



The Future of Applied AI in Ecommerce

Lucidworks

Commerce Has a Data Problem

With data coming from many different sources and formats, brands and the vendors that support them are struggling to connect the dots. They fail to create the personalized shopping experience that consumers are starving for. AI is the best way to take advantage of that data and apply it to produce a customized buyer's journey.

Applied AI leverages a set of technologies that augment human tasks and solve business problems more accurately and efficiently. Applied AI typically encompasses machine learning, natural language processing, and data from signals augmented with algorithmic intelligence.

Ecommerce has been one of the most elegant industries to employ applied AI and realize immediate benefits. Many retailers are likely deploying some form of AI-based technology in their ecommerce today. In this white paper we'll present a logical methodology for deploying AI in stages across ecommerce operations and beyond. Enormous benefits can be realized regardless of your vertical or category (B2B, B2C, DTC, omnichannel, etc.),

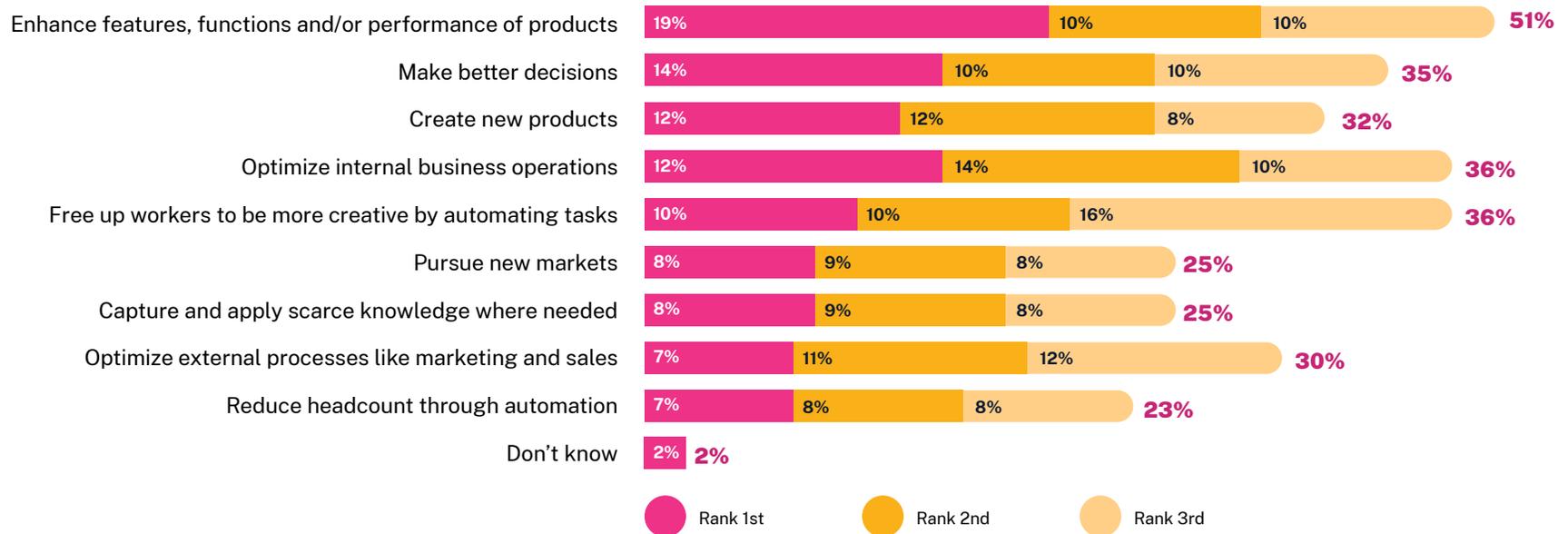
We will focus on using AI for the four following objectives:

- 1 Develop your commerce intelligence to better understand your customer and their product and content needs
- 2 Detect intent so you identify and unify all of the available data to organize information and support actual business outcomes
- 3 Enrich your data and leverage existing source systems to drive more acquisition, conversion, and revenue
- 4 Create a fully personalized and connected experience for both your customer and your employee journeys with next gen cognitive commerce only possible with AI

AI Transformed the Modern Commerce Experience

Companies leveraging AI are realizing, on average, a 10-12% revenue gain¹ and the technology is expected to boost profitability by 59% by 2035.

