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DOI:

[10.1163/9789004529953_004](https://doi.org/10.1163/9789004529953_004)

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Document Version

Peer reviewed version

Citation for published version (Harvard):

de Amstalden, M & Schafer, B 2022, 'When brand distinctiveness is in the AI of the beholder: trademark law in the age of AI shoppers', *New Zealand Yearbook of International Law*, vol. 18, pp. 51–84.
https://doi.org/10.1163/9789004529953_004

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When Brand Distinctiveness is in the AI of the Beholder – Trademark Law for Autonomous Intelligent Shopping Agents

Mariela de Amstalden¹ and Burkhard Schafer²

Abstract

Trademark law is quintessentially a response to all-too-human cognitive failures: We have limited time, limited attention spans, limited memory and an ability for pattern recognition that on the one hand is highly evolved, but also prone to manipulation. But what happens as we increasingly outsource our purchasing decisions to machines? Artificial Intelligence (AI) in the form of autonomous intelligent shopping agents (AISA) such as *Siri* or *Alexa* continue to gain autonomy. However, two trademarks that would not be confusing for a human may be difficult to distinguish for an AISA, and conversely, an AISA may be able to distinguish trademarks that are confusing for humans. Similarly, actions intended to infringe a competitor trademark may not be triggered when shoppers are AISAs, but now novel forms of trademark infringement may become possible only in the realm of AISAs. This paper discusses whether the advent of AISAs in retail, and the following change in consumer practises, challenges the current international trademark regime, with a particular focus on the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

1. Brands after AI Disruption: An Introduction

From the early days of the World Wide Web (WWW) and the commercialisation of the Internet, courts struggled to extend by analogy brick and mortar conceptions of trademark law to this novel medium. Metaphors abound – are Google search results billboards on an information

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highway; is Amazon a department store or a greasy spoon?³ In 2014 and 2015 respectively, courts in the United Kingdom (UK) and the United States (US) had to address the question of how to make sense of increasingly sophisticated search tools that shape the way consumers look for goods online, and ultimately make purchase decisions. In *Lush v Amazon*⁴ and *Multi Time Machine, Inc. v. Amazon.com (MTM)*,⁵ the question was how the ‘ambient intelligence’ that sophisticated search tools and user interfaces provide impacts on traditional trademark concepts such as likelihood of confusion or reasonable consumer. The two jurisdictions, in the event, came to opposite decisions, despite the striking similarity in the facts. This divergence of results indicates that the appeal to these highly subjective metaphors informing their reasoning creates challenges for a harmonized international trade order, especially as the main players are globally operating service providers.

This paper argues that the challenges faced by courts in these cases have in the few intervening years changed through a move towards more autonomous shopping assistance. Smart digital assistants such as *Alexa* and *Siri* build on some of the search technologies that were at the heart of *Lush* and *MTM*, but through a combination of technological advances and new ways of deploying these systems, the resulting AISAs are changing from a mere assistive tool for human consumers to increasingly autonomous or semi-autonomous actors themselves.

This, in turn, raises the question that is at the heart of this enquiry: from its conception, the ‘audience’ of trademark law were human consumers making decisions under uncertainty. *Lush* and *MTM* already hinted at a future where this understanding of the audience for trademark law becomes fragile. The ‘technologically augmented consumers’ were, arguably, often still confused and subject to misdirection. Yet they were confused in ways significantly different from that of the brick-and-mortar world, and it became increasingly questionable if the old legal categories provided still adequate protection, both for them and also for the owners of the marks.

With AISAs as the next iteration of technological intermediation of consumer decisions, this question has become even more acute. If we are increasingly able to outsource purchase

³For a discussion of these metaphors see Andrea Hall, ‘Standing the Test of Time: Likelihood of Confusion in *Multi Time Machine v. Amazon*’ (2016) 31(2) *Berkeley Technology Law Journal*, 815, 822ff.

⁴ *Cosmetic Warriors Ltd and another v Amazon.co.uk Ltd and another* [2014] EWHC 181 (Ch).

⁵ *Multi Time Mach., Inc. v Amazon.com, Inc.*, 804 F 3d 930 (9th Cir. 2015).

decisions to machines that know us better than we do ourselves, is it now necessary to treat these machines (or rather their developers) as a second, equally important ‘audience’ of trademark law? Furthermore, to what extent, if at all, do we need to recalibrate the current legal framework for this new audience? Or more radically, do we still need trademarks in a world where the decision maker is not limited by cognitive constraints that are typical for humans and humans only?

To answer this question, we explore how these new purchasers interact with the trademark system. Are they competitors, disruptors, or allies? Do they challenge the balance of interest between consumers, trademark owners and their competitors that current law so far tried to strike? If so, is there a need for legal realignment, or is the emerging system socially preferable?

