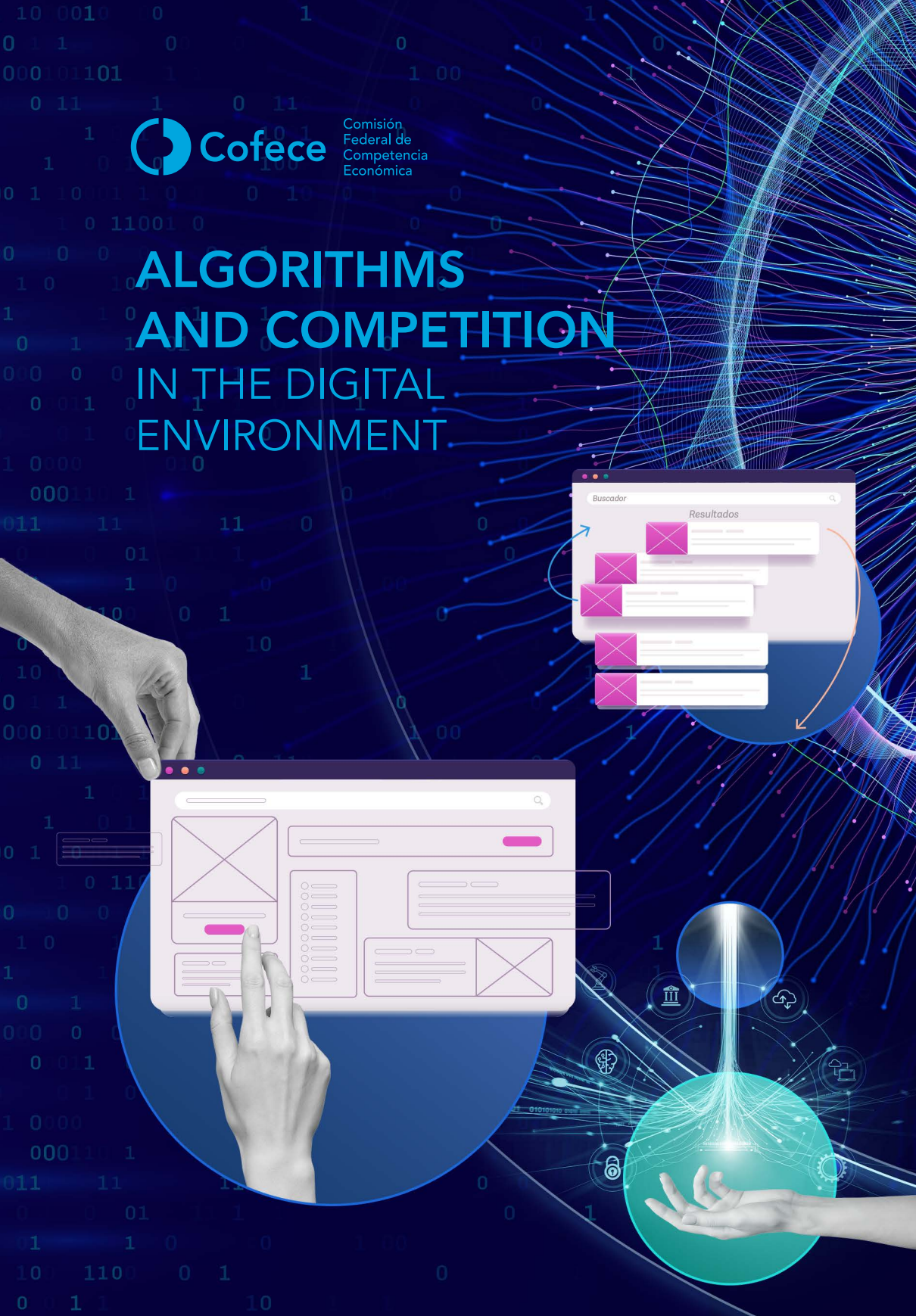
Cofece
Comisión Federal de Competencia Económica

ALGORITHMS AND COMPETITION IN THE DIGITAL ENVIRONMENT



Algorithms and Competition in the Digital Environment

General Directorate of Digital Markets

Cofece
Comisión Federal de Competencia Económica

Algorithms and Competition in the Digital Environment

1ª edición en español: Noviembre 2024.
First edition in English: November 2024.

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Content

Glossary of key terms

Apps

Computer programs or software designed for a particular purpose and that can be downloaded to a phone or any other device.

Source: Cambridge Dictionary, *App*. Available here.

Artificial Intelligence (AI)

A broad definition refers to AI as a branch of computer science that studies and designs computers capable of performing specific tasks in a way that is perceived as "intelligent." A narrow definition views AI as the discipline of creating algorithms that can learn and generate responses based on the information they have. Numerous virtual assistants, apps, and programs have integrated AI to enhance their functionality.

Sources:
Cofece (2024), *Data and Competition in the Digital Environment*, p. 9. Available here.
OECD (2017), *Algorithms and Collusion: Competition Policy in the Digital Age*, p. 9. Available here.
OECD (2019), *Hello World: Artificial Intelligence and its use in the public sector*, p. 11. Available here.

Data portability

The ability of an individual to transfer or grant access to their data to another person or company in a structured, commonly used, and readable format. Data portability allows data holders to obtain and reuse their data for personal purposes across different services, as well as move, copy, or transfer their data securely without affecting its usability.

Sources:
OECD (2021), *Data portability, interoperability and digital platform competition*. p. 10. Available here.
ICO (s.f.), *Right to data portability*. Available here

Digital economy

All economic activities that depend on digital resources or significantly benefit from them. These resources include technologies, infrastructure, digital services, and data. The digital economy encompasses both traditional markets that have adopted digital technologies and markets that operate entirely in a digital environment.

Sources:
Cofece (2024), *Key Concepts of Competition in the Digital Economy*, p. 7. Available here.
OECD (2020) *A roadmap toward a common framework for measuring the Digital Economy*, p. 35. Available here.
OECD (2022), *OECD Handbook on Competition Policy in the Digital Age*, p. 8. Available here.

Digital markets

The environment in which producers and consumers interact to exchange goods and services within the digital economy, accessible via websites or applications.

Sources:
Cofece (2024), *Key Concepts of Competition in the Digital Economy*, p. 8. Available here.
OECD (2022), *Handbook on Competition Policy in the Digital Age*, p. 8. Available here.

Digital platforms

Services or infrastructures that facilitate interaction between two or more interdependent user groups through services or applications, adding economic and social value. The user groups connected by the platform are often referred to as the platforms' "sides".

Sources:
Cofece (2024), *Key Concepts of Competition in the Digital Economy*, p. 9. Available here.
OECD (2019), *An Introduction to Online platforms and their role in the Digital Transformation*, p. 22. Available here.

Dominant position

Also known as substantial market power, it refers to the situation where a company has the ability to restrict the supply of goods or services and/or set prices above competitive levels in a given market, without another company being able to counteract this ability.

Sources:
Cofece (2024), *Data and Competition in the Digital Environment*, pp. 38-39. Available here.
Motta, M. (2004), *Competition Policy: Theory and Practice*. Available here.
First Circuit Court of Appeals in Administrative Law, Specialized in Economic Competition, Broadcasting and Telecommunications (2016), *Tesis I.10.A.E.122 A (10a.) Digital record no. 2011144. COMPETENCIA ECONÓMICA. CONCEPTO DE "PODER SUSTANCIAL" EN ESA MATERIA*. Available here.

E-commerce

The activities of buying and selling products online. In a narrower sense, it refers to the provision of consumer goods and services through online sales channels.

Source: OECD (2019), *Implications of e-commerce for Competition Policy*, p. 8. Available here.

Economic competition

The effort made by two or more individuals, businesses, or companies to increase their market share by offering a greater variety of higher-quality products and services at better prices. Competition enhances purchasing power and consumer welfare, while also allowing companies to access inputs under competitive conditions, encouraging innovation and boosting productivity.

Source: Cofece (2016) *Herramientas de Competencia Económica*, p. 5. Available here.

Interoperability

The ability of different digital services to work together, enabling communication and data exchange between them, and allowing users to combine multiple services with substitute or complementary functions.

Source: OECD (2021), *Data portability, interoperability and digital platform competition*. p. 12. Available here.

Marketplaces

Digital platforms that intermediate in the sales of goods and services between customers and multiple retailers. Unlike a traditional online store where only one company sells its products, a marketplace acts as an intermediary, connecting various sellers with potential buyers in one place. The platform operator does not necessarily own any inventory, as their business may only involve presenting third-party inventory to users and facilitate transactions.

Sources:
Cofece (2024), *Key Concepts of Competition in the Digital Economy*, p. 6. Available here.
OECD (2020), *Abuse of Dominance in Digital Markets – Contribution from Romania*, p. 3. Available here.
Forbes (2017), *What are Online Marketplaces and What Is Their Future?* Available here.

***Per se* illegality**

A rule under which certain anticompetitive agreements, known as absolute monopolistic practices, are inherently considered violations of competition law, regardless of whether they may be justified or provide any benefits. These practices are presumed to be harmful and are always subject to sanctions.