AI PRIMARY BENEFITS TO COMPANIES

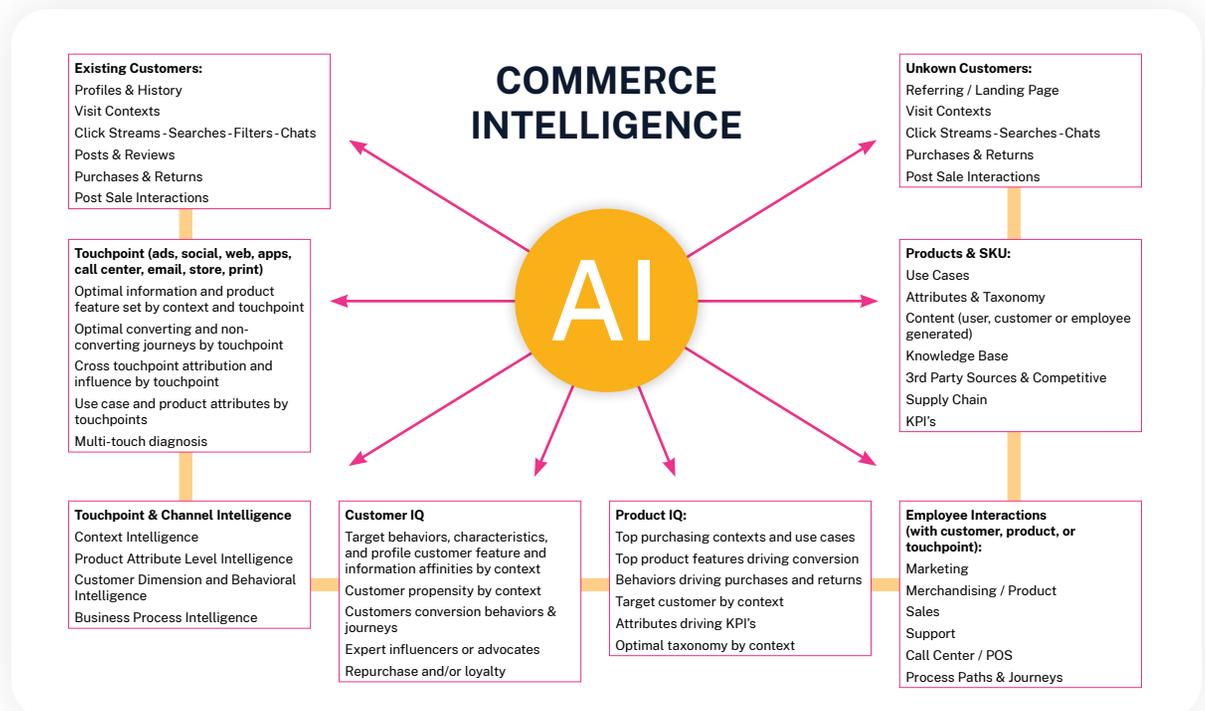


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91% of consumers are more likely to shop with brands that recognize them and provide them with a relevant experience.²

Develop Your Commerce IQ

Commerce intelligence requires continuous effort to learn and understand your shoppers, their journeys, how they use your products, and how they interact with your brand. While this capability is fundamental to any business, it's crucial in ecommerce. However, only 14% of executives report that they currently have truly customer-centric strategies. While product-centric strategies are still important, combining the two is something AI can definitely enable.



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AI can identify types of products and all of their respective attributes, shopper personas, and how those products and branded content are used throughout the buying journey.

This is critical to driving affinity towards your brand. AI can also uncover the relationships these insights have to your KPIs to help with problems such as cold start, private browsing, and cross-device mapping. This is particularly important as privacy and data sharing constraints such as ITP, GDPR, and CCPA continue to expand.

Developing commerce intelligence can be done by instrumenting your customer and employee-facing applications. AI can detect patterns in employee/customer interactions and extract use cases from the interaction content. Models can be trained on various information sources surrounding your products such as product catalogs, attribute categories and seasonal marketing data. The context of your shopper interactions — the when, where, and how they purchase — will help further elevate this capability.

Just as important as why customers do buy, is understanding why they don't buy or leave your site.

This requires the collecting of active behavioral data — clickstream, search, browse, email, and chat — and pairing it with information in your analytics and customer data platforms (your CDP and/or CRM). It's also an essential step to be diligent about mining through historical enterprise-wide data and connecting all of the dots there. Folding

in data from call centers and brick and mortar stores will also add an additional and vital intelligence layer. Augmenting all of this with available demographic, psychographic, geographic, and knowledge graph data provides additional training for the AI to capitalize on. The AI can then be used to validate and modify existing segmentation or customer intelligence you may already have in place.

AI really leaps ahead when going beyond segments and clusters, down to the individual shopper in the moment.

