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ARTIFICIAL INTELLIGENCE REPORT

Artificial Intelligence (INT 404)

TITLE: ARTIFICIAL INTELLIGENCE IN E-COMMERCE

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ABSTRACT

With the development of information and communication technologies, artificial intelligence is becoming increasingly popular. The main aim of companies in today's e-commerce world is to influence customer behaviour in favour of certain products and brands. The application of artificial intelligence as an innovative tool in the field of e-commerce may seem as a positive step forward. The paper focuses on the description of the essence of e-commerce and artificial intelligence and their benefits. The aim is also to evaluate the importance of artificial intelligence and its use in the context of e-commerce based on available studies on this issue.

INTRODUCTION

When someone says “artificial intelligence,” the first thing that comes to mind might be a vision from movies like Steven Spielberg’s 2001 film A.I. Artificial Intelligence, sci-fi thriller Ex Machina, or 1982 cult classic Blade Runner.

But when it comes to the ecommerce sector, it’s less about human-like robotics and more about the learning technologies and algorithms that provide the foundation.

AI can help today’s online retailers deliver an optimized customer experience on and off their ecommerce websites by using collected business and customer data to make better business decisions and more accurately predict the future.

Let’s look at some of the ways AI and associated technologies are moving the ecommerce industry forward,

from improving customer interactions to streamlining business processes.

CONTENT

AI Is Bringing Change to the Ecommerce Industry

Artificial intelligence isn’t just a novel technology implemented for its “cool factor.” Implementing AI has the potential to impact any number of business functions across your organization.

To understand how it could impact your business, it helps to have an understanding of the components of artificial intelligence.

The definition of AI is broad, and encompasses data mining, natural language processing, and machine learning.

- Data mining refers to the gathering of both current and historical data to inform predictions.
- Natural language processing focuses on human-computer interaction and how computers interpret natural human language.
- Machine learning concerns using a collection of algorithms to apply past experience or provide examples to solve a problem. Deep learning "involves layering algorithms in an effort to gain greater understanding of the data."

Over the past couple of years, AI technology has matured and become a powerful tool to boost sales and optimize operations. Even many small ecommerce businesses are using technology with some kind of AI capability.

Benefits of Using Artificial Intelligence in Ecommerce Companies

Amazon has long recognized the benefits of artificial intelligence and related technologies. The behemoth ecommerce company uses machine learning to improve product selection and user experience and to optimize logistics.

A recent publication from McKinsey & Company and the Retail Industry Leaders Association named seven imperatives for rethinking retail in 2021, and every single one could in some way be supported by some type of AI-informed technology.

1.More targeted marketing and advertising.

Personalization is a top priority, according to surveyed retailers, but only 15% say they've fully implemented personalization across channels. Stand out from the crowd with a more personalized message and have one-to-one conversations with your customers.

Advances in AI and machine learning have enabled deep personalization techniques to customize content by user. By analysing big data from purchase histories and other customer interactions, you can zero in on what your customers really want and deliver the message that will most resonate.

2.Increased customer retention.

Delivering targeted marketing and advertising messages personalized for their customers can increase retention. McKinsey omnichannel personalization research indicated there's a 10-15% uplift potential in revenue and retention from omnichannel personalization strategies.

The report reads: "A critical element of personalization is building better data and insights on customers, an asset that also generates additional value across the value chain. … Our research suggests the ROI for personalization will quickly outpace that of traditional mass marketing."

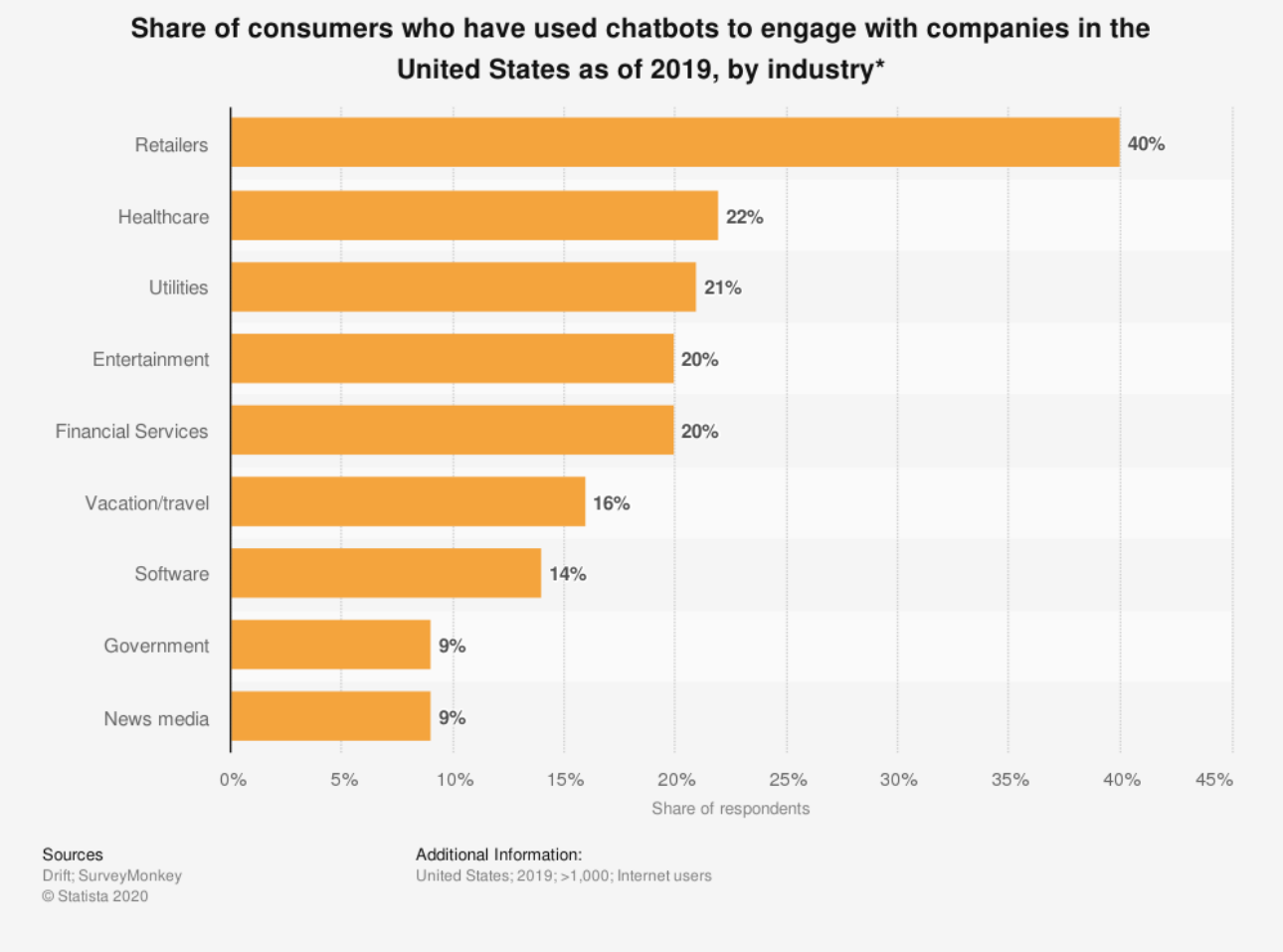
3.Seamless automation.

