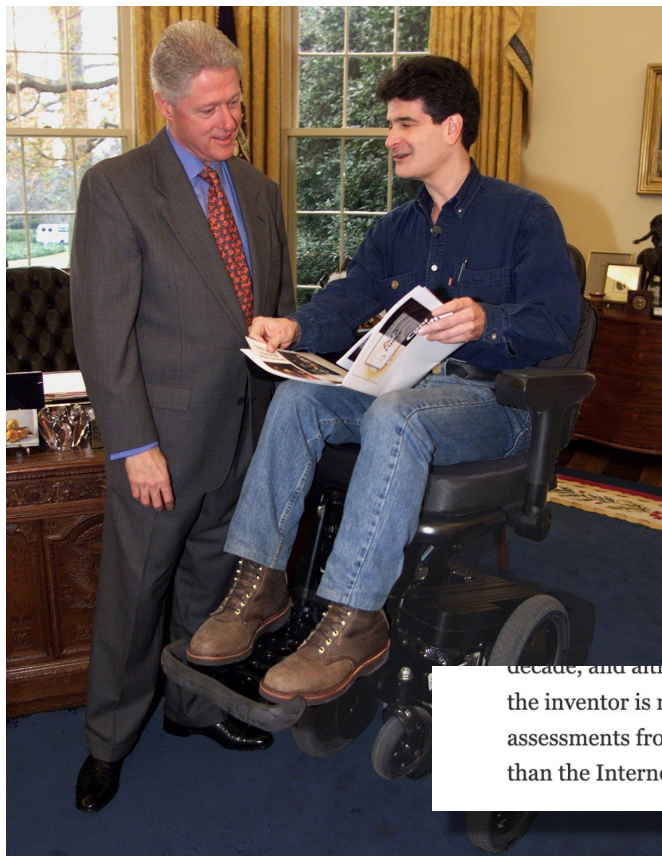


## Breakdown of Countries (excl. US)



**Technology** →  **Problem**

**Problem** →  **Solution**



TIME

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## Reinventing the Wheel

By John Heilemann | Sunday, Dec. 02, 2001

Like 0

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decade, and although the author (with whom

the inventor is no longer collaborating) never revealed what Ginger was, his précis included over-the-top assessments from some of Silicon Valley's mightiest kingpins. As big a deal as the PC, said Steve Jobs; maybe bigger than the Internet, said John Doerr, the venture capitalist behind Netscape, Amazon.com and now Ginger.

"Just lean forward," Kamen commands, so I do, and instantly I start rolling across the concrete right at him.

"Now, stop," Kamen says. How? This thing has no brakes. "Just think about stopping." Staring into the middle distance, I conjure an image of a red stop sign—and just like that, Ginger and I come to a halt.

"Just think about backing up," Kamen says. I

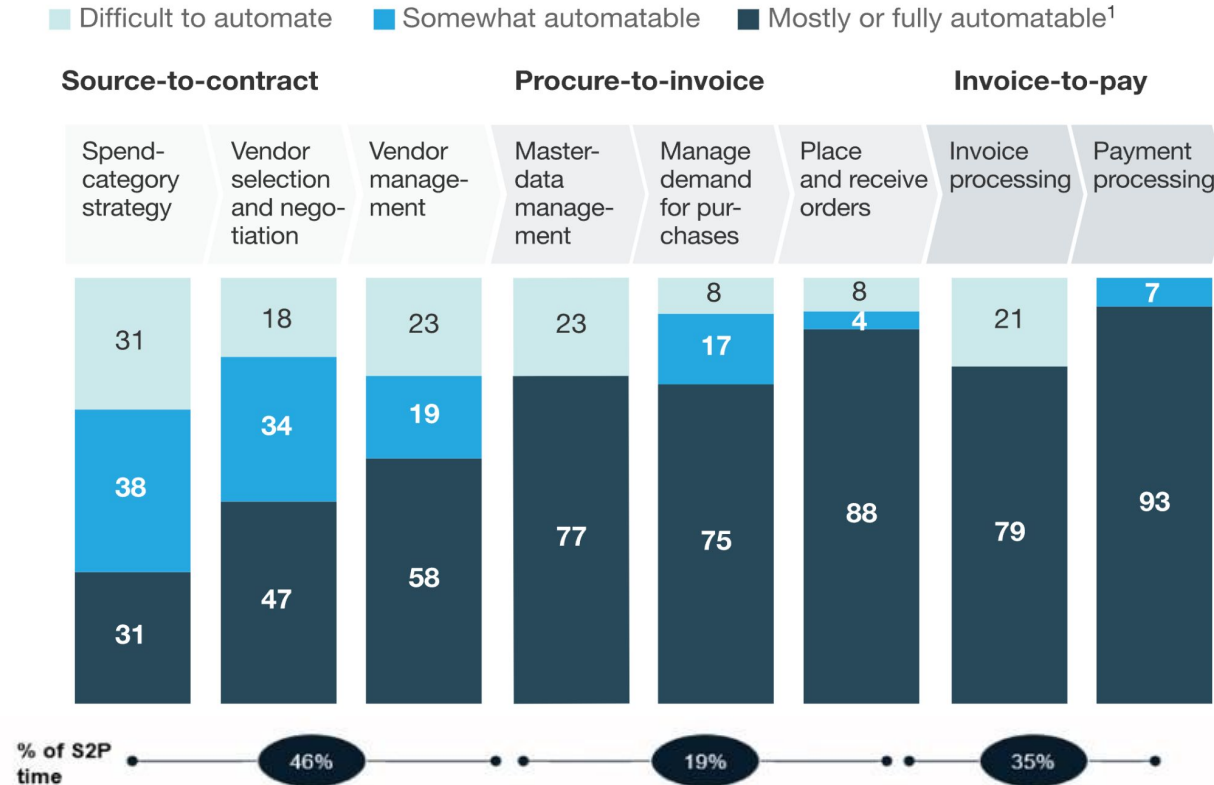
### SEGWAY'S SPECS

**COST:** About \$8,000 for industrial models; consumer versions may cost \$3,000.

**MAXIMUM SPEED:** 5 m.p.h. to 17 m.p.h., depending on settings

Follow @TIME

**McKinsey Study:** Source-to-contract (S2C) represents ½ of procurement time spent, and is the most difficult to automate. So legacy technology solutions only address the P2P (easier to automate) side.



<https://www.mckinsey.com/capabilities/operations/our-inasig>  
<https://a-road-map-for-digitizing-source-to-pay>

**Q&A**