Shopper behavior changes as the purpose of their site visit changes. For example, during the holidays, when customers are not shopping for themselves and instead shopping for their family, friends, and even pets, AI can detect and understand these variations automatically.

Thanks to event tracking and big data analytics, it is possible to quickly uncover how your users shop, what is important to them, what drives them to purchase, and more about their overall persona. While privacy and compliance are always a concern, research shows that 91% of consumers are more likely to shop with brands that recognize them and provide them with a relevant experience.

This brings us to **Step 2**, AI-powered needs and goal detection.



83% of customer experience stakeholders cited linked business outcomes to customer needs.

Detect Shopper Needs, Goals, and Intent

AI can infer shopper needs and their ultimate goals by mapping their interactions. Important outcomes include detecting what product and content attributes are most important and knowing which specific conditions certain products lead your shoppers to convert.

If your applications aren't delivering the results or product attributes (color, model, size, etc.) important to your users' end goals, it not only impacts on-site conversions but also deeply impacts acquisition such as SEO, affiliate and social media traffic. It is essential to understand each shopper's ultimate goal and intent so that you can deliver the right information they need to make a purchase decision. This is both vital to driving conversions as well as overall business optimizations (i.e., refining marketing campaigns, product planning, inventory planning, etc.).

A SUMMARY OF SHOPPER GOALS AND MOTIVATIONS IS DEPICTED IN THE FOLLOWING DIAGRAM:



Activity Based

- A meal
- A sport
- An art project
- A trip
- A job
- A project
- A repair / upgrade



Event Based

- Seasonal Events
- Holidays
- Life Events
- Sport Event
- Transitional Events
- Entertainment Events
- Corporate Events



Social Based

- Trending (ex. fashion / regional)
- Cohorts
- Influencers
- Experts
- Reviews Based
- Gifting
- Registries / Lists
- Guilt



B2B Based

- Team / Department Needs
- Application Requirements
- Job Requirements
- Project Requirements
- Replenishment



Group Based

- For family members
- For the home (ex. kitchen)
- For the pets (other family)
- For the garage (vehicles / tools)



Self Based

- Health need (ex. remedy)
- Beauty / Cosmetic
- Age Related
- Fitness
- Getting a Deal
- Emotionally / Psychologically
- An investment
- Save Time
- Security / Fear
- Comfort
- Greed
- Brand Trust
- Sense of Urgency



Context Based

- Regional / Local Trend
- Seasonal
- Climate
- Conditions (ex. security risk)
- Convenience

In parallel to detecting intent and goals, AI can be used to uncover important product attributes and features.

By pairing shopper behaviors with underlying product attributes, content, and corresponding interactions, you will uncover the attributes and features that matter to customers.

For instance, a customer of yours might be looking for a specific brand of vacuum cleaner and a certain model. After they find that vacuum cleaner, they might start searching for other cleaning products and home goods. Next time they visit your site, you can have those models trained, through that valuable usage data, to show related home care products. The system can also hide products they've purchased in the past. So instead of showing other vacuum cleaners, the AI will show filters and other parts of the previously purchased vacuum that might need replacing over a certain period of time.

A common input to your machine learning application is your brand's interaction analytics across the web, call center, and brick and mortar stores. Touchpoints like clickstream, searches, filtering, sorting, can be coupled with purchases and cart abandonments. These will all give you a good idea of what attributes and features should be prioritized to improve ROI. This exercise can also be used to identify areas of sparse data, and ideally, where to employ AI to fill in the blanks.

And this takes us to **Step 3**.



3

25% of medium-sized businesses have lost a customer due to incomplete or inaccurate information.

Enrich Your Data

According to Dun & Bradstreet's study, *The Past, Present, and Future of Data*, 25% of medium-sized businesses have lost a customer due to incomplete or inaccurate information³. AI can optimize your experiences and processes and enrich your product catalog and content through deep learning, crawling, semantic extraction and signals.

But the number one hindrance to successfully bringing AI into your ecommerce organization will be the lack of data and the quality of data that is available. Fortunately AI is a powerful tool for improving the quantity and quality of data going into your systems of record.

The number of integrations and data available in and out of ecommerce systems has increased exponentially. Most pronounced is the sheer volume of user-generated data which can include analytics and user-generated content (reviews, FAQs, etc.). In addition, the volatility, velocity, and complexity of the data available has also increased.