Sources:
Cofece (2016), *Herramientas de competencia económica*, p. 19. Available here.
Second Circuit Court of Appeals in Administrative Law, Specialized in Economic Competition, Broadcasting and Telecommunications (2019), *Tesis I.2o.A.E.66 A (10a.) Digital record no. 2019731. PRÁCTICAS MONOPÓLICAS. DIFERENCIAS EN LA APLICACIÓN DE LA REGLA "PER SE" Y DE LA REGLA DE LA RAZÓN, AL INVESTIGARLAS*. Available here.

Rule of reason

The individual assessment of a conduct or practice carried out by one or more economic agents, weighing the potential harm to competition against the benefits in terms of efficiency and consumer welfare improvements. In these cases, the impact of the conduct is analyzed to determine whether the benefits outweigh the negative effects on competition.

Sources:
Cofece (2024), *Key Concepts of Competition in the Digital Economy*, p. 47. Available here.
Second Circuit Court of Appeals in Administrative Law, Specialized in Economic Competition, Broadcasting and Telecommunications (2019), *Tesis I.2o.A.E.66 A (10a.) Digital record no. 2019731. PRÁCTICAS MONOPÓLICAS. DIFERENCIAS EN LA APLICACIÓN DE LA REGLA "PER SE" Y DE LA REGLA DE LA RAZÓN, AL INVESTIGARLAS*. Available here.

Streaming

A type of technology that allows the transmission and playback of audio and video content over the internet without needing to download the entire file before it can be viewed or heard. Streaming provides access to a wide range of digital content (from TV shows and movies to music, video games, and more) at any time, on any device that can connect to the internet.

Sources:
Poor, A. (2019), *¿Qué es el streaming y cómo funciona?* Available here.
Cofece (2024), *Data and Competition in the Digital Environment*, p. 11. Available here.

Introduction

Digital assistants, navigation apps, social media, online marketplaces, streaming platforms, dating apps, browsers, weather apps, and delivery platforms all have one thing in common: they use algorithms to operate. In the digital economy, it is hard to imagine a service that doesn't depend on algorithms.

In recent years, algorithms have gained significant relevance, and more people are seeking to understand how they work and how they can be leveraged for the benefit of society. These tools are incredibly useful, offering practical solutions to a wide range of tasks and simplifying your daily life. However, as with any technology, it is important to be aware of how we use them.

Many companies work tirelessly to improve the services they offer you through algorithms, generating benefits for both themselves and you. However, some might use these algorithms to take advantage of their market position, harming other companies that want to compete and you as a consumer.

As a competition authority, we are committed to ensuring you are familiar with algorithms, their usefulness, benefits, and the potential risks associated with their use. When companies employ algorithms in a competitive environment, you can reap the best outcomes from these tools. However, when competition is lacking, you may face higher prices, fewer options, or lower quality.

The objective of this notebook is to show you the importance of algorithms in the digital economy and their role in competition. Here, we will explain what algorithms are, how they are used in digital markets, and the benefits and risks they pose for you, businesses, and overall competition.

1. Algorithms and their use in digital markets

It is common for streaming platforms to recommend content that you might enjoy while you're deciding what movie to watch or what music to listen to. This is made possible because the platform uses algorithms to analyze and identify your consumption patterns, suggesting content that you may like based on your search history, viewing habits, and other factors.

Did you know that, in addition to your activity on the platform, Netflix takes other factors into account when recommending content? These include the time of day you access the platform, your preferred languages, the devices you use to watch content, and how much time you spend on a particular title?[1]

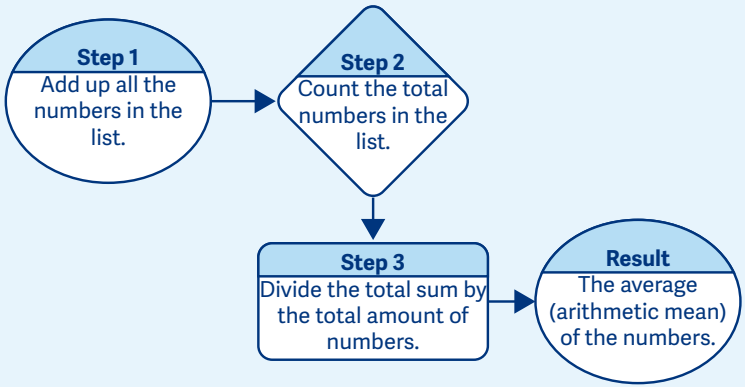
1.1. What are algorithms?

Algorithms are a sequence of clear and precise instructions (a list of operations) that must be followed in a specific order, mechanically and systematically, to complete a task or activity.[2] Instruction manuals for assembling objects (such as furniture, toys, etc.) and cooking recipes are examples of algorithms in everyday life.

1. Netflix (n.d.), *Cómo funciona el sistema de recomendaciones de Netflix*. Available here.
2. OECD (2017), *Algorithms and Collusion: Competition Policy in the Digital Age*, pp. 8-9. Available aquí.

Example 1. Algorithm

Algorithm to calculate the average of a list of numbers:



Example 2. Algorithm to prepare a simple salad

Simple Salad

Ingredients

- *1 lettuce*
- *2 tomatoes*
- *1 cucumber*
- *1 carrot*
- *Salt to taste*
- *Olive oil (2 tbsp.)*
- *Vinegar or lemon juice (1 tbsp.)*

Step 1: Wash and prepare the ingredients.

a. *Wash the lettuce, tomatoes, cucumber, and carrot under running water.*
b. *Dry the vegetables with paper towels or a clean cloth.*

Step 2: Cut the vegetables.

a. *Chop the lettuce into medium-sized pieces and place them in a large bowl.*
b. *Chop the tomatoes into slices or cubes and add them to the bowl.*
c. *Peel and slice the cucumber; add it to the bowl.*
d. *Grate or julienne the carrot and add it to the bowl.*

Step 3: Prepare the dressing.

a. *In a small bowl, mix 2 tablespoons of olive oil with 1 tablespoon of vinegar or lemon juice.*
b. *Add salt to taste and mix well.*

Step 4: Toss the salad.

a. *Pour the dressing over the vegetables in the bowl.*
b. *Gently toss with salad tongs to combine all the ingredients and evenly distribute the dressing.*

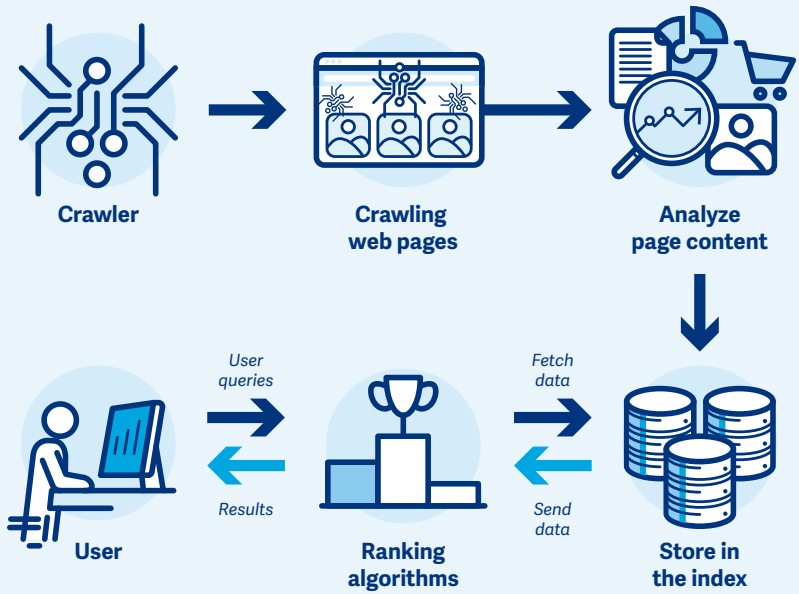
Step 5: Serve.

a. *Divide the salad into individual portions or serve directly from the bowl.*

Result: A fresh mixed salad, ready to enjoy.

In the digital environment, algorithms are fed with data ("input") and transform it into a response ("output") through a sequence of computational steps.[3] For example, Google uses algorithms to display information (output) based on the searches or queries you perform (input).

Example 3. Use of data to feed algorithms



Algorithms are fed with data (input) such as the queries you make to an online search engine and transform it into a response (output), such as the search results. To do this, algorithms analyze information from millions of web pages and classify it to present relevant results based on the question you submitted.

Both large and smaller companies use algorithms and integrate them into their processes to access various tools, such as facial or voice recognition, to name a few examples.[4]

3. OECD (2023), *Algorithmic Competition, OECD Competition Policy Roundtable Background Note*, p. 8. Available here, and Joshi, A. (2023), *Machine Learning and Artificial Intelligence*, p. 8. Available here.
4. CMA (2021), *Algorithms: How they can reduce competition and harm consumers*, p. 4. Available here.

Did you know that in 2021, the use of algorithms on Amazon Marketplace caused the price of a Pokémon toy to fluctuate constantly in the weeks leading up to Christmas? Since August, there were at least 14 price changes, driving the toy's price up from 49.99 USD to 89.99 USD.[5]

1.2. Use and application of algorithms in the digital economy

Having established what algorithms are, we will now explain some of their applications in the digital environment to illustrate their impact on the digital economy and their effect on competition.