The goal of automation is to accomplish a task with as little human intervention as possible. That can mean anything from scheduling emails in a CRM or marketing tool, using Zapier to automate tasks or leveraging advanced technology to help with hiring.

In the context of future ecommerce trends, however, some of the most commonly talked about today are robotics and machine learning.

AI can play a big role in helping you automate the repetitive tasks that keep your online store functioning. With AI, you can automate things like product recommendations, loyalty discounts, low-level support, and more.

4.Efficient sales process.



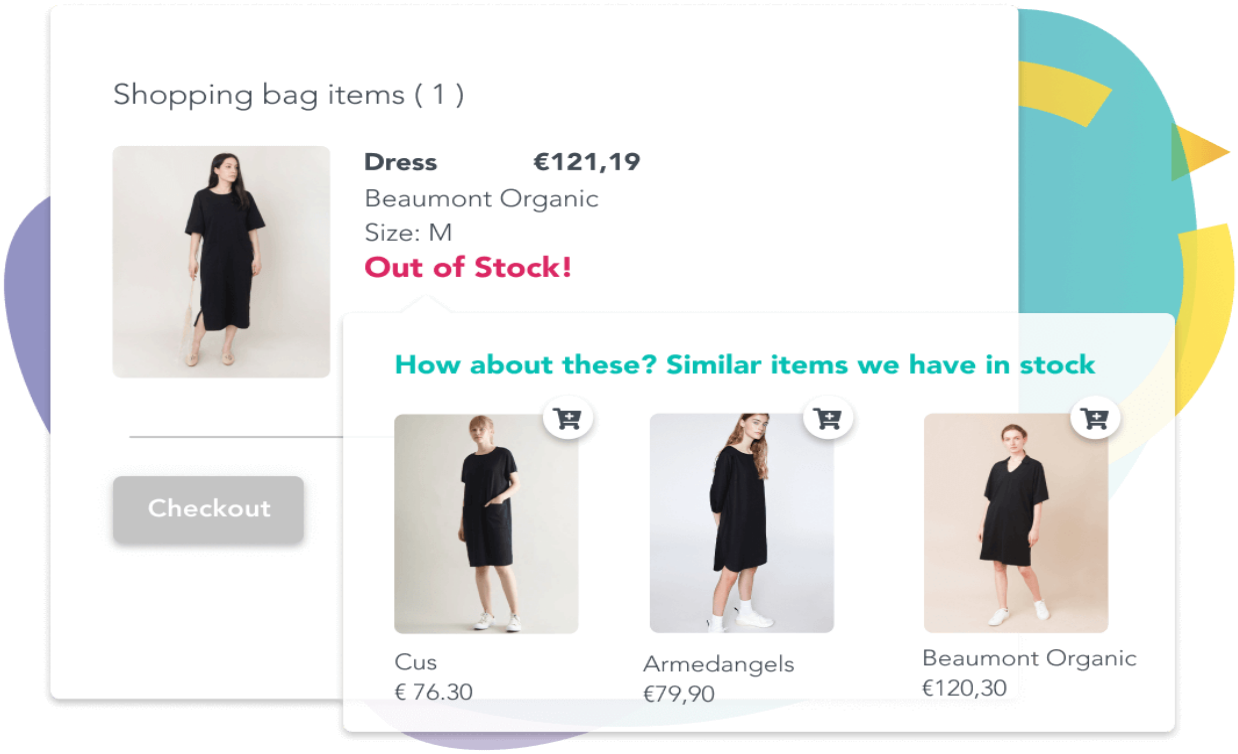
Using AI can help you create a more efficient sales process by gathering data about your customers, automate follow-up abandoned cart inquiries, and more. You can help move customers through the funnel by having them engage with chatbots for simple questions.

AI Use Cases in Ecommerce

There are plenty of use cases in ecommerce for AI, and you're probably familiar with a lot of them — you just might not know that the technology they're built on is actually related to AI. Here are six of the most common:

1. Personalized product recommendations.
2. Pricing optimization.
3. Enhanced customer service.
4. Customer segmentation.
5. Smart logistics.
6. Sales and demand forecasting.
7. Chatbots and Virtual Assistants

1. Personalized product recommendations.

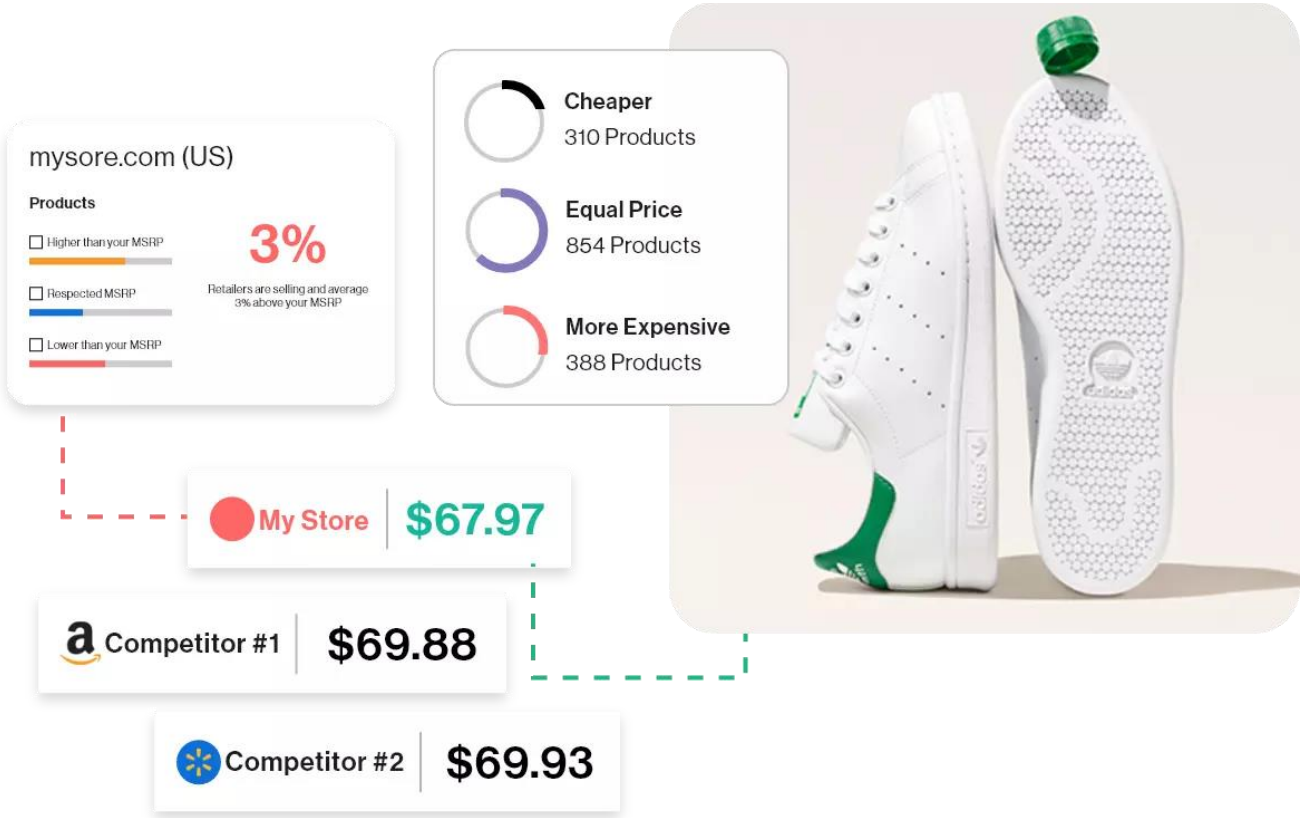


It’s easier than ever to collect and process customer data about their online shopping experience. Artificial intelligence is being used to offer personalized product recommendations based on past customer behavior and lookalike customers.

Websites that recommend items you might like based on previous purchases use machine learning to analyze your purchase history. Retailers rely on machine learning to capture data, analyze it, and use it to deliver a personalized experience, implement a marketing campaign, optimize pricing, and generate customer insights.

Over time, machine learning will require less and less involvement from data scientists for everyday types of applications in ecommerce companies.

2. Pricing optimization.



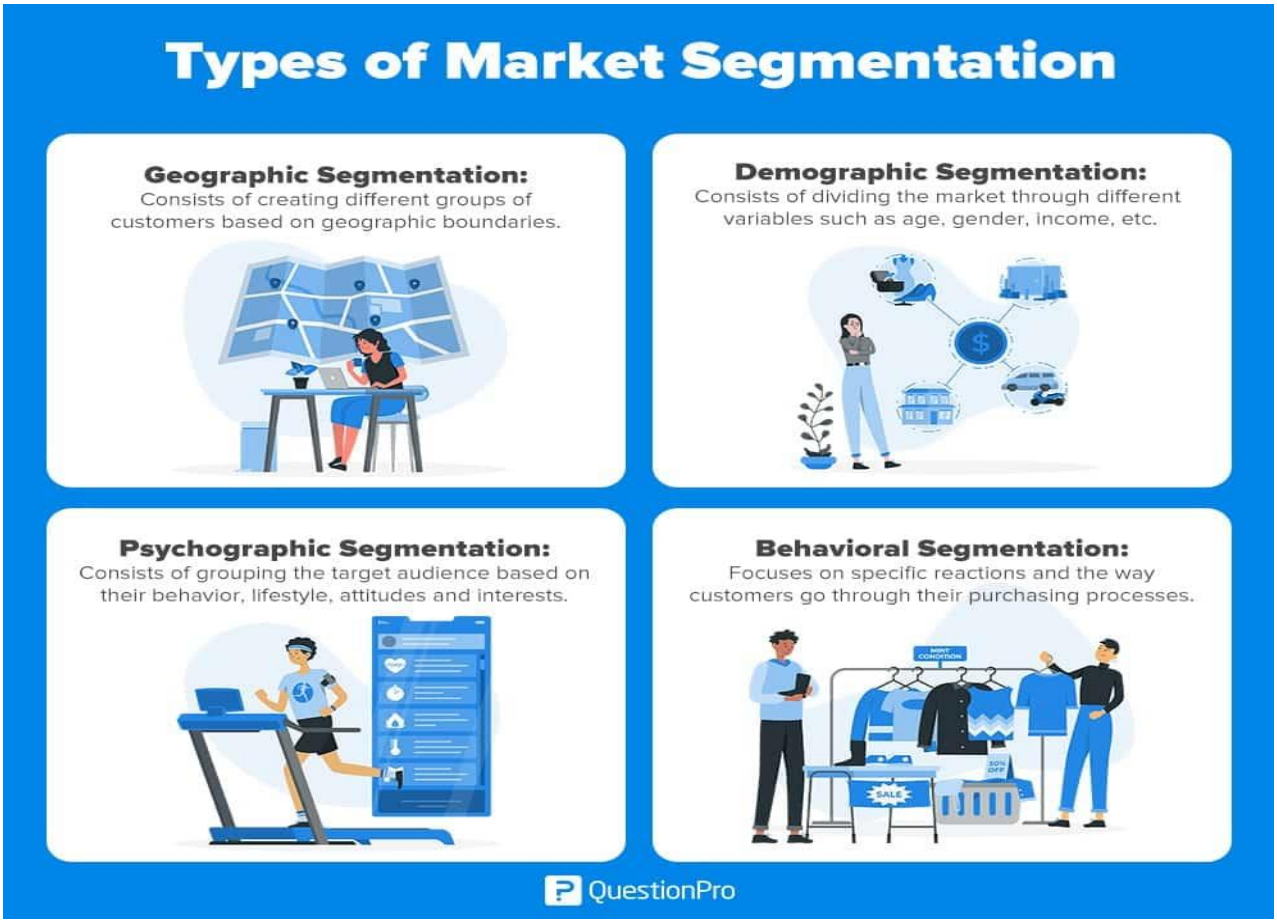
AI-enabled dynamic pricing is a strategy of changing your product price based on supply and demand. With access to the right data, today's tools can predict when and what to discount, dynamically calculating the minimum discount necessary for the sale.

3. Enhanced customer service.

With virtual assistants and chatbot technology, you can deliver the appearance of higher touch customer support. While these bots aren’t completely self-reliant, they can facilitate simple transactions, leaving live support agents able to focus on more complex issues.

Virtual agents also have the advantage of being available 24/7, so low-level questions and issues can be addressed at any time of day, without making your customer wait.

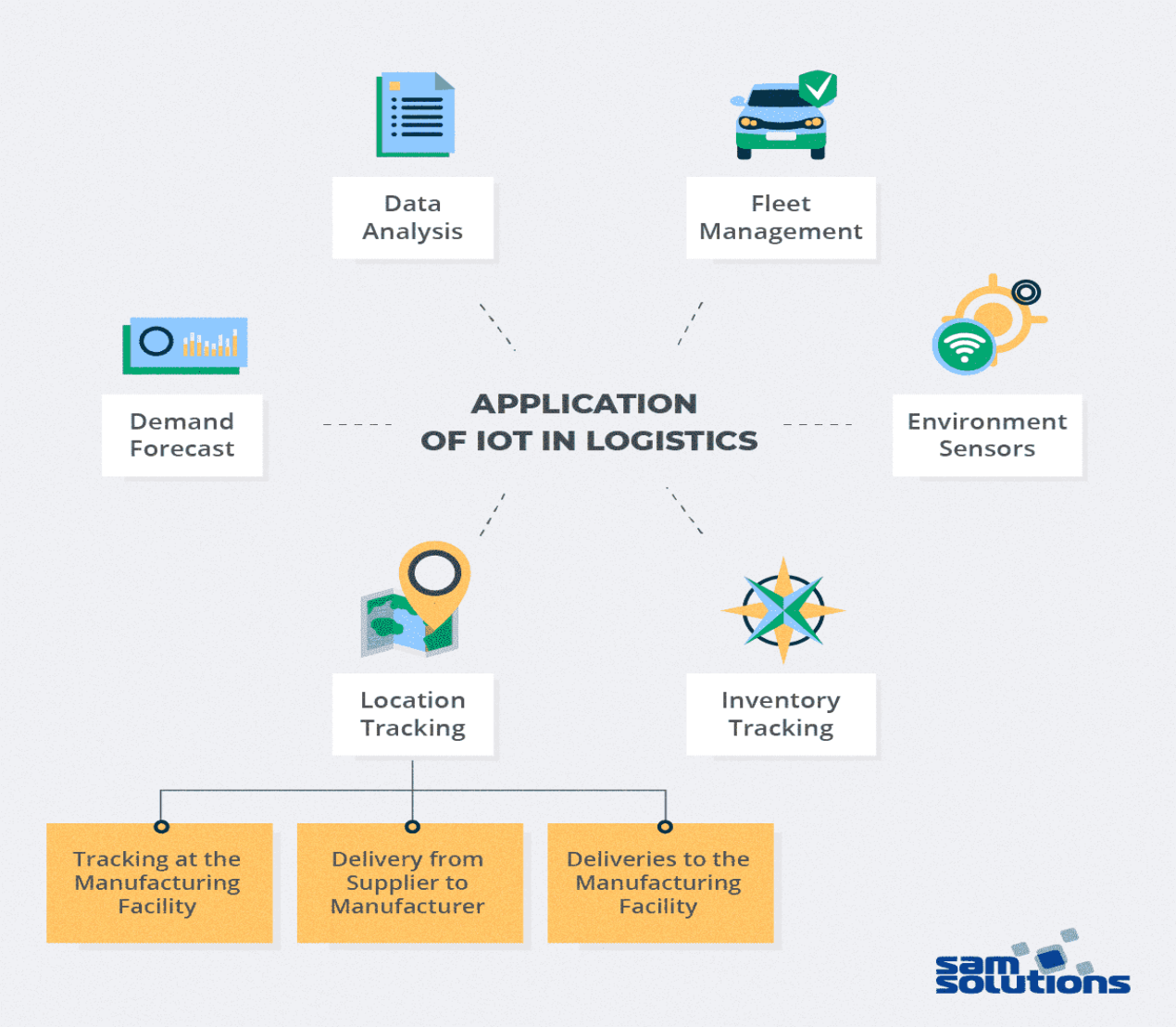
4. Customer segmentation.



Access to more business and customer data and processing power is enabling ecommerce operators to understand their customers and identify new trends better than ever.

In an insight from Accenture, they write, “AI systems can explore highly complex and varied options for customer engagement very quickly, and continuously optimize their performance as more data becomes available. This means marketers can set parameters and allow the AI to optimize and learn to achieve precision.”

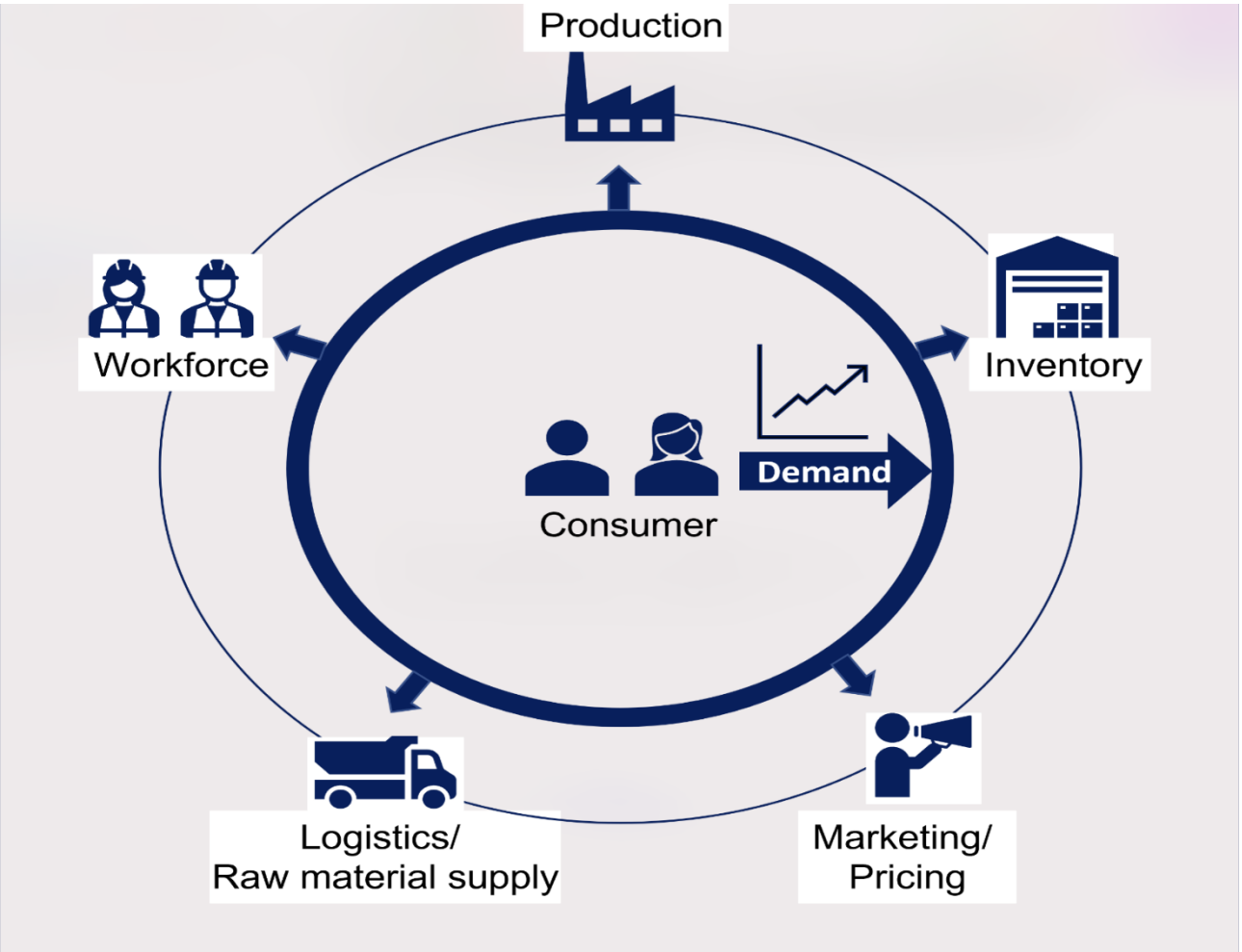
5. Smart logistics.



According to a report from Emerging Tech Brew, "Machine learning's predictive powers shine in logistics, helping to forecast transit times, demand levels, and shipment delays."

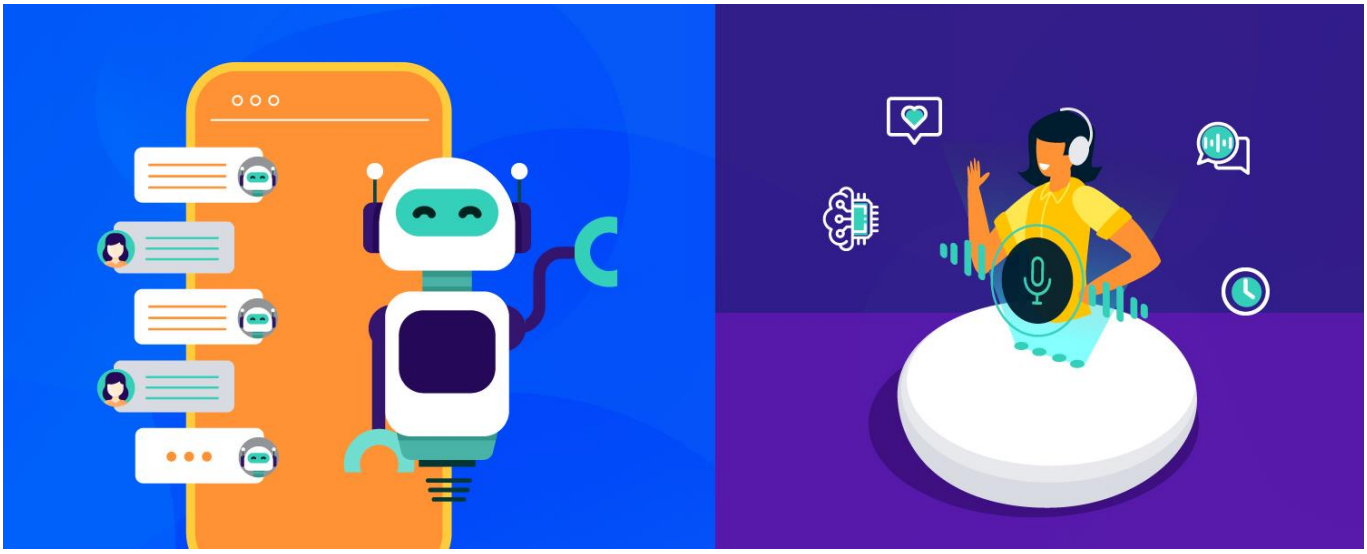
Smart logistics or intelligent logistics, is all about using real-time information through sensors, RFID tags, and the like, for inventory management and to better forecast demand. Machine learning systems become smarter over time to build better predictions for their supply chain and logistics functions.

6. Sales and demand forecasting.



Particularly in a world during and after COVID-19, you'll want to plan your inventory on both real-time and historical data. Artificial intelligence can help you do just that. A recent McKinsey report suggests that investment in real-time customer analytics will continue to be important to monitor and react to shifts in consumer demand that can be harnessed for price optimization or targeted marketing.

7.Chatbots and virtual assistants



Virtual Chatbots are virtual advisors, AI personal assistants, or intelligent virtual agents who communicate with businesses and brands via messaging apps. Product marketing, brand engagement, product assistance, sales, and support discussions are common uses of conversational bots.

How to Implement Artificial Intelligence into Ecommerce

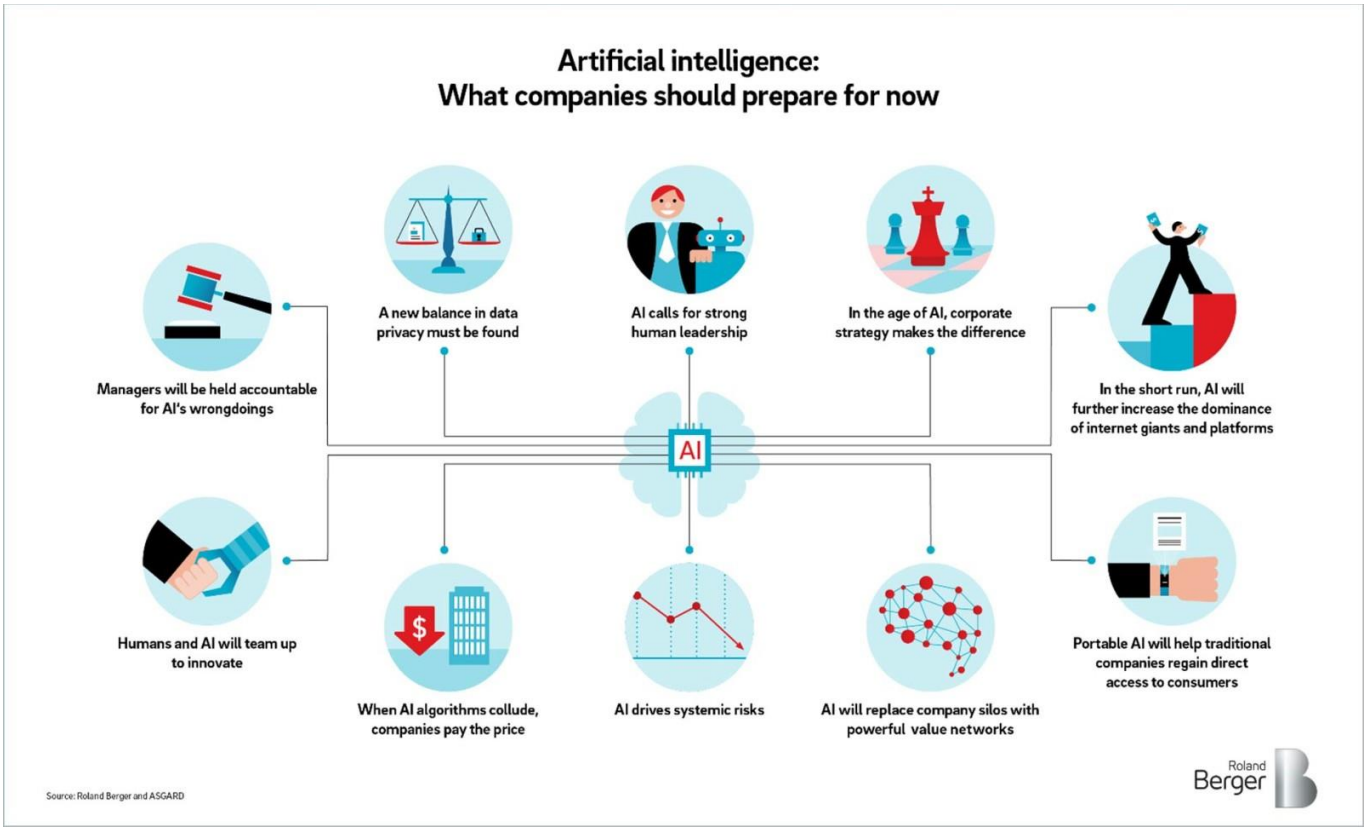
1. Create a strategy.

You have to start somewhere — and your strategy will lay out the path you need to take from there to your AI goal. Don’t just punt this to a newly hired AI expert or your CIO or CTO.

Really put some thought into what you want to accomplish with AI. Take a practical approach, and don’t

forget to start small. You can always build on your successes down the road.

2. Find narrow use cases that are relevant to the overall corporate strategy.



The most successful AI use cases live at the intersection of business objectives, data differentiation, and readily available artificial intelligence models. All that to say — you should focus on revenue-generating opportunities where you have a data advantage and in a context appropriate for proven AI technology.

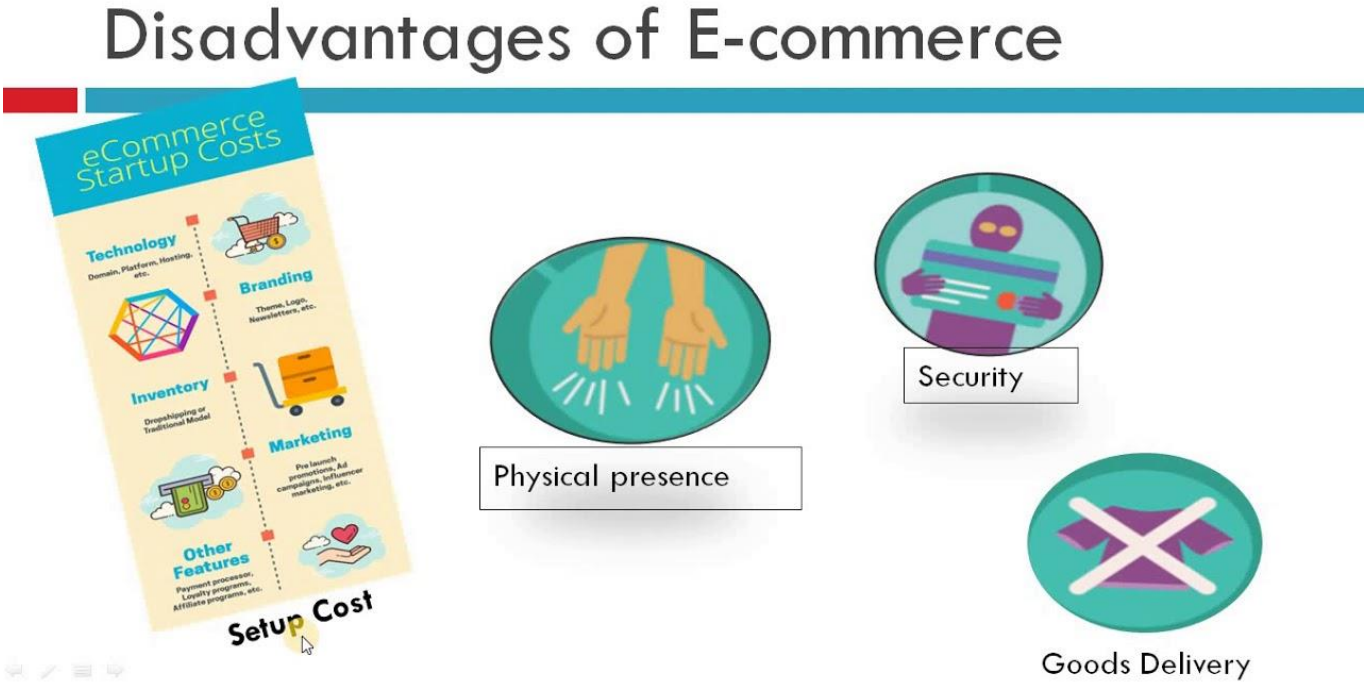
3. Leverage third-party expertise.

Even if you’re an armchair AI aficionado, you’ll want to accept expert assistance on this one. Bring in a tiger team on a project or part-time basis to dig in and help you build a strategic AI roadmap. Those third parties can be helpful in bringing your MVP (minimum viable product) to life as well.

4. Build a full-scale solution.

Once you're confident in what your team has produced, it's time to build the full scale solution. Don't be surprised if it still takes some iterations before it works like you expect. As you and your team become more comfortable working in the realm of AI, you'll start to see greater benefit from the projects you implement.

Disadvantages of Artificial Intelligence



1. High costs

The ability to create a machine that can simulate human intelligence is no small feat. It requires plenty of time and resources and can cost a huge deal of money. AI also needs to operate on the latest hardware and software to stay updated and meet the latest requirements, thus making it quite costly.

2.No creativity

A big disadvantage of AI is that it cannot learn to think outside the box. AI is capable of learning over time with pre-fed data and past experiences, but cannot be creative

in its approach. A classic example is the bot Quill who can write Forbes earning reports. These reports only contain data and facts already provided to the bot. Although it is impressive that a bot can write an article on its own, it lacks the human touch present in other Forbes articles.

3.Unemployment

One application of artificial intelligence is a robot, which is displacing occupations and increasing unemployment (in a few cases). Therefore, some claim that there is always a chance of unemployment as a result of chatbots and robots replacing humans.

For instance, robots are frequently utilized to replace human resources in manufacturing businesses in some more technologically advanced nations like Japan. This is not always the case, though, as it creates additional opportunities for humans to work while also replacing humans in order to increase efficiency.

4.Make humans lazy

AI applications automate the majority of tedious and repetitive tasks. Since we do not have to memorize things or solve puzzles to get the job done, we tend to use our brains less and less. This addiction to AI can cause problems to future generations

5.No ethics

Ethics and morality are important human features that can be difficult to incorporate into an AI. The rapid progress of AI has raised a number of concerns that one day, AI will grow uncontrollably, and eventually wipe out humanity. This moment is referred to as the AI singularity.

6.Emotionless

Since early childhood, we have been taught that neither computers nor other machines have feelings. Humans function as a team, and team management is essential for achieving goals. However, there is no denying that robots are superior to humans when functioning effectively, but it is also true that human connections, which form the basis of teams, cannot be replaced by computers.

7.No Improvement

Humans cannot develop artificial intelligence because it is a technology based on pre-loaded facts and experience. AI is proficient at repeatedly carrying out the same task, but if we want any adjustments or improvements, we must manually alter the codes. AI cannot be accessed and utilized akin to human intelligence, but it can store infinite data.

Machines can only complete tasks they have been developed or programmed for; if they are asked to complete anything else, they frequently fail or provide useless results, which can have significant negative effects. Thus, we are unable to make anything conventional.

METHODOLOGY

1.Data Collection:

In e-commerce, data can be collected from various sources such as customer interactions, transactional data, search queries, customer reviews, social media, and website analytics. This data can be collected through

various methods like web scraping, API calls, and surveys.

2.Data Pre-processing:

Once the data is collected, it needs to be pre-processed to ensure that it is clean and ready for analysis. This involves tasks like removing duplicates, handling missing data, and converting data into a format that can be easily analysed.

3.Data Analysis:

In this step, statistical and machine learning techniques are used to analyse the pre-processed data. This includes identifying patterns, trends, and correlations in the data, as well as creating visualizations to better understand the data.

4.Model Building:

Based on the insights obtained from data analysis, machine learning models are built. These models can be used for various purposes like recommendation systems, fraud detection, customer segmentation, and predictive analytics.

5.Testing and Validation:

Once the model is built, it needs to be tested and validated to ensure that it works as expected. This

involves evaluating the accuracy of the model and checking that it meets the desired performance metrics.

6.Deployment:

After the model has been validated, it is deployed in a production environment. This involves integrating the model into the e-commerce platform, ensuring that it is compatible with the existing system, and setting up an infrastructure for the model to run continuously.

7.Monitoring and Maintenance:

Finally, the model needs to be monitored and maintained to ensure that it continues to perform well over time. This includes regularly updating the model with new data, monitoring the performance of the model, and identifying and addressing any issues that may arise.

CODE SECTION

Inventory Management code:

```
#include <iostream>

#include <vector>

class Product {

public:

    int id;

    std::string name;
```

```
    double price;
    int quantity;
    Product(int _id, std::string _name, double _price, int
_quantity) :
        id(_id), name(_name), price(_price),
quantity(_quantity) {}
};

class Inventory {
public:
    std::vector<Product> products;

    void add_product(Product product) {
        products.push_back(product);
    }

    void remove_product(Product product) {
        for (auto it = products.begin(); it != products.end();
++it) {
            if (it->id == product.id) {
                products.erase(it);
                break;
```

```
            }
        }
    }

    void update_quantity(Product product, int quantity) {
        for (auto& p : products) {
            if (p.id == product.id) {
                p.quantity = quantity;
                break;
            }
        }
    }
};

int main() {
    Inventory inventory;
    Product p1(1, "Product 1", 10.99, 100);
    Product p2(2, "Product 2", 5.99, 50);

    inventory.add_product(p1);
    inventory.add_product(p2);
```

```
    inventory.remove_product(p1);

    inventory.update_quantity(p2, 25);

    for (const auto& p : inventory.products) {
        std::cout << "Product ID: " << p.id << ", Name: " << p.name << ", Price: $" << p.price << ", Quantity: " << p.quantity << std::endl;
    }

    return 0;
}
```

CONCLUSION

Tomorrow's AI sounds like it's straight from the movies, but there's plenty of AI technology today that may look less glamorous improving customer experience, increasing conversion rates, and helping to streamline the way the business is run.

If you want to deliver the best possible shopping experience on your ecommerce website, look into the various benefits of artificial intelligence and machine

learning. It can help you make better use of your customer and business data to set a plan for your future that will work.

As highlighted in this article, **artificial intelligence in Ecommerce** is playing a leading role in driving innovative solutions and customer experiences. Some the leading **use cases of artificial intelligence in Ecommerce** is in the area of personalized shopping, product recommendations, and inventory management.

As an online retailer, are you considering how to implement a **working model of artificial intelligence** for your business? Designed for **AI in Ecommerce startups**, Countants is an established data analytics provider that are enabling online retailers with solutions centred around product analytics and E-commerce KPIs.

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