In this paper, we will argue four main points. First, that AISAs have significant potential to replace some of the ‘consumer-oriented’ functions of trademarks, and as a result could make parts of trademark law obsolete. Secondly, that, in this environment, and seemingly paradoxically, the reasoning of both *Lush* and *MTM*, even though they pointed in opposite directions, become problematic. Thirdly, while the idea of the eventual ‘death of trademarks’ has some appeal, it assumes an ‘ideal AI shopper’ that may never be accomplished. In this sense, our premise suggests that, in the short to medium term, adjustments of trademark law that accommodate limitations and potential of AISAs may be necessary for the benefits of both consumers and trademark owners. Lastly, the existing legal framework appears to be flexible enough to accommodate most of these needed changes, and where changes are needed, our analysis suggests that they are better left to dedicated regulatory instruments for AI (similar to the proposed European Union AI Act)⁶ than trademark law.

This paper is thus structured as follows. In the first part, we will develop the background for the discussion. After a brief historical analysis of *Lush* and *MTM*, we introduce AISAs and discuss how their abilities and use cases change the parameters for these two decisions. In this context, we also give a short account of the technologies that underpin AISAs, the emerging business models and use cases for them — to the extent that these are legally salient. We then discuss some of the challenges and opportunities that these technologies pose for trademark

⁶ Proposal for a Regulation of the European Parliament and of the Council laying down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts, COM/2021/206 final.

law and argue that the relation between them can be complex and multifaceted: trademark and AISAs each try to achieve similar objectives, but in ways that are sometimes antagonistic, sometimes synergistic, and sometimes through alternative ways to achieve the same end. Based on this analysis, we will draw some tentative normative conclusions for potential ways in which international trademark law could respond to these developments.

2. The Evolving Contexts for Trademarks and Trademark Law in the AI Era

In this section, we introduce two decisions that heralded the change from traditional human consumers to technologically supported consumers, and the way in which courts have tried to account for this change. We show how these decisions depended on features of technologically enhanced shopping experiences that are increasingly becoming obsolete. We demonstrate this in the subsequent section by introducing some of the capabilities, shortcomings and use-cases for AISAs

2.1. Historical Precursors: *Lush and MTM*

In 2014, courts in the UK and the US faced the question of how trademark law should respond to automated and computer-generated search results and recommendations. In *Cosmetic Warriors Limited and Lush Limited v Amazon.co.uk*, three issues were at stake.⁷

2.1.1. *Lush*

Lush Ltd. had made the decision not to offer its products through the Amazon website, at least partly out of a fear that its distinctively ethical brand may be negatively affected by its association with the online retailer. However, so the claim, Amazon continued to benefit from the *Lush* brand, by structuring its search tools in a way that shopper's interest in the *Lush*-branded products were directed to similar products by different brands on the Amazon website. In particular, three types of strategies deployed by Amazon were under contention. The first strategy related to putting a bid on Google's Adwords, so that users of the search engine who typed the term LUSH would also see a sponsored advertisement by Amazon. That advert,

⁷ *Cosmetic Warriors Limited and Lush Limited v Amazon.co.uk Limited and Amazon EU SARL* [2014] EWHC (Ch) 181.

marked as ‘sponsored’, linked to Amazon’s webpage and also included the phrase ‘Low Prices on Lush Soap’. The second strategy related to generating a sponsored link that did not contain the word *Lush*, but instead for instance ‘Bath Bombs at Amazon’. The third strategy related to the search function on Amazon's own website, which in turn affected two different functionalities: an autocomplete function and a search function. We explore these functionalities below.

For the autocomplete function, as soon as a consumer typed the letters ‘Lu’ in the search interface for the category ‘Beauty’ or ‘Health and Personal Care’, the algorithm predicted, based on the behavioural data of a large number of customers, that the customer might be interested in *Lush* products, and, crucially, also similar products made by *Lush* competitors. As a result of this, the customer was offered a range of options through a drop-down menu to complete their search, such as 'lush bath bombs'. Importantly, these suggestions contained the term *Lush*. A consumer clicking on one of these options was directed to a new page, with similar products to those produced by *Lush*. The shopper was not informed explicitly that *Lush* items were not available, and that instead the products on display were an algorithmic prediction of what customers might be interested in. The same lack of explicit information was identified in cases when a consumer mistyped ‘Lush’ as ‘Lsuh’ — the Amazon search engine recognised this as a typo for *Lush* and again offered, without further explanation, similar products from other brands. For the search function, if the consumers continued to type ‘Lush’ by themselves into the search bar (ignoring the suggested completion), the return generated a page with products labelled ‘related searches’, most of them with items such as bath bombs similar to those produced by *Lush*. As a reminder, the page also displayed to the customer the search terms they had used, so the name *Lush* remained displayed on that page too. Again, the consumer was not explicitly informed that *Lush*-branded products were not available.