Lack of data can create the following performance challenges in ecommerce:

- **Customer acquisition impact** such as not finding your products, brand, or content on the web
- **Product discovery challenges** including not finding your products within your own site through search and browse
- **Conversion problems** from not having enough information about a product for the shopper to make a decision
- **Lower lift** such as in missing out on additional revenue through better recommendations
- **Merchandising and personalization limitations** because of lack of shopper behavior data
- **Low customer satisfaction** caused by lack of data, where shoppers can't find what they want on-site or in the store
- **Less visibility & insight** due to not being able to connect your data across silos within your organization

ECOMMERCE SOURCE DATA CHALLENGES*

1 Sourcing Data

AI can be used to identify data that should be included in the experience. Not all customers may be looking for products. They might be looking for content, videos, testimonials, user generated content, reviews, offers and more. The same entity extraction used to predict what your users are looking for paired with behavioral signals can be used to get a clearer understanding of your customers' information needs.

2 Linking

AI can be used to identify relationships between data within a single or multiple sources. This includes automatically associating content with products, uncovering contexts and behaviors without formal linking to content and products. Deep learning takes this further such as using computer vision to detect relationships across images and content.

3 Enriching

Sparse data is a well known issue in ecommerce. AI can be used to supplement data through encoding of signals, semantics, NLP, sentiment, and context. User behavioral tracking, crawling, deep learning methods such as feature extraction from text and images can also be employed. The enriched data can be placed in dense vectors to drive vastly improved relevance, recall, precision, personalization and corresponding KPI's.

4 Classifying

Classification is done through human intuition, expertise based on theory or hypothesis on how users think about products or content. AI can be used to auto-classify, label, and tag products through techniques such as feature extraction, sentiment analysis, and supervised learning through contextual and behavioral signals. This will not only automate classification but align it to how your users actually shop.

5 Cleaning

AI can be used to identifying data that should be included in the experience. Not all customers may be looking for products. They might be looking for content, videos, testimonials, user generated content, reviews, offers and more. The same entity extraction used to predict what your users are looking for paired with behavioral signals can be used to get a clearer understanding of your customers' information needs.

**Data processes can vary*

TYPICAL DATA SOURCES AND USES



Smart Content

CMS/DAM,
Secured/Restricted,
User Generated/
Community

- Spec Sheets
- Safety Materials
- Papers
- Guides
- Videos
- UGC
- Digital Assets



Product Discovery

PIM/MDM,
Product Content,
Inventory, Pricing

- Multi-Language
- Multi-Currency
- Multi-Pricing
- Multi-Discout
- Multi-Availability
- Multi-Lead Time



Merchandising

Automations, Curation,
Rules, Personalization,
Recommendations

- Spec Sheets
- Safety Materials
- Papers
- Guides
- Videos
- UGC
- Digital Assets



Marketing

Analytics, Segments,
Audiences, Campaigns,
Targeting, Journeys

- SEO
- Email
- Mobile
- Integrated Ads
- Landing Pages
- Connected Exp.



Service

Knowledge Base,
FAQ, Chat, Order /
Shipment / Payment
Search

- Chatbot
- Messenger
- Self Service
- Call Center
- Commerce Integration



Enterprise

Order Management,
Transactions, Planning/
Forecasts, Financials,
Logistics

- Notifications
- Triggers
- Proximity
- Replenishment
- Margin / Cost
- Inventory Ratios
- Cost/Margin

Now, how do we enhance the data, coming from all of these sources, in all of these formats? It's no small feat. Here's how to ensure you're making applied AI truly hum:

- 1 As you crawl all these multiple sources of information, and automatically identify important labels or tags to augment existing records you have. As an example, crawling content pages, user generated content, and third sources which can add valuable information and context surrounding your products, content, and brand.
- 2 AI can be used to link data by tagging and mapping relationships within algorithmic models. Lexical or semantic graphs can be created so the machine can automate these relationships, thus organizing data in a way that actionable and can be surfaced by business users to optimize in real time.
- 3 Use AI to enrich these massive data sets at scale by:
 - Classification and tagging of your existing data to be aligned with the way your users think about products
 - Identifying relationships between your records
 - Eliminating noise by automatically deleting duplicate and garbage data
 - Enriching through deep learning
 - Leveraging signals to drive continual self-learning and ongoing optimization

Now, let's talk about **Step 4**, where you will bring it all together to deliver a much more enhanced ecommerce experience.

4

10 seconds – how long before a shopper leaves a site if they can't find what they are looking for.

Power AI-led Experiences

AI-led experiences, sometimes called cognitive commerce, occur at the most mature stage in the ecommerce journey. Here, AI is used to enhance the experience at every touchpoint, from recommendations and personalization to merchandising and testing.