Below, you will find an initial classification of algorithms based on the functions they perform, along with descriptions[6] and examples. This will help to understand some of the benefits and risks they pose in the competitive process.

Table 1. Types of algorithms and their application according to the functions they perform

Type	Description
Search	It presents and organizes information based on searches or queries you make. For instance, Google organizes and displays information when you perform a search, while Booking arranges for rooms or hotels when you look for accommodation.
Recommendation	It recommends and organizes information, products, or services based on user data (including information about your behavior) or other parameters (such as results sponsored by advertisers). Netflix, for instance, recommends content you might like to watch and Spotify suggests music tailored to your preferences.
Allocation	It executes transactions automatically and allocates the supply and demand of a good or service based on user requests. A good example is Uber, which connects you with a driver when you request a ride.

5. Wakabayashi, D. (2022), *Does Anyone Know What Paper Towels Should Cost?* Available here.
6. Based on OECD (2023), *Algorithmic Competition, OECD Competition Policy Roundtable Background Note*, pp. 8-9. Available here; Autorité de la Concurrence and Bundeskartellamt (2019), *Algorithms and Competition*, pp. 9-13. Available here.

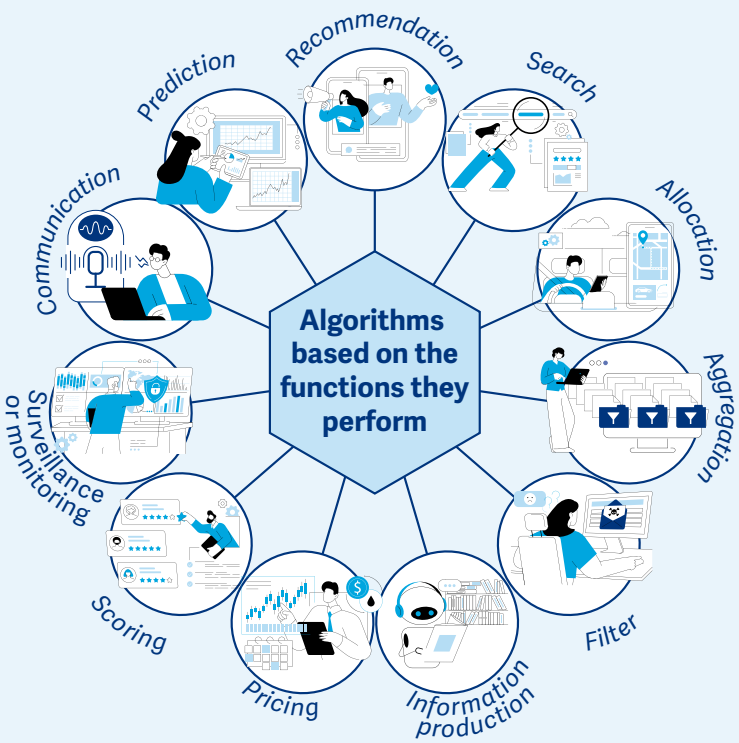
Table 1. Types of algorithms and their application according to the functions they perform

Type	Description
Surveillance or monitoring	It observes behaviors and patterns to detect fraud or monitor people's activity. It can also be used to monitor a market and track company behaviors, decisions, and pricing. For example, Palantir is used by government agencies and large companies for data analysis and surveillance. Its algorithm processes vast amounts of data to identify patterns that may indicate suspicious activities.[7] Similarly, Social Sentinel analyzes social media posts to detect threats or suspicious behavior, often utilized in educational settings to help prevent incidents.[8]
Pricing	It estimates and recommends prices that customers may be willing to pay, using data on customer or market characteristics. Take Uber, for example: it determines dynamic pricing or adjusts fares in real time based on changes in demand, supply, costs, or capacity.
Aggregation	It collects, categorizes, and reorders information from different sources. Google News, for instance, categorizes and reorders news based on specific topics.
Communication	It automates communication. An example is Alexa, a virtual assistant that relies on various communication and language processing algorithms to interact with you effectively. These algorithms enable Alexa to understand voice commands, process information, communicate with different services, and provide relevant responses.
Filter	It filters information and data based on predefined criteria, typically running in the background. Such as Norton, which identifies and filters unsolicited emails or spam, as well as potential viruses.
Information production	They are procedures or sets of instructions designed to generate new data, content, or knowledge from existing information. They produce automated responses based on a topic or query. For instance, GPT-4 or Claude can summarize or provide selected information automatically on a requested topic.
Prediction	It predicts future behaviors or scenarios based on information about past events. PredProl, for example, forecasts where and when crimes are most likely to occur, enabling police to focus patrols in those areas.[9]
Scoring	It rates or ranks information, products, companies, and/or consumers based on reviews. eBay serves as an example, displaying products according to their ratings or based on the reviews received.

7. See *Palantir Foundry for AML*, available here
8. See *Why expensive social media monitoring has failed to protect schools*, Slate, 2022. Available here.
9. See PredPol, *el primer software de predicción del crimen*, Forbes, April 8, 2015. Available here.

The following image provides examples of the uses and applications of algorithms based on the functions they perform. You may use some of them daily and, therefore, be familiar with how they work.

Example 4. Ttypes of algorithms and their application based on the functions they perform



A second classification of algorithms is based on their learning method.[10] The chosen learning method influences how algorithms evolve over time.

10. Based on Autorité de la Concurrence and Bundeskartellamt (2019), *Algorithms and Competition*, pp. 9-10. Available here.

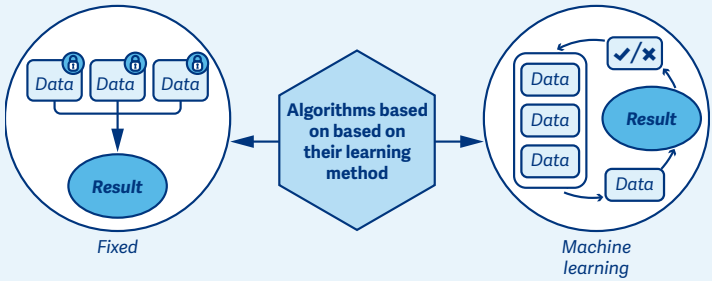
Table 2. Types of algorithms and their application based on their learning method

Type	Description
Fixed	The person who develops the algorithm determines how it operates, and this doesn't change over time or with new information. Instead, the output changes based on the data used to feed the algorithm. For instance, an online store might set product prices based on competitors' price fluctuations. While the prices (output) change over time, the algorithm itself remain static.[11]
Machine learning	These algorithms adjust their behavior to improve their output based on previously obtained results. They can make predictions and automatically organize inputs, based on common characteristics of the information they process. These algorithms adapt and modify their functioning to achieve more accurate and effective results.[12] The main types of machine learning algorithms are: (i) supervised learning: algorithms learn from labeled data to develop general rules that link input to output, such as classification systems; (ii) unsupervised learning: algorithms identify patterns in unlabeled data, for example, by grouping objects based on common characteristics; and (iii) reinforcement learning: algorithms learn through trial and error and perform tasks in dynamic environments. Deep learning is a subfield of machine learning that allows computers to learn by replicating human neuron activity through artificial neural networks.[13] For example, AlphaGo Zero learns to play a game solely using reinforcement learning.[14]

Below are examples of the use and application of both fixed and machine learning algorithms.

11. Vir Singh, P. (2023), *Algorithmic Pricing: Understanding the FTC's Case Against Amazon*. Available here.
12. Bonaccorso, G. (2018). *Machine Learning Algorithms*, pp. 10, 13, 27-28. Available here.
13. OECD (2017), *Algorithms and Collusion: Competition Policy in the Digital Age,* pp. 9-11. Available here. Joshi, A. (2023), *Machine Learning and Artificial Intelligence*, pp. 9-10. Available here.
14. See Silver, Schrittwieser, et al, *Mastering the Game of Go without Human Knowledge*. Available here.

Example 5. Illustration: Types of algorithms and their application based on their learning method



Finally, algorithms can also be classified based on the ease or difficulty of interpreting their behavior.[15]

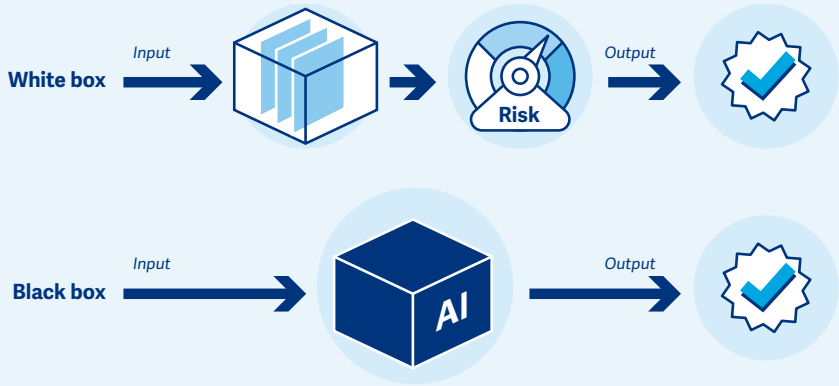
Table 3. Types of algorithms and their application based on their level of interpretation

Type	Description
White box[16]	Its behavior is easy to interpret through its programming code. For instance, A2i Fuel analyses competitors' prices, identifies the lowest price, and applies predefined rules to determine its response, matching that price accordingly. [17]
Black box	Its behavior is challenging to interpret, even when the programming code is accessible. An example is deep learning, where understanding how decisions are made by algorithms is often highly complex.[18]

The table below illustrates examples of white box and black box algorithms.

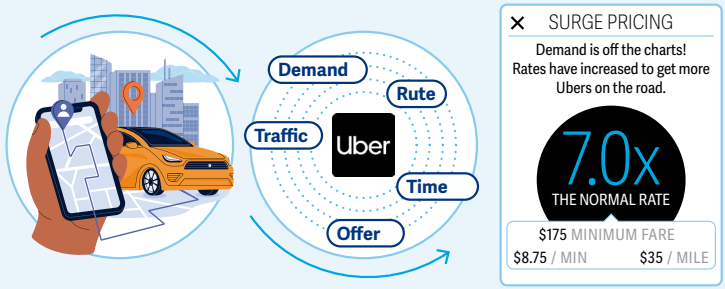
15. See Autorité de la Concurrence and Bundeskartellamt (2019), *Algorithms and Competition*, pp. 11-13. Available here.
16. Also known as "adaptative", "heuristic", "static" or "analytical". See Autorité de la Concurrence and Bundeskartellamt (2019), *Algorithms and Competition*, p. 11. Available here.
17. See A2i Systems, available here.
18. See Blouin, L. (2023), *AI's Mysterious 'Black Box' Problem, Explained*. Available here.

Example 6. Illustration: algorithms and their applications based on their level of interpretability



The three classifications presented and their applications are not mutually exclusive, as a single algorithm can have characteristics that place it in more than one category. In fact, within the same classification, an algorithm can belong to different types. Furthermore, companies can use multiple algorithms simultaneously for different purposes.

Example 7. Algorithm use by Uber, based on the function they perform



When you request an Uber, the app relies on algorithms to assign you an available driver. Rather than choosing the nearest driver, the algorithm considers factors such as traffic conditions and other geographical elements that could impact how quickly a driver can reach you. It waits a few seconds to evaluate potential matches before selecting the best alternative. This approach not only minimizes your waiting time but also optimizes the number of rides for drivers.[19]

At the same time, Uber employs algorithms to determine dynamic pricing and calculate the fare for your trip. These algorithms adjust prices based on variables such as the trip duration, distance, traffic conditions, and demand. Consequently, fares may temporarily increase during peak hours or high-demand periods.[20]

19. Uber (n.d.), *How does Uber match riders with drivers?* Available here.
20. Uber (n.d.), *How Uber's dynamic pricing model works?* Available here.

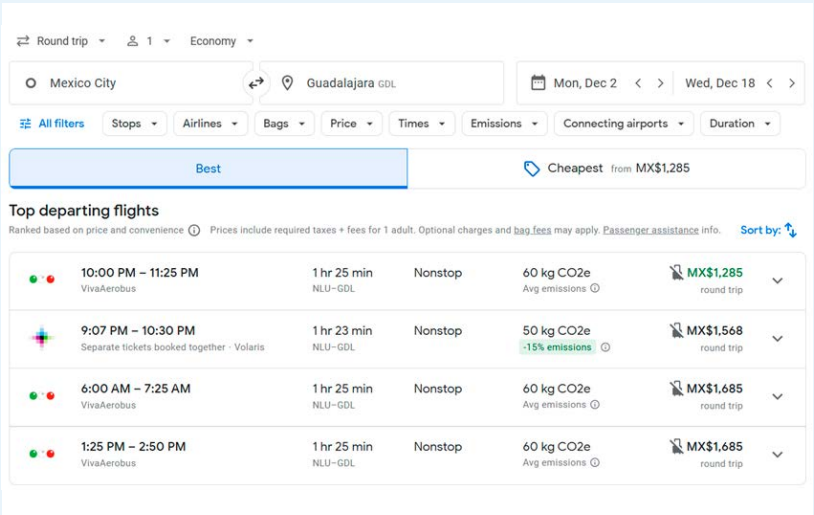
2. Algorithms and competition

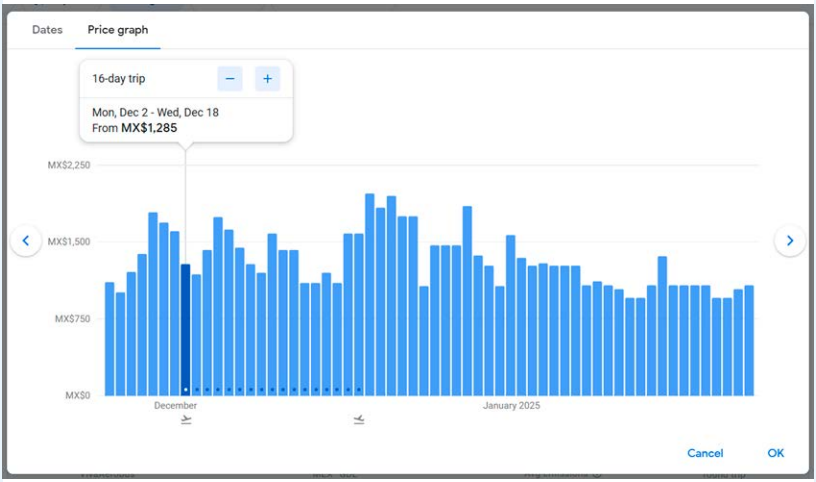
2.1. Benefits of the use of algorithms

Lower search costs. The use of algorithms simplifies access to a wide range of products and relevant information, such as price or quality, enabling you to compare options and choose the one that best suits your preferences. For instance, certain websites use algorithms to provide instant price comparisons across a variety of goods and services. Additionally, there are tools that employ monitoring algorithms to notify you when prices decrease, helping you identify the optimal time to make a purchase.[21]

21. OECD (2023), *Algorithmic Competition*, p. 11. Available here.

Example 8. Websites that assist with price comparison and monitoring





Some websites track flight prices, offering features such as price history, fares comparisons across different airlines, flight duration, and details on direct flights versus those with layovers. These websites also allow you to monitor prices and receive alerts, enabling you to buy tickets at the most favorable time.

Higher quality and innovation. Some algorithms serve as tools to enhance the quality of goods or services or to develop new products. They enable companies to continuously innovate, allowing them to enter markets and exert competitive pressure,[22] which can even lead to the creation of entirely new markets.[23] This benefits you as well, giving you access to novel and disruptive goods and services.[24]

The use of algorithms has also allowed companies to expand their business lines. For example, the Australian airline Qantas launched an app that rewards customers with points for maintaining healthy habits, such as walking a certain number of steps per day or exercising. To unlock these points, users are encouraged to sign up for Qantas health insurance, another business line. Additionally, the app sells flights and other products. To ensure effective communication of these offers, the platform uses algorithms to send personalized messages, enhancing the overall customer experience.[25]

Personalized offering of goods and services. Algorithms enable companies to tailor their offerings of goods and services based on your interests and past purchases,[26] using algorithms to identify your preferences and behavior.

This personalized approach to advertising, goods, and services benefits you by providing relevant recommendations, while helping businesses boost sales.[27] For instance, some coffee shops use apps to display personalized offers based on your preferences and habits. When you visit their locations, digital menus adjust dynamically, taking into account factors like weather, your tastes, and inventory levels, creating a more tailored experience attuned to your preferences.[28]

Informed decision-making by consumers. Algorithms help companies better organize the information they present to you, including prices but also quality and features that align with your preferences. At the same

22. OECD (2017), *Algorithms and collusion: Competition Policy in the Digital Age*, pp. 14-16. Available here.
23. OECD (2023), *Algorithmic Competition*, p. 10. Available here.
24. Competition Policy International, Antitrust Chronicle, Algorithms Revisited, July 2020. volume 1 (1). Lovdahl Liza, *Algorithms & Competition Law*, p. 22. Available here.
25. Edelman, D. & Abraham, M. (2022), *Customer Experience in the Age of AI*. Available here.
26. Autorité de la Concurrence y Bundeskartellamt (2019), *Algorithms and Competition*, p. 6. Available here
27. Competition Policy International, Antitrust Chronicle, Algorithms Revisited, Julio 2020. volume 1 (1). Lovdahl Liza, *Algorithms & Competition Law*, p. 22. Available here.
28. Edelman, D. & Abraham, M. (2022), *Customer Experience in the Age of AI*. Available here.

time, they allow you to compare products more effectively, based on attributes like price and quality, making it easier to make informed purchasing decisions, by identifying the options that best meet your needs.[29]

Reduction of production costs. Algorithms assists companies in reducing costs by optimizing production processes and improving employee productivity.[30] For instance, they can quickly clean and analyze market data to identify patterns and trends in less time, freeing employees to focus on more complex high-value tasks.[31] Algorithms also streamline activities like creating business plans, designing presentations, or generating images for new products,[32] enabling companies to allocate resources more efficiently. [33]

Did you know? By incorporating algorithms into its operations, the package delivery and transportation company UPS achieved significant savings. Using these tools, UPS optimized its routes, reducing the distance traveled by drivers by 85 million miles per year, savings of $2.55 million annually.[34]

2.2. Risks of using algorithms in economic competition

Algorithms can have uses that arise concerns regarding competition. In this section, we will explore some business practices that may constitute abuses of market power and harm competition.[35] Additionally, we will discuss how some companies use algorithms to influence your purchasing decisions in the digital environment[36] and, in some cases, how these practices could negatively impact competition.[37] Finally, we will explain what algorithmic collusion is and why it harms you as a consumer.

29. OECD (2017), *Algorithms and collusion: Competition Policy in the Digital Age*, p. 17. Available here.
30. OECD (2023), *Algorithmic Competition*, p. 10. Available here.
31. Tripathi, A. (2024), *The Next Big Data Leap: How AI Is Reshaping Data And Analytics Roles*. Available here.
32. Gates, B. (2023), *AI is about to completely change how you use computers*. Available here.
33. OECD (2017), *Algorithms and collusion: Competition Policy in the Digital Age*, p. 15. Available here.
34. Ismail, S. (s.f.), *Why Algorithms Are The Future Of Business Success*. Available here.
35. For further reference on this topic, see the section "Abuse of Market Power in the Digital Economy" in the notebook *Key Concepts of Competition in the digital Economy*. Available here.
36. CMA (2020), *Online platforms and digital advertising*, p. 165. Available here.
37. Marty, F. & Torregrossa, J. (2023), *Tackling dark patterns: how to reasonably prevent consumer manipulation and competition distorsions?* P. 2. Available here.

It is important to clarify that when evaluating business strategies that could be considered an abuse of dominance, it is essential to assess whether the potential harm caused by the use of algorithms outweighs their benefits. This is done using the "rule of reason". These practices are deemed illegal only under specific conditions.[38] In contrast, strategies used by companies to collude are inherently harmful to the competitive process and are considered *per se* illegal.[39]

Self-preferencing. A significant risk to competition arises when a dominant company in a market[40] uses its power to favor its own products or services on its platform,[41] over those of its competitors. Instead of applying the same rules to all players and ranking products or services based on merit, the company manipulates algorithms to benefit itself and discriminate against rivals.[42]

While these business strategies do not always reduce competition, companies with market power may leverage self-preferencing to foreclose competitors in other markets,[43] thereby limiting the diversity of options available to consumers.

38. For further reference on this topic, see the section "Abuse of dominant position in the digital economy" in the notebook *Key Concepts of Competition in the Digital Economy*. Available here.
39. Cofece (2020), Guía para Tramitar el Procedimiento de Investigación por Prácticas Monopólicas Absolutas, p. 4. Available here.
40. Although self-preferencing is not limited to companies that dominate a market, for the purposes of this document, we refer to it as a form of price or treatment discrimination that can have harmful effects on competition conditions in a market, as defined by the Federal Economic Competition Law.
41. Cofece (2024), *Key Concepts of Competition in the Digital Economy*, p. 51. Available here.
42. CMA (2021), *Algorithms: How they can reduce competition and harm consumers*, p. 25. Available here.
43. OECD (2023), *Algorithmic Competition*, p. 18. Available here.

KFTC vs. Kakao

On February 14, 2023, the Korea Fair Trade Commission (KFTC) fined Kakao, the company behind the Kakao T taxi app for manipulating its taxi allocation algorithm to prioritize taxis affiliated with its platform over non-affiliated ones.

Kakao T is a digital platform that allows passengers to request taxis from both affiliated and non-affiliated taxis. Taxi drivers can operate independently or as part of a taxi franchise. Affiliated drivers exclusively use the Kakao T app to find passengers.

Kakao manipulated its algorithm in two ways that benefited its affiliated drivers:

- Prioritizing passengers for affiliated drivers over non-affiliated ones.
- Assigning shorter, less profitable routes to non-affiliated drivers.

As Kakao T was the dominant platform in the market, these strategies made it difficult for competing taxi franchises to attract drivers. Kakao's strategies ultimately excluded competitors from the market. As a result, Kakao's share of affiliated drivers rose from 14% in 2019 to 73% in 2021.

Sources:
KFTC (2023), *Kakao Mobility sanctioned for making calls to subsidiary affiliated taxis*. Available here.
OECD (2023), *Algorithmic Competition*, p. 19. Available here.

Tying and/or bundling. Tying and/or bundling occurs when a company requires you to purchase one product as a condition for obtaining another often unrelated or "tied"[44] (e.g., product A is only sold if you also buy product B), effectively forcing you to buy both. Alternatively, the company may offer products A and B together, either exclusively as a bundle (AB), or individually but at a discounted price when purchased together.[45] This strategy could pose risks to competition, particularly when employed by a company with a dominant market position.[46]

44. OECD (1993), *Glossary of Industrial Organisation Economics and Competition Law*, p. 83. Available here y Cofece (2024), *Key Concepts of Competition in the Digital Economy*, pp. 48-49. Available here.
45. OECD (2023), *Algorithmic Competition*, p. 22. Available here. In Mexico, this is the situation described in section III of Article 56 of the Federal Economic Competition Law, available here that covers "*the sale or transaction conditioned on the purchase, acquisition, sale, or provision of another good or service, typically different or distinguishable, or based on reciprocity*".
46. Although tying and/or bundling do not occur solely in companies that dominate a market, for the purposes of this document, we refer to the form of tying and/or bundling that has harmful effects on competition conditions in a market, as defined by the Federal Economic Competition Law.

CE vs. Google

On July 17, 2018, the European Commission (EC) fined Google €4.34 billion for abusing its dominant position through certain illegal business practices, including tying and/or bundling. The EC found that Google held a dominant position in markets for general internet search services, licensable smart mobile operating systems and app stores for Android mobile operating system.

Mobile device manufacturers must obtain a license from Google to install the Android operating system. To obtain this license, manufacturers were required to preinstall specific Google apps. As a result, Google offered its apps and services to manufacturers as a bundle that includes Google Play Store, Google Search, and Google Chrome. Manufacturers where obliged to preinstall these apps on virtually all Android devices.

During its investigation, the EC found that manufacturers considered the Play Store as essential because consumers expect it to be preinstalled on their devices. Additionally, apps like Google Search and browsers like Google Chrome served as key entry points for internet searches on mobile devices. The mandatory preinstallation of these apps meant that users relied on them by default, without seeking alternatives.

Google's strategy diminished manufacturers' incentives to preinstall competing search apps and browsers, weakening the ability of rivals to compete. The EC concluded that Google's behavior had no justification other than to hinder competition in the investigated markets.

The EC concluded that Google used these strategies to cement its dominant position in general search services. As a result, rival search services have fewer opportunities to compete, which limits innovation in the market.

Sources:
EC (2018), *AT.40099*. Available here.
EC (2018), *Antitrust: Commission fines Google €4.34 billion for illegal practices regarding Android mobile devices to strengthen dominance of Google's search engine*. Available here.

In the digital economy, companies often use algorithms to bundle products by collecting data to better understand their consumers. For example, digital assistants like Alexa, Siri, and Google Assistant rely on algorithms to perform multiple tasks simultaneously. Companies such as Amazon, Apple, Google, are continually developing the best digital assistant, creating algorithms that integrate multiple tasks and functionalities: organizing calendars, reminding you of meetings, alerting you to bring an umbrella if rain is forecast, calling contacts and more. These assistants function as technological bundles, making interconnected decisions based on your habits, tastes, preferences and interests.[47]

To enhance service quality and improve user experience, companies may introduce additional features to complement their core services. For instance, a social network that initially allowed content sharing might later add instant messaging. However, it is not always clear whether these fea-

47. Gal, M. & Koren, E. (2017), *Algorithmic Consumers*, pp. 336-337. Available here.

tures are mere add-ons or whether they constitute tying or bundling. In certain cases, such strategies can be more beneficial than harmful, by offering a more comprehensive experience.

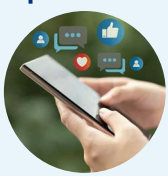
Algorithms also help companies estimate how much you are willing to pay for products you frequently consume, influencing their business decisions and profitability. Based on your willingness to pay, companies may offer tied or bundled products that align with your preferences.

As demonstrated by the Google case, companies with a dominant position can use tying and/or bundling strategies to reinforce their market power. With the use of algorithms, this risk is also present. Companies with extensive data about your preferences may train their algorithms, to create highly appealing bundles, potentially excluding smaller competitors without the chance to compete if they lack of equivalent data capabilities.[48]

Choice architecture and dark patterns. In the digital economy, companies can influence your decisions and behavior through the design of websites, apps, and devices. This influence is referred to as choice architecture, which encompasses the environment in which you act as a user of digital services, including the presentation and arrangement of options, as well as interface design.[49]

Algorithms play a crucial role in choice architecture by enabling companies to optimize their interactions with users through personalized results and recommendations.[50]

Example 9. Choice architecture based on algorithms



Social media

Streaming

E-commerce

Social media, audio and video streaming platforms, and e-commerce websites use choice architecture powered by recommendation or filter algorithms to determine the content they display or suggest to you. These algorithms control the amount of information and options presented to you.[51]

48. Cheng, T. & Nowag, J. (2023), *Algorithmic predation and exclusion,* p. 53. Available here.
49. CMA (2022), *Online Choice Architecture*, pp. iii, 2. Available here.
50. CMA (2022), *Online Choice Architecture*, p. 45. Available here.
51. CMA (2021), *Algorithms: How they can reduce competition and harm consumers*, p. 15. Available here.

While choice architecture can benefit you by providing faster return processes or relevant products or services recommendations,[52] it can also be used to exploit you through harmful user interface, known as dark patterns.[53]

Dark patterns are user interfaces designed to influence your decisions as a digital consumer, often leading you to make choices you might not have made if you were fully informed.[54]

Example 10. Dark patterns

Promotional messages highlighting the limited availability of a product, whether in terms of quantity or time, are examples of dark patterns. These algorithm-driven messages create a sense of urgency, pushing you to buy more or discouraging you from taking the time to explore other options before making a purchase.[55]

Artificially highlighting the scarcity of a product to create a false sense of urgency is a tactic designed to influence your purchasing decisions, potentially leading you to buy items you might not have otherwise considered.

The harmful effect of dark patterns is closely tied to some concerns about competition. For instance, dark patterns can be part of business strategies like self-preferencing, by inducing you to choose a particular offer or option, while excluding potentially better alternatives.[56] This is particularly harmful when implemented by companies with significant market power.[57]

Companies employing dark patterns can gain an unfair advantage and distort competition by shifting incentives away from competing on merits—such as obtaining your preference based on factors like quality or price—to highlight less beneficial attributes, by exploiting potential consumer biases you may have. This can result in higher prices, lower-quality products, and ultimately, less efficient markets.[58]

52. CMA (2022), *Online Choice Architecture*, p. 2. Available here.
53. CMA (2021), *Algorithms: How they can reduce competition and harm consumers*, p. 8. Available here.
54. OECD (2021), *Roundtable on Dark Commercial Patterns Online. Summary of discussion*, p. 4. Available here.
55. CMA (2021), *Algorithms: How they can reduce competition and harm consumers*, p. 24. Available here.
56. Marty, F. & Torregrossa, J. (2023), *Tackling dark patterns: how to reasonably prevent consumer manipulation and competition distortions?* pp. 4-5. Available here.
57. To learn more about self-preferencing, see the section 3.1 *Abuse of market power in the digital economy, in the notebook Key Concepts of Competition in the Digital Economy*. Available here.
58. CMA (2022), *Online Choice Architecture*, p. 29. Available here.

In the United States, the Federal Trade Commission (FTC) has taken legal action against Amazon for allegedly using dark patterns to manipulate users into subscribing to its Prime service.

FTC vs. Amazon

In June 2023, the FTC filed a lawsuit against Amazon for allegedly using dark patterns to deceive consumers into subscribing to its Amazon Prime service with automatic renewal, while making the cancellation process unnecessarily complex. The FTC argued that these practices allowed Amazon to unfairly maintain its market power, thereby harming free competition.

According to the FTC, at the end of a purchase on Amazon, consumers are repeatedly prompted to subscribe to Amazon Prime, and in many cases, completing the purchase without subscribing to Prime is intentionally difficult. In many cases, the button to complete the purchase doesn't make it clear that by selecting it, a Prime subscription with a monthly fee is also activated.

The FTC also accused Amazon of designing an intentionally burdensome cancellation process for Prime. Consumers must navigate several steps: first, they must locate the cancellation option; then, they are redirected to multiple pages offering discounts to retain the subscription, options to deactivate auto-renewal, or prompts to abandon the cancellation. Only after completing these steps can users finally cancel the service.

The case remains ongoing.

Sources:
FTC (2023), *Amazon.com, Inc. (ROSCA), FTC v.* Available here.
FTC (2023), FTC Takes Action Against Amazon for Enrolling Consumers in Amazon Prime Without Consent and Sabotaging their Attempts to Cancel. Available here.
FTC (2023), Amended complaint for permanent injunction, civil penalties, monetary relief, and other equitable relief. Available here.
FTC (2023), FTC Adds Senior Executives Who Played Key Roles in Prime Enrollment Scheme to Case Against Amazon. Available here.

The use of algorithms not only affects competition through practices such as self-preferencing, tying and/or bundling, or dark patterns in choice architecture. Algorithms also enable competitors within the same market to coordinate strategies, which can further harm competition and market dynamics.

Collusion. Collusion occurs when competitors agree to fix the prices at which they should sell a product or to reduce production in order to increase their profits.[59] Under the Mexican Federal Economic Competition Law, collusion -also known as a cartel- is referred to as an **Absolute Monopolistic Practice**. This includes contracts, agreements, arrangements, or combinations of these, between competitors with the objective

59. OECD (1993), *Glossary of Industrial Organisation Economics and Competition Law*, p. 20. Available here.

or effect of manipulating prices, dividing the market, manipulating supply or demand, colluding in bids, or exchanging information to achieve any of these objectives.[60]

According to economic theory, collusion can be classified into two types:

- **Explicit collusion.** This refers to practices based on express agreements, whether written, oral, or through any other means. Typically, companies interact directly to agree on the price they want to set or the outcomes they aim to achieve.[61]
- **Tacit collusion.** This occurs when companies engage in coordinated non-explicit behavior, without an explicit agreement nor direct contact or communication between them. Instead, each company acts independently and reacts to its competitors' behavior to maximize its profits.[62]

The secrecy surrounding Absolute Monopolistic Practices[63] leaves competition authorities with two potential types of evidence to prove their existence: direct evidence and indirect evidence.

- **Direct evidence** demonstrates that an event occurred without requiring additional interpretation. Examples include the testimony of a witness who observed the agreement, documents recording or reporting on the agreement or its enforcement, digital evidence, or audio/video recordings. This evidence is directly linked to the fact being proven without the need for inferences or assumptions.
- **Indirect evidence** consists of circumstantial clues or evidence that, when connected to the facts of the case, can reasonably lead to the conclusion that collusion occurred. Based on known facts, an inference is made to reach a conclusion. This type of evidence includes economic analyses based on data such as simultaneous price increases by competitors, sharing customers with a competitor, as well as

60. Cofece (2016), *¿Qué es una práctica monopólica absoluta?* Available here.
61. OECD (2017), *Algorithms and Collusion: Competition Policy in the Digital Age*, p. 19. Available here.
62. Ezrachi, A., Stucke, M. (2020), *Sustainable and Unchallenged Algorithmic Tacit Collusion*, p. 218. Available here.
63. The secretive nature in which absolute monopolistic practices occur is a topic that is frequently addressed in economic competition. In this regard, the Second Chamber of the Supreme Court of Justice of the Nation (SCJN) has stated the following: "*(...) competition law theory has consistently pointed out that, due to the obscurity in which these practices are carried out, proving their existence is a difficult task, as those engaging in such conduct seek to hide their actions and avoid leaving evidence or traces that would demonstrate it; (...)*" Second Chamber of the SCJN, (2015), *Thesis 2a./J. 95/2015 (10a.) Digital registry no. 2009658. PRÁCTICA MONOPÓLICA ABSOLUTA. PARA SU ACREDITAMIENTO ES VÁLIDO ACUDIR A PRUEBAS INDIRECTAS O CIRCUNSTANCIALES*. Available here.

other indicators like meetings or phone calls between competitors at similar times, actions to conceal information, metadata, or matching IP addresses, among others.[64]

We refer to algorithmic collusion when certain market characteristics, often associated with computers or algorithms, facilitate anticompetitive behavior.[65] These algorithms can learn to collude in ways that differ from human interactions, adjusting their prices or strategies without explicit communication.

There are three concerns that competition authorities analyze regarding algorithmic collusion: (i) ease of explicit coordination; (ii) possibility of creating "hub-and-spoke" structures; and (iii) risk of autonomous collusion.[66]

Did you know that the original concept of hub-and-spoke is inspired by the structure of a bicycle wheel? In a wheel, the "hub" is the center that holds the wheel, and the "spokes" are the rods that connect the center to the outer rim.

This analogy is used to explain how, in certain markets, several competing companies (the **spokes**) are connected through a common intermediary (the **hub**). While the spokes don't directly connect to each other, they all converge at the same central point.

First, algorithms can facilitate **explicit collusion**, and the way they can do so depends on the type of algorithm, for example:[67]

64. Fourth Circuit Court of Appeals in Administrative Law of the First Circuit, (2008), *Thesis I.4o.A. J/74 Digital registry no. 168495. COMPETENCIA ECONÓMICA. LA PRUEBA INDIRECTA ES IDÓNEA PARA ACREDITAR, A TRAVÉS DE INDICIOS, CIERTOS HECHOS O CIRCUNSTANCIAS A PARTIR DE LO QUE SE CONOCE COMO LA MEJOR INFORMACIÓN AVAILABLE, RESPECTO DE LA ACTUACIÓN DE EMPRESAS QUE HAN CONCERTADO ACUERDOS PARA LLEVAR A CABO PRÁCTICAS MONOPÓLICAS*. Available here and Glad, D. (s.f.), *Proving the Existence of Cartels with Direct & Indirect Evidence*. Available here.
65. For this definition, we use the concept of *Algorithmic Collusion* by Daniel Sokol and Justin Johnson in the Competition Law Dictionary by Concurrences. Available here.
66. CMA (2021), *Algorithms: How they can reduce competition and harm consumers*, pp. 29-30. Available here.
67. CMA (2018), *Pricing algorithms. Economic working paper on the use of algorithms to facilitate collusion and personalised pricing*, p. 22. Available here.

- Monitoring algorithms collect and process information from competitors. Eventually, a cartel member could use this information to detect when other members breach the agreement and to enforce the collusive arrangement.
- Pricing algorithms could raise competition concerns if competitors share the same pricing algorithm, which could be programmed to prevent participants from competing and setting anti-competitive prices instead.
- Signaling algorithms enable the revelation and dissemination of information to announce the intention to collude and to negotiate the rules that must be followed for implementing or maintaining the agreement.

One example occurred in the UK, where the UK's Competition and Markets Authority (CMA) found that two competing companies colluded to fix their prices and used algorithms to monitor their collusive agreement.

CMA v. Trod and GB

The companies Trod and GB were involved in selling licensed sports and entertainment products, including posters and frames featuring popular images like One Direction and Justin Bieber.

From March 24, 2011, to July 1, 2015, Trod and GB agreed not to lower the prices of the posters and frames they sold on Amazon in the UK. They implemented their agreement using algorithms that automatically adjusted their prices, ensuring that neither company set a price lower than the other.

The CMA determined that Trod and GB had violated competition law and imposed a fine.

Sources:
CMA (2016), *Decision of the Competition and Markets Authority. Online sales of posters and frames*. Case 50223. Available here.
CMA (2016), *Amazon Marketplace online sellers fined £160k for price-fixing*. Available here.
CMA (2016), *Online seller admits breaking competition law*. Available here.

Another landmark case of explicit algorithmic collusion occurred in the U.S., where the Department of Justice (DOJ) investigated several poster sellers on Amazon Marketplace.

DOJ vs. Topkins

In 2015, the DOJ found David Topkins, a poster seller on Amazon Marketplace, guilty of agreeing with several other sellers to fix the prices at which they sold posters.

According to the ruling, David Topkins and other poster sellers agreed to design, program, and share an algorithmic software to set their prices. One of the competitors developed an algorithm to identify the lowest price offered by an external seller and set their own price just below that amount. The other cartel members programmed their algorithms to match this new price. As a result, they collectively controlled the price range in the market, limiting competition.

Sources:
DOJ (2016), *Former E-Commerce Executive Charged with Price Fixing in the Antitrust Division's First Online Marketplace Prosecution*. Available here.
OECD (2017), *Algorithms and Collusion: Competition Policy in the Digital Age*, p. 28. Available here.

Second, algorithms can create "**hub-and-spoke**" structures, which facilitate interaction between companies without the need for direct contact. In some cases, this allows competitors (the spokes) to make explicit agreements or exchange information without directly communicating with each other. Instead, the agreement or exchange occurs through a third party (the hub), such as the operator of an online marketplace.[68]

Hub-and-spoke structures can also be found in traditional markets. For example, the Office of Fair Trading (OFT, now the CMA) fined three companies for entering into a collusive agreement through a hub-and-spoke structure.

The toys case

In 2003, the OFT found that Hasbro, Argos, and Littlewoods agreed to fix the prices of certain toys and games. Hasbro was one of the largest toys and games manufacturers in the UK, while Argos and Littlewoods were two major retailers competing directly with each other.

Hasbro persuaded the retailers to charge the recommended retail price. Argos and Littlewoods were concerned that if one of them charged the recommended price, the other would lower it to attract more customers.

This distrust led Hasbro to act as the "hub" while Argos and Littlewoods became the "spokes". Hasbro identified common products in the retailers' catalogs and checked whether both agreed to maintain the recommended price for those products. When both retailers accepted, Hasbro communicated their intention to maintain the recommended prices and monitored their compliance.

As a result, the OFT imposed a fine of £22.65 million on all three companies.

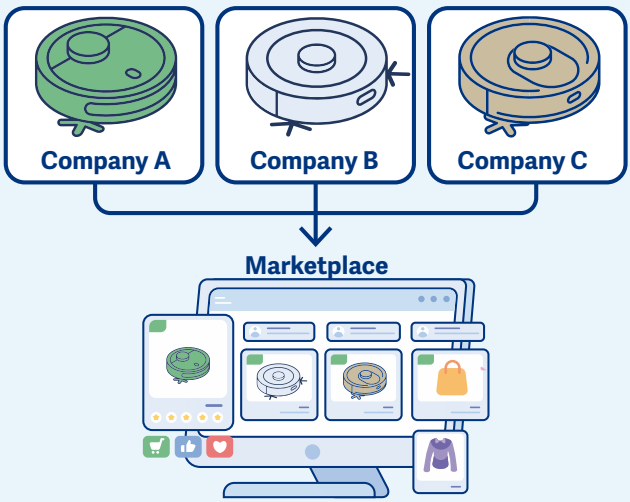
Sources:
OFT (2003), *Hasbro U.K. Ltd / Argos Ltd / Littlewoods Ltd*. Available here.
OECD (2019), *Roundtable on Hub-and-Spoke Arrangements – Background Note by the Secretariat*, p. 6. Available here.

68. OECD (2019), Roundtable on *Hub-and-Spoke* Arrangements – Background Note, p. 5. Disponible aquí.

In the digital environment, concerns about the "hub-and-spoke" model focus on competitors independently or coordinately choosing to use the same hub to develop or implement the algorithms they use to set the prices of their goods or services and exchange information indirectly. By relying on the same algorithms, they may end up adopting similar pricing strategies.[69]

There are platform operators who offer tools and algorithms to sellers using their platforms to market goods or services. An example of this is an online marketplace where companies A, B, and C sell their robot vacuums, with the platform helping them establish and manage their prices.

Example 11. Manufacturers of the same product and their distributor



Companies A, B, and C are manufacturers of robot vacuums, which are sold through the same online marketplace.

In this example, A, B, and C are part of the same level in the supply chain, as they are all manufacturers. The marketplace, on the other hand, occupies a different level in the supply chain, acting as a business partner to A, B, and C and serving as a distribution channel for the robot vacuums.

69. OECD (2017), *Algorithms and Collusion: Competition Policy in the Digital Age*, p. 28. Available here.

In this example, the platform operator could provide algorithms capable of suggesting prices or allow sellers to delegate their pricing decisions to the platform. If all companies use the same algorithm to determine their prices, they could coordinate their pricing strategies without directly communicating with each other.[70]

Finally, self-learning algorithms could facilitate **collusion**. While a person may initially program a self-learning algorithm to maximize the company's benefit, the algorithm could later adjust itself to maximize the joint benefit of two or more companies, without any intervention or sharing of information from the programmer. This poses interesting challenges from an economic, legal, and technological perspective.

In recent years, there has been a growing number of economic analyses examining pricing models and scenarios involving algorithms. These studies employ reinforcement learning algorithms,[71] concluding that these algorithms could set collusive prices without any communication between them. While some of these studies show a tendency for independent pricing algorithms to adopt tacit collusion strategies autonomously, the extent of the risk these strategies pose in real market conditions remains unclear.[72]

Algorithms have changed the competitive dynamics in digital markets. While the benefits of using and applying these tools are evident, there are also instances where they hinder competition, and ultimately harm consumers. Competition authorities are constantly exploring solutions and ways to prevent this technology from being more harmful than beneficial.

2.3. Strategies to address the risks of algorithm use

Regulation. In previous sections, we explained that companies can use algorithms to implement business strategies that, under certain circumstances, can undermine competition. Some jurisdictions are particularly concerned about how these algorithms are being used. For example,

70. CMA (2021), *Algorithms: How they can reduce competition and harm consumers*, pp. 31-32. Available here.
71. Gautier, A., Ashwin, T, et al. (2020), *AI algorithms, price discrimination and collusion: a technological, economic and legal perspective*, pp. 16-17. Available here.
72. Ezrachi, A. & Stucke, M. (2016) *Virtual Competition*, p. 65. Harvard University Press.

Germany revised its competition law to prohibit, among other things, self-preferencing by dominant companies, and to impose obligations for interoperability and portability.[73]

Additionally, other jurisdictions have expressed concerns about the use of dark patterns and have enacted laws to prohibit them under certain conditions. In 2020, the European Union passed the Digital Services Act (DSA), which regulates certain obligations of digital platforms. Among them, the DSA prohibits dark patterns, preventing digital platforms from designing, organizing, or operating their interfaces in ways that deceive, manipulate, or distort your ability to make free and informed decisions.[74] Similarly, in 2023, a legislative initiative was introduced in the United States to prevent large digital companies from using dark patterns to manipulate you to obtain your personal data.[75]

Self-regulation. In addition to regulation, there are other measures to promote more competitive markets when companies use algorithms. One option is for companies to establish and share public guidelines and standards, which helps to understand how they can train their algorithms in a way that meets transparency obligations and ensures compliance.[76]

By sharing these guidelines and standards, companies improve transparency and enable users to understand their practices, fostering trust and facilitating compliance. In this context, transparency and accountability of the effects that algorithms produce is key.

On the other hand, some jurisdictions have developed frameworks and guidelines to help companies ensure that their algorithms are of high quality and used properly, especially to prevent concerns related to bias and discrimination. In Europe, an initiative has been launched to make algorithms more transparent and hold them accountable for potential violations of the law. These obligations can be challenging, especially when it comes to black box algorithms.[77]

Use of algorithms by authorities. Algorithms are not only a subject of study for competition authorities; they are also increasingly being used to enhance performance, such as identifying suspicious activities and

73. Coglianese, C. & Lai, A. (2022), *Antitrust by Algorithm*, p. 9. Available here. To learn more about data interoperability and portability as possible solutions to foster competition, see the notebook *Data and Competition in the Digital Environment*, p. 43. Available here.
74. CE (2024), *Questions and answers on the Digital Services Act*. Available here.
75. Warner, M. (2023), *Warner, Fischer Lead Bipartisan Reintroduction of Legislation to Ban Manipulative 'Dark Patterns'*. Available here.
76. CMA (2021), *Algorithms: How they can reduce competition and harm consumers*, pp. 43-44. Available here.
77. OECD (2017), *Algorithms and Collusion: Competition Policy in the Digital Age*, pp. 47-48. Available here.

allocating resources for monitoring them.[78] For this purpose, it is essential to develop the technology and capacity to analyze algorithms.[79] For example, the CMA uses algorithmic techniques to understand how companies handle data, what their machine learning and AI algorithms do, the consequences of their use, and what actions should they take.[80]

These tools are also useful for identifying specific markets and market structures where companies are more likely to collude, or to detect price trends and their evolution over time.[81] Machine learning algorithms can be especially useful for competition authorities to monitor market behavior and development.[82]

At Cofece, as part of our activities including monitoring and tracking the markets, we have evaluated the design of algorithms to streamline processes and optimize the use of our resources. We are interested in algorithms for processing, systematizing, and analyzing information, and are working on developing algorithms to better detect certain strategies by companies that could harm competition.[83]

As a consumer, you interact with algorithms every day, particularly when you use digital services. While you enjoy the many benefits that these tools offer, you could also be affected by the risks they pose, especially if they lead to higher prices or lower-quality goods and services. That's why, as a competition authority, we are committed to staying updated and developing the necessary tools to perform our functions more effectively, with the aim of ensuring effective competition conditions that benefit you and businesses. At the same time, we strive to keep you informed and provide you with the tools you need to be a conscious consumer.

78. Coglianese, C. (2023), *AI For the Antitrust Regulator*. Available here.
79. Ezrachi y Stucke (2016), *Virtual Competition. The promise and perils of the algorithm-driven economy*, p. 231. Harvard University Press
80. Coglianese, C. & Lai, A. (2022), *Antitrust by Algorithm*, pp. 10-12. Available here.
81. Sargeant, H. & Groza, T. (2023), *Unleashing the power of algorithms in antitrust enforcement: navigating the boundaries of bias and opportunity*, p. 6. Available here.
82. Coglianese, C. & Lai, A. (2022), *Antitrust by Algorithm*, p. 13. Available here.
83. OECD (2023), *Algorithmic competition – Note by Mexico*, p. 5. Available here.

3. Conclusions

Algorithms have revolutionized our interaction with the digital world, offering us numerous benefits. Thanks to them, you save time and effort when shopping, access more innovative and higher-quality products and services, and enjoy personalized offers tailored to your interests and preferences. Ultimately, all of this helps you make more informed decisions as a consumer.

However, it is important to recognize that some companies may use algorithms to implement strategies that give them undue competitive advantages. These practices harm other companies that want to compete in the market and affect you as a consumer, potentially leading to fewer product or service options, lower quality, and higher prices.

Moreover, some companies employ methods to influence the way you make decisions, such as choice architecture based on algorithms or the use of dark patterns to subtly manipulate your behavior and purchase decisions.

Algorithms can also facilitate collusion or cartels among competing companies, potentially leading to Absolute Monopolistic Practices.

In response to these challenges, at Cofece, we are firmly committed to protecting and promoting effective competition in digital markets. We join competition authorities worldwide in efforts to ensure competition in digital markets. This work is carried out not only through the issuance of regulations, guidelines, and frameworks, but also through studies and

documents to keep consumers informed and aware of these issues, and the development of algorithms to detect anticompetitive business strategies.

We understand the importance of staying vigilant about the development and use of these and other technologies. Therefore, we actively monitor these highly dynamic markets to prevent, identify, and mitigate potential risks to competition.

It is essential that we remain aware of the impact algorithms and new technologies have on markets and on our decisions as consumers. We encourage you to stay informed, to be a conscious consumer, and to join us in the effort to maintain fair and competitive markets. Together, we can ensure that technological innovation remains a tool for improving our quality of life without compromising competition or our rights as consumers.

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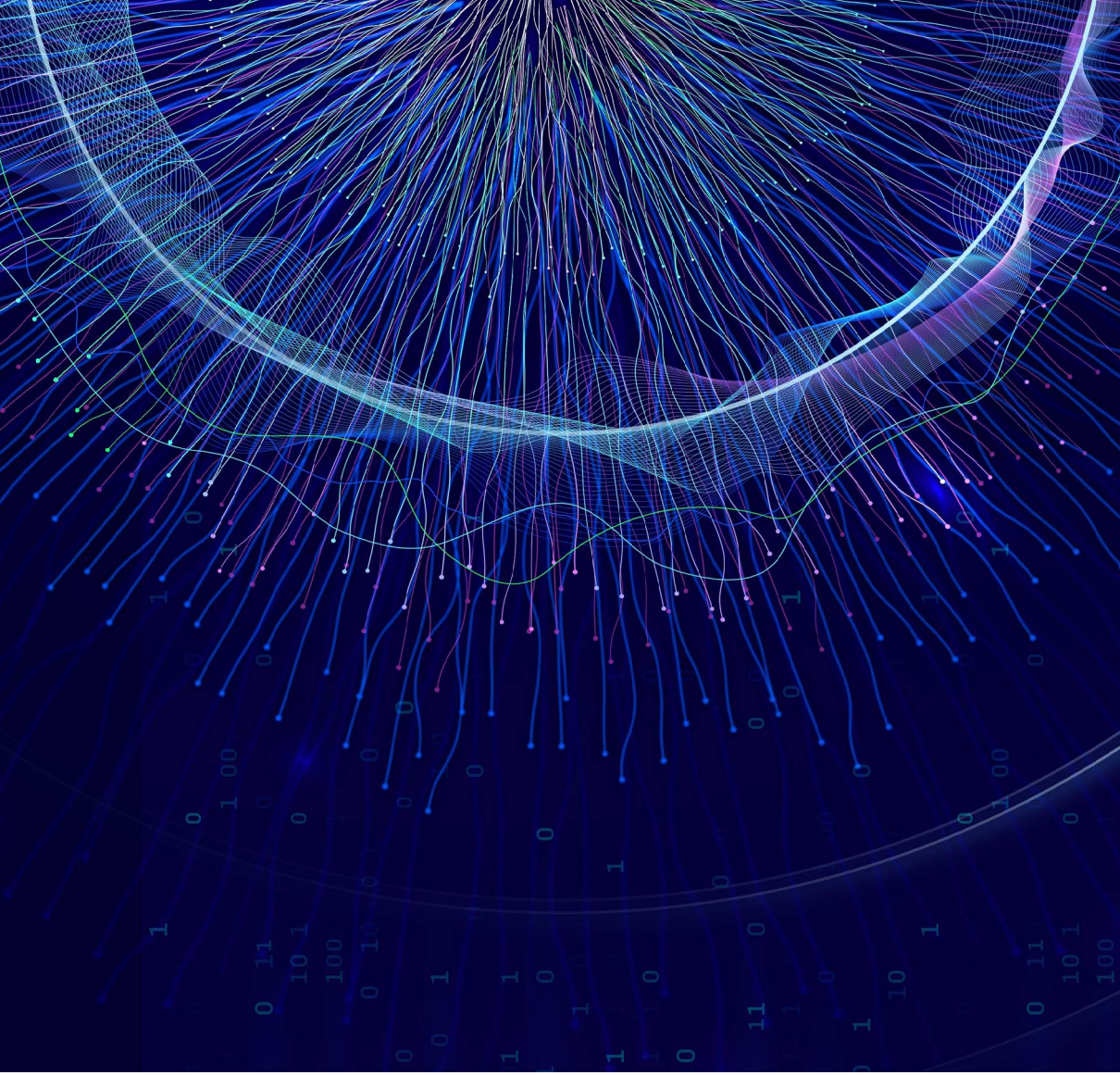

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