Against this backdrop, the court found that the first and the third strategies deployed by Amazon were indeed infringing *Lush*’s trademark rights. However, the second strategy, namely the mere placing of brand-related bids on Adword when the results did not also contain the word *Lush*, did not amount to an infringement of trademark rights. While the decision regarding the Adword mechanism mainly restated established doctrine, the deployment of the third strategy, that is, the way in which Amazon’s search algorithm ‘understood’ what the consumer ‘probably’ wanted and making suggestions based on Amazon’s substantial database of past searches by their customers, that explored new territory. The changing nature of this very territory is at the centre of our present analysis.

In *Lush*, the court held first, that the way the brand term was used and displayed was a use of the mark in the course of trade. Furthermore, this use negatively affected trademark functionality, in particular origin, advertising and investment functions of the trademark, and therefore infringed *Lush*'s trademark rights. We will delve into the rationale of this judgement below, after introducing another decision with a very similar fact pattern, yet a very different conclusion.

2.1.2. MTM

A year after *Lush* was decided by a UK court broadly in favour of the trademark owner, a substantially identical fact pattern was adjudicated in the US. *Multi Time Machine, Inc. v. Amazon.com*,⁸ MTM's too had taken the decision not to offer their high-end, military-themed watches via Amazon, to maintain a sense of exclusivity and 'rough adventure' that was associated with their particularly rugged and resilient time pieces. However, as with *Lush*, when a consumer searched for 'mtm special ops', a page would be created that displayed a range of military-style watches that Amazon did sell, without an explicit acknowledgement that the specific term, 'mtm special ops' had created a zero return. The results on display did include the brand and a picture of each available watch.

Multi Time Machine sued Amazon, alleging that this way of responding to the 'MTM' query by a customer created a likelihood of consumer confusion, because its search results did not make it clear that MTM watches were not available through Amazon. The Court for the District of California sided with MTM⁹, and so did, initially, the US Court of Appeals for the Ninth Circuit.¹⁰ However, this court soon after reversed its own decision when one of its judges changed his mind.

2.1.3. Understanding Opposites

How could the courts come to opposite decisions? Some of the reason might well lie in the different domestic trademark regimes, but the key issues on which the judges came to opposite conclusions were about facts, in particular about how consumers interact with 'intelligent' search engines (that is search engines that go beyond matching strings of letters), how search

⁸ *Multi Time Mach., Inc. v. Amazon.com, Inc. (MTM III)*, 804 F.3d 930 (9th Cir. 2015).

⁹ *Multi Time Machine, Inc. v. Amazon.com, Inc. (MTM I)*, 926 F. Supp. 2d 1130, 1142 (C.D. Cal. 2013).

¹⁰ *MTM* (n 8).

engines are integrated into Amazon's business model, and to a much lesser extent already, the degree of control Amazon exercises over the way in which its algorithms use trademark terms and expressions.

First, the English court emphasised the essential identity of Amazon's search engine provider and Amazon as a retailer, even though they were distinct commercial entities in the Amazon ecosystem. This 'self-serving' outcome of the search recommendations matters, and for the court undermines Amazon's argument that it merely reacts to the way in which their customers think and speak, something of benefit for them rather than the retailer. Second, the results of the search were presented without an explicit explanation that Amazon does not stock *Lush* products, and that therefore only similar items from other brands were displayed. Today, we would understand this as a requirement of algorithmic explainability — a topic that has garnered considerable interest over the last few years — but was not yet on the agenda of courts and legislators back in 2014. More commonly discussed in data protection law, this notion has taken centre stage in the discussion on trustworthy AI. The decision of the English court in *Lush* suggests the creation of a potentially highly innovative and novel obligation, buried in its discussion of the factual features of the case at hand. Third, at the time of the trial, the search interfaces of other retailers such as *Debenhams* behaved very differently. They prominently displayed that 'no such product' could be found in the database. In the opinion of the court, consumer experience with these websites also shaped their expectation of the behaviour of Amazon's search engine. The average consumer does not understand, and need not understand, how search or recommender algorithms work. Nor did the court consider a detailed analysis of the technical underpinning of the search engine necessary. The issue of generification will become relevant again below. One of our premises posits that generification is an inevitable side effect of the manner in which intelligent shopping assistants work, unless explicitly instructed otherwise. This, in turn, creates a duty on the developers of such machines to prevent generification by training the AI to distinguish: (1) *Lush*, the trademark, from (2) 'lush', the adjective. Ironically, this would mandate that the developers of AIs include explicit, symbolic representations of these trademarks in the ontologies on which the shopping assistants are trained – and thus potentially also use them in the course of trade.

It is then maybe unsurprising that the reason why the US court decided in the opposite direction centred on a different assessment of the competency of the average consumer. For the US courts, how the customer reached the final display of good was considerably less important

that the way these were then presented to them. As long as all the information that is necessary to identify these products correctly as what they are is present, how the consumer got to that stage mattered less. The map is not the territory, and as long as customers get what they want, how they described and framed their search initially to the machine is of little relevance.

In some ways, the US decision is more realistic in its appreciation of the abilities of the average consumer, even in 2012. In other ways, it underestimates much more than the English court the power of data, and with that the way in which Amazon is different from the retailers of the past, making the use of trademark vocabulary and analogies to physical shops problematic. Amazon's business model is based on its superior access to, and use, of data. It is not, or maybe not even primarily, a retailer. Instead, it is a software company that offers a wide range of services, including streaming services, cloud computing and AI, all of which centre around the importance and value of the data it holds and analyses. Its customers are as likely government departments and police agencies as they are manufacturers of goods.¹¹

A part of Amazon's defence in *Lush* was the claim that their algorithm simply replicated and anticipated how the user had truly 'meant' their search. On one level this is correct, as the search algorithm is also informed by a user's previous history. It underestimates however how layout and functionality of their web services in turn influence and shape the way we operate online. Companies like Amazon are not merely massive recipients of data that allows them to passively 'mirror' customer behaviour. Rather, they exercise significant influence about this very behaviour and actively shape it. This was the key insight posited by Andrea Hall's excellent analysis of *MTM*.¹² As long as the courts stay within the conceptual framework of a retail company in the analogies they deploy, they fail to account for the real challenge to the trademark regime that data-driven shopping intermediation brings, and underestimate the asymmetric power relation between mark owners and companies like Amazon. Where we partly diverge from Hall's analysis, especially for the next generation of AISAs, is the role of trademark law to address these issues. Thinking of AIs as an 'audience' for trademark law can mitigate some particularly harmful practices. However, next generation AISAs do not so much violate trademarks as sidestep them. To the extent that this raises concerns for market fairness and the intellectual property (IP) of producers, remedies are more likely to be found in competition law, or *sui generis* AI regulation, than trademark law alone.

¹¹ See e.g. Emily West, 'Amazon: Surveillance as a service' (2019) 17 (1–2) *Surveillance & Society* 27.

¹² Hall (n 3) 844.

2.2 AISAs as an Emerging New Audience for Trademark Law

In the above two cases, we noted a number of crucial factors that swayed the judges. For the English court, it was first important that the search algorithm was developed by Amazon, and also directly benefitted Amazon – with any benefits for the consumer as a side effect. Second, it was also important that the algorithm did not explain its reasoning, and in particular did not communicate that it had not been able to find goods with the brand name specified by the consumer. Third, even though the consumer did not (need to) understand how the algorithm worked in detail, they understood how to search for a product, and were familiar with search interfaces. That means that they too were thinking to frame their search through appropriate names, terms, and expressions that they anticipated would lead to good results. There is, with other words, a difference in the mind of a consumer who intentionally types the word ‘Lush’ into a search engine interface, and one who casually mentions to a shop assistant that they want ‘something like these Lush bombs’. This means that to some extent, the layout of a search interface in 2014 did not invite a ‘narrative’ account of what they were interested in, rather, it invited them to think in terms of brand names for an optimal search. Finally, for the US decision, it was crucial that the consumer remained in firm control of the final purchasing decision, and that before they made the final decision, they saw both an image of the object they were buying and its description. This, so the judges, would have shown any reasonably attentive consumer that they were not, in fact, buying MTM watches.

Fast forward 12 years later, and the next evolution of smart computational shopping assistance calls all of these factors into question. AISAs such as *Alexa* or *Siri*, increasingly are or are becoming capable to execute our shopping decisions, assist us in varying degrees in the decisions-making, and sometimes even second guess our needs and desires and act on our behalf autonomously or semi-autonomously.¹³ According to Juniper Research, by 2024 there will be over 8.4 billion devices with voice assistants such as Apple’s *Siri*, Amazon’s *Alexa* or Google’s *Nest Mini*. By that time, they will have overtaken the world population.¹⁴

¹³ For examples of AISA see Lee Curtis and Rachel Platts, ‘AI Is Coming and It Will Change Trade Mark Law’ *Managing Intell. Prop.* 271 (2017): 9.

¹⁴ Juniper Research, ‘Number of voice assistant devices in use to overtake world population by 2024, reaching 8.4 bn, led by smartphones’ (Press release, 28 April 2020) available at: <<https://www.juniperresearch.com/press/press-releases/number-of-voice-assistant-devices-in-use>> (Last accessed: 15.06.2021).

This prediction suggests that, rather than visiting a shop or website and inspecting an item (or its image), consumers increasingly tell an AISA what they want to purchase, and then leave the execution of this desire to an AI system. Even when visiting a traditional shop, smart Augmented Reality devices, from the ubiquitous smart phone to the ill-fated Google Glasses, can superimpose information into the world that the shopper perceives, and in this way counteract the influence that visual displays such as trademarks traditionally exerted.¹⁵ We will look in the next section briefly at the technologies underpinning AISAs, and then at the business models that they support.

2.3. AISA as a Technology Primer

AISAs are not a single technology or program. Rather they combine several distinct systems, with a variety of programming paradigms each, to achieve a unified functionality. It is beyond the scope of the present analysis to offer a comprehensive account into the technology underpinning AISAs. We will focus instead on some key technologies which are pertinent for the present legal analysis, with the potential to change the fact pattern from that governing *Lush* and *MTM*.

Using technology to automate or part-automate shopping, the key functionality of AISAs the way our analysis conceptualises it, is by no means new. From the first emergence of the e-commerce and digital retail platforms, AI researchers recognised the potential to delegate at least routine purchases to software programs. Anderson Consulting's 'BargainFinder' from 1995 seemed for many to herald even then an entirely new way for consumers to shop online¹⁶ — or maybe not so new after all, as the programs were intended to carry out tasks that at least the rich would have been able to outsource to their servants in the 19th century, an analogy to which we will return below.

¹⁵ Tobias Röddiger, Dominik Doerner, and Michael Beigl. 'ARMart: AR-Based Shopping Assistant to Choose and Find Store Items.' (2018 ACM International Joint Conference and 2018 International Symposium on Pervasive and Ubiquitous Computing and Wearable Computers, October 2018) 440-443.

¹⁶ Adam B. Brody, and Edward J. Gottsman. 'Pocket BargainFinder: a handheld device for augmented commerce' (1999) *International Symposium on Handheld and Ubiquitous Computing* 44-51.

BargainFinder provided functionality that we find today on price comparison websites. It failed as a commercial product at the time because many online platform providers blocked access to their sites to prevent neutral price comparison. *PersonaLogic* allowed users to build their own preference profiles for goods, which then automated search across platform, it too failed commercially, also because the vendor had to provide an interface whose categories matched exactly those that the consumer had chosen for their profile. Acquired by AOL in 1998 it quickly disappeared. *Ringo* was one of the first agents to use collaborative filtering, that is it not only looked for pre-defined categories and text search, but analysed information from other shoppers to recommend similar products.¹⁷ Here we encounter for the first time the possibility that a *Ringo* shopper may have searched initially for goods of one specific brand, only to get as recommendation goods of a different brand *if* the recommendations from other customers indicated that they were suitable substitutes. Commercialised as *Firefly*, it was acquired by Microsoft and soon after ceased to exist as an independent product, but the technology quickly migrated to lender-site recommender systems including Amazon's.¹⁸

We encounter a recurring pattern during that period: digital shopping assistants are developed by academics with a view on profiling the preferences of consumers and assist them in finding the product that best suits their needs. However, once reaching maturity to become commercialised, they are either blocked by platform providers, or bought by them and turned into a biased vendor-driven agent. This was also the fate of *ShopBot*, acquired by *Excite* and *IntelliShopper*, an ambitious customer-centric system that however failed to reach the market.¹⁹

The UK court in *Lush* was arguably more attuned to this power differential, and more keenly aware that the vendor driven agents impose their categories on the shoppers for their own benefit. While the driver behind this pattern was mainly unequal economic power, it was also facilitated by the technological limitations of these early technologies. Even though they quickly acquired (limited) learning capabilities, they were rooted in the symbolic programming paradigm and the formal ontologies that enabled the semantic web. Their 'retail knowledge' with other words was represented in declarative form, with the developers making explicit

¹⁷ Robin Burke, 'Knowledge-based recommender systems' (2000) 69(Supplement 32) *Encyclopedia of library and information systems* 175, 175.

¹⁸ Filippo Menczer, W. Nick Street, Narayan Vishwakarma, Alvaro E. Monge, and Markus Jakobsson. 'IntelliShopper: A proactive, personal, private shopping assistant' (2002) 3 *Autonomous agents and multiagent systems* 1001, 1003.

¹⁹ Lance Gentry and Roger Calantone, 'A comparison of three models to explain shop-bot use on the web' (2002) 19 (11) *Psychology & Marketing*, 945.

decisions about the relation between terms.²⁰ This again fits the understanding of the court in *Lush*, which considered the decisions of the shopping agents (search function) and the way in which they use vocabulary as attributable to Amazon. It also explains why brands and brand-names still matter in these systems: they are hard-baked into the ontology, and direct in this way the user's search strategies.²¹

Finally, even for these earlier systems, the aspiration was to allow them not just to collect information (search and recommender functions), but to autonomously execute the 'buy' function on their owners behalf.²² Despite the technology being available early on, automated trading remained limited to a number of highly technical and specialist fields, such as algorithmic trading in stocks, where the controller of the algorithm are typically highly trained specialists themselves.²³ This, too, reflected power and information asymmetries more than technological limitations. As noted above, Amazon is not just a retailer in goods, its business is data. Keeping shoppers engaged with the site for as long as possible allows more fine-grained profiling, and this in turn generates a more profitable promotion of adverts for other goods. A shopping bot that profiles its owner solely on the owner's devices, and then has minimal interaction with the online retailer, does not fit into this ecosystem. Consequently, for retailers to open their platforms to agents like this required considerable external pressure – something that happens now, so we argue, through third party AISAs that 'piggy back' on other smart devices, in particular smartphones.

While it is therefore more about changes in the business models rather than the technology itself between 2014 and 2022, we briefly focus on one technology that contributed the most to change this landscape, and which also poses a number of particularly problematic ramifications for brands and trademarks. It is the case that AISAs 'back function' combines established technologies such as search, recommender system and automated contract formation. However,

²⁰ For a historical overview see: Ann-Kristin Cordes, Benjamin Barann, Michael Rosemann, and Jorg Becker, 'Semantic shopping: A literature study' (Conference Paper, Hawaii Conference on System Sciences, 7-10. January 2020); for an early system see Maryam Fazel Zarandi, *A retail ontology: formal semantics and efficient implementation* (Library and Archives Canada= Bibliothèque et Archives Canada, 2009).

²¹ Michael D. Smith and Erik Brynjolfsson, 'Consumer decision-making at an Internet shopbot: Brand still matters' (2001) 49 (4) *The Journal of Industrial Economics* 541.

²² See e.g. Maria Fasli 'On agent technology for e-commerce: trust, security and legal issues' (2007) 22 (1) *The Knowledge Engineering Review* 3; Tina Balke "'Entity" and "Autonomy"—The Conclusion of Contracts by Software Agents in the Eyes of the Law' (2010) 24(3) *Revue d'intelligence artificielle* 391.

²³ Alain P. Chaboud, Benjamin Chiquoine, Erik Hjalmarsson, and Clara Vega. 'Rise of the machines: Algorithmic trading in the foreign exchange market' (2014) 69(5) *The Journal of Finance* 2045.

their ‘front end’ is a digital assistant of the type *Siri*, *Cortana* and *Alexa* that have been increasingly introduced to a wider consumer base. These typically have a natural language interface, gradually one that responds to oral conversations that can be given in free-form, as close as possible to talking to a human.²⁴ Often, this is augmented by a dialogue function so that AISAs can also respond to the query, ask for clarifications or confirm their understanding. Sometimes, these responses are scripted, but more often these days, they are in turn the result of a machine learning system that offers increased flexibility and can tailor answers to the user.

In 2018, Google's virtual assistant ‘*Google Duplex*’ demonstrated these new capabilities by reserving a table at a restaurant. The mastery of language was sufficient to fool a waiter at the restaurant into believing to have interacted with a human. Virtual assistants such as *Alexa*, *Cortana*, *Siri* and *Google Home* receive inputs from user voice based on natural language processing, aiming to replicate the type of dialogue one would have had with a human assistant.²⁵ Crucially, the boom in the use of Digital Assistants, especially their ability to understand their users even when these do not follow pre-defined scripts, required a different programming paradigm.²⁶ It shifted the emphasis away from declarative, ‘good old fashioned’ AI where knowledge is represented symbolically to machine learning approaches for neuro-linguistic programming (NLP), and large language models.²⁷ This means the AI now learns, potentially in a non-supervised way, patterns in large data sets often scraped from open sources. As a result, the associations that it finds are not necessarily any longer those that the developer thinks people should use, but those that they do use, at least statistically speaking. However, the complexity of these models also makes this process opaque, even to the developers themselves.²⁸

²⁴ See e.g. Peter Gentsch, ‘Conversational AI: how (chat) bots will reshape the digital experience’ In *ibid.*, *AI in marketing, sales and service* (Palgrave Macmillan, 2019) 81.

²⁵ Gustavo López, Luis Quesada, and Luis A. Guerrero, ‘Alexa vs. Siri vs. Cortana vs. Google Assistant: a comparison of speech-based natural user interfaces’ (Conference Paper, *International conference on applied human factors and ergonomics*, 2017) 241; Alex Sciuto, Arnita Saini, Jodi Forlizzi, and Jason I. Hong, ‘“Hey Alexa, What’s Up?” A Mixed-Methods Study of In-Home Conversational Agent Usage’ (Conference paper, *Designing interactive systems conference*, 2018) 857-868.

²⁶ Werner Vogels, ‘Bringing the Magic of Amazon AI and Alexa to Apps on AWS’ *All Things Distributed* (Web page, 2016) <<https://www.allthingsdistributed.com/2016/11/amazon-ai-and-alexa-for-all-aws-apps.html>>; Rachel Batish, *Voicebot and Chatbot Design: Flexible Conversational Interfaces with Amazon Alexa, Google Home, and Facebook Messenger* (Packt Publishing Ltd, 2018).

²⁷ See e.g. Eunjoon Cho, and Shankar Kumar, ‘A conversational neural language model for speech recognition in digital assistants’ (Conference paper, *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, April 2018) 5784.

²⁸ Alex Tamkin, Miles Brundage, Jack Clark, and Deep Ganguli, ‘Understanding the capabilities, limitations, and societal impact of large language models’ (2021) *arXiv preprint arXiv:2102.02503*.

From a world where the user had to anticipate keywords that were most likely to give the desired results (and with that a place for trademarks), next generation AISAs are considerably more user-centric, shifting at least to a degree the control over meaning to the user, or the community of speakers whose data is scraped for the language models.²⁹ The way user search via the type of web interface that was at the centre of *Lush* in contrast through a voice activated AISA differ considerably, something recognised also by the developers.³⁰ As Lau argued:

It is possible that this form of black-box machine learning could mitigate against programmer bias and manipulation, to the point that programmers themselves could not explain how or why computers have learned certain patterns. The learning is wholly dependent on the statistical patterns within the training dataset.³¹

While Lau argues that the hope that AI on its own may lead to more democratic language policies may be premature, these technologies still see a shift of control away from developers, whose ability to ‘hard-bake’ for instance in the search ontology a rule into the system that someone looking for ‘Lush’ should be also shown results for the competitor ‘Lash’ is diminished (unless significant numbers of speakers consider the two equivalent). This is also reflected in the merging business models. OpenAI made its language model at least initially available for everyone, while Amazon opened its Alexa also for third party app developers. Shopping assistants build by Google or Microsoft finally have even less incentive to give the preferred usage of retailers or manufacturers priority over those of their users.³²

This does not necessarily mean that the fact pattern encountered in *Lush* will disappear entirely. Even though it has been shown that large language models often outperform supervised learning and thus work best with little directed influence by the developers,³³ digital assistants and shopbots *can* and will still be trained on dedicated retail ontologies that can preserve in theory, a concept of brand name even were most users to deviate from the conventions governing its use. However, unlike the shopping assistants of the past who quickly became subject to control by and biased in favour of the platform, current AISAs are both from a

²⁹ Sanjay Ghosh, Jatin Pherwani, ‘Designing of a natural voice assistants for mobile through user centered design approach’ In: Masaaki Kurosu (ed) *Human–Computer Interaction: Design and Evaluation* (Springer International Publishing, 2015) 320

³⁰ Yoelle Maarek, ‘Alexa, Can You Help Me Shop?’ (Conference paper, 42nd International ACM SIGIR Conference on Research and Development in Information Retrieval, July 2019) 1369.

³¹ Mandy Lau, ‘Artificial intelligence language models and the false fantasy of participatory language policies’ (Working paper, *Working papers in Applied Linguistics & Linguistics at York, 1*) 4.

³² Zahy B. Ramadan ‘“Alexafying” shoppers: The examination of Amazon's captive relationship strategy’ (2021) 62 *Journal of Retailing and Consumer Services* 102610.

³³ Alec Radford, Jeffrey Wu, Rewon Child, David Luan, Dario Amodei, and Ilya Sutskever, ‘Language models are unsupervised multitask learners’ (2019) 1(8) OpenAI blog9.

technological perspective and also from a business model perspective, much less likely to succumb to the same pattern. Large language models developed by third parties, made available openly to developers, and focussing on unsupervised learning reduce both ability and incentive to direct consumers away from what they want and to what the retail platform prioritises. In addition, data protection law is emerging as a further driver for this development: profiling consumers on their own mobile devices and smartphones only, without feeding their data back to the retailer, emerges as a more privacy friendly way to support shopping through AISAs. Other trends include the reorientation towards edge computing, reducing dependencies of AI computation in cloud-based services. This provides further incentives to minimise the control of retailers and retail platforms over the AISA.³⁴

With these discussions, we have prepared the first prong of the attack against the reasoning in *Lush*. The type of control that Amazon exercised over its own search interface is considerably less prominent in AISAs, and furthermore, they are also much more likely to be operated by third parties who do not profit directly from the purchase decision by the AISA user. In the next section, we will see how the very same technologies also enable business models that subvert the rationale for *MTM*.

2.4. AISAs as Business Models

One of our posited premises here is that the inner working of AISA's algorithms are not as relevant for our legal analysis as the new business models for their use that they enable. In this sense, we can distinguish three different ways in which AISAs interact with a human consumer: shopping then shipping with human *in* the loop; shopping then shipping with human on the loop; and shipping then shopping.³⁵ We elaborate below.

(A) 'Shopping then Shipping with human *in* the loop'

This model is closest to what we have been doing for the last few years. On visiting an online market place, the buyer interacts with an AI through a search interface. The AI then advises the

³⁴ Bogdan Hoanca, Christina McDowell Marinchak, and Edward Forrest. 'Ethical Implications of the General Data Protection Directive for Virtual Personal Marketing Assistants' (Conference paper, *2018 IEEE International Conference on Big Data (Big Data)*, December 2018) 4073.

³⁵ Based on the classification in Ajay Agrawal, Joshua Gans and Avi Goldfarb, *Prediction Machines: The Simple Economics of Artificial Intelligence* (Harvard Business Press, 2018).

shopper based on elements such as browsing history, past purchase decisions and decision patterns across all shoppers what the user is likely looking for. Based on this analysis, the AI makes a *targeted* recommendation, typically displayed as a list and possibly a snippet preview of the product. The user then follows up on one or several recommendations to the full offer, decides if it matches their needs, and then either decides to make the purchase or to continue the search.

(B) ‘Shopping then Shipping with human *on* the loop’

This model began its rise to prominence with the advent of AISAs on mobile phones. Here, the shopper gives verbal instructions to the AISA (‘Alexa buy a bottle of Perrier’; ‘*Siri*, buy me some water’). The AISA searches, possibly across several platforms, and finds a corresponding item. It may then report back not with a full description or image of the product, but with key information only, such as ‘I found an offer for 2 bottles at £1, to be delivered tonight’. Unless the shopper objects, the purchase is then actioned. Alternatively, as long as it stays within certain parameters (not above a certain value, in line with past behaviour, etc.) the AISA may simply proceed with the acquisition.

(C) ‘Shipping then Shopping’

In this, the most advanced and currently still somewhat speculative mode, the AISA predicts on the basis of the user’s past behaviour products they might want or need to buy, and autonomously sends/delivers a product (without the buyer directly asking the AISA to order). What happens next depends on who controls the AISA. In one business model, the AISA is controlled by the shopping platform, and if the shopper does not want the goods sent to them, they return them. In contrast, if the AISA is controlled by the shopper, then a question of contract law may arise in cases where the delivered goods were what the AISA ordered, but not what its owner wanted.³⁶

Relevant for our purposes are in particular options B and C. In both, the direct control that the user still exercised in the *MTM* case is substantially weakened. In C in particular, the additional hassle to return an item will mitigate do make this choice due to the brand alone – I ‘may’ have

³⁶ The contract law issues that this scenario creates have been known since the emergence of electronic agents at the turn of the century. See e.g. Jean-Francois Lerouge, ‘The use of electronic agents questioned under contractual law: suggested solutions on a European and American level’ (1999) 18 *J. Marshall J. Computer & Info. L* 403

had a MTM products in mind when I asked the AISA to get me something rugged and reliable, but now I have a product that according to a trusted autonomous system, a system that understands my needs, has characteristics that make it the best match for me. Would I really return it now?

Business models like this tilt the balance away from *MTM*. However, this is only one factor in the decision, and the control over the algorithm and who benefits from the way it operates was just as relevant. We demonstrate this through a number of variations on the three scenarios above:

- Scenario 1a): Our AISA, operating on our phone, profiles our behaviour, and correctly infers that we are using ‘Lush’ as a generic term for bath bombs. It correctly interprets our request ‘Buy some Lush for me’ as ‘buy bath bombs in my usual price range, whatever the brand’ and shops for them across various market places. In this case, the developers of the AISA do not benefit financially from the buying decision.
- Scenario 1b): as above, but here the AISA does not profile me, but draws on big data sets about consumer behaviour to again correctly predict that *we* do not really mind which brand we get.
- Scenario 1c): as above b) but this time the data set was manipulated intentionally by a competitor of ‘Lush’, who flooded feedback sites with AI generated scripts that indicate consumer indifference between Lush and their brand. Our AISA is manipulated into seeing a pattern here that identifies ‘Lush’ and that other brand, a pattern that does not represent common usage and mental models of the consumers.
- Scenario 1d): here too an adversary comes into play. But rather than manipulating the machine learning algorithm of our AISA directly, they back-engineered the way in which our AISA identifies and distinguishes between trademarks. In particular, they managed to find a way to display their brand and logo in a way that for the human observer is clearly distinct from the competitor mark, but for the AISAs looks identical. This type of attack, known as adversarial attack against deep learning, has been studied extensively in security contexts such as image recognition by autonomous vehicles.³⁷ It has been shown that it is quite easy to fool many AI systems in misidentifying signs

³⁷ See, among others: Andrew Ilyas, Logan Engstrom, Anish Athalye, and Jessy Lin, ‘Black-Box Adversarial Attacks with Limited Queries and Information’ (2018) 80 *Proceedings of Machine Learning Research* 2137.

and images by making changes to some pixels that are much too small to be perceived by the human eye.

This last example gives us the mirror image to the ‘optimistic’ view of the AI shopper we discussed in the introduction. AISAs may be less easy to confuse trademarks that can be confusing for humans, and in this respect, we argue that trademark law should take the ‘technologically augmented’ consumer, a more robust market player than the average consumer of the past, serious. At the same time, AISAs can be confused by attacks that would not be confusing at all for a human. Thus, we must also ask the question if it can be permissible to register as trademark a sign that for human inspection is clearly distinct from that registered already by any