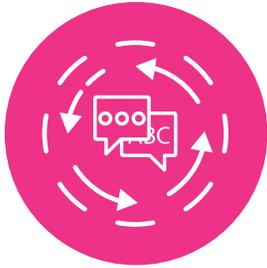
Wildly valuable tactics under this umbrella can also include:

- Semantic search
- Dense vectors
- Deep learning-based search

The reasons why to implement these types of applied AI methodologies are easy to triangulate. Research shows that most shoppers leave a commerce site within 10 seconds of not finding what they were looking for. Much of this can be attributed to product and content not being organized in the way users think or shop.

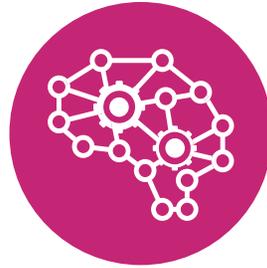
In a perfect world, each experience would be tailored to the consumer in a hyper-personalized way. Products surfaced would feel one-to-one and companies could still prioritize and brand their own initiatives within these deeply personal experiences. These tactics are the real-world methodologies that allow us to do just that.

TOOLS TO IMPROVE QUALITY OF RESULTS



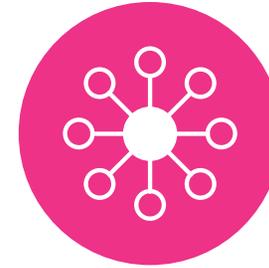
Natural Language Processing

- Knowledge Base / Dictionaries
- Detection (ex. Synonyms, Speech)
- Analyzers
- Token Filtering
- Entity Extraction



ML/AI

- Clustering & Classification
- Semantic Parsing
- Signals / Predicted Intent
- Head/Tail Analysis
- Knowledge Graphs
- Behavioral Graphs
- Affinity / Propensity Models



Semantic Vectors

- Embeddings on Documents & Queries
- Documents + Queries
- Documents + Semantics
- Documents + Knowledge Graph
- Documents + Context
- Documents + Behaviors
- Documents + Affinity Models

To illustrate how these tools work to enhance the journey, let's delve into the most impactful AI-led experience: personalization.

According to Gartner⁴, personalized experiences lead to, on average, up to a 16% lift of impact of KPIs. AI can drive sympathetic experiences across many or all of the elements of personalization. In the current age of privacy, you can expect a significant amount of your traffic to be anonymous and untraceable, therefore AI offers the most viable method to improve the performance of that traffic.

Through machine learning, personalization elements such as context and behaviors are associated with underlying signals and KPIs. These associations drive continuous improvement - the more data you have about the user, the better the shopping experience you can deliver. All of this can be married to work in harmony.

Finally, it's essential to constantly measure and optimize. Your analytics should link data across your entire organization. And with connected, enriched data, applied AI can enable your brand to unlock customer insights, power predictions, automate optimization, and ultimately take your ecommerce experience to the next frontier.

ELEMENTS OF PERSONALIZATION



Context

Industry, Trade, Region, Season, Channel, Referrer, Landing Page, Audience, Segment



Profile

Organization, Contract, Preferences, Omni-Channel Order History, Visit History, Affinities, Propensities, LTV



Behaviors

Keywords, Filters, Sorts, Click Through, Browse, Page Views (Click Stream), Abandons, Carts, Orders



Semantic

NLP/NLU, Ontology, Industry/Domain Dictionaries and Knowledge Graphs, Synonym Learning



Signals

Implicit, Explicit, System Search & Clickstream Meta-Data, Crowd, Transactional, Enterprise (inventory, margin, fulfillment), Sourced



Rules & Enrichment

Testing, Merchandising, Pin/Boost/Bury, Query Rewriting, Redirects, Curated Experiences, Product & Content Enrichment

Lucidworks

Bring Your Ecommerce to a New Age of Connected Experiences

Implementing applied AI can seem daunting, but once you've developed your commerce intelligence, you can start to better unify your data, understand your shoppers, and bring your ecommerce to a new age of personalized, connected experiences.

This is where Lucidworks can help. We bring an AI-driven ecommerce platform that powers some of the world's largest brands. Lucidworks Fusion combines domain knowledge with machine learning and AI-powered search capabilities to offer real-time hyper-personalized digital shopping experiences, simplify shopper engagement and purchase paths, and increase customer loyalty.

Get Started >

Learn how Lucidworks can power connected shopping experiences for your brand and meet every customer's need in the moment.

¹ <https://www.ibm.com/thought-leadership/institute-business-value/report/ai-value-pandemic>

² https://www.accenture.com/_acnmedia/pdf-83/accenture-pulse-check-infographic.pdf#zoom=50

³ <https://www.dnb.com/perspectives/master-data/data-management-report.html>

⁴ <https://www.gartner.com/en/executive-guidance/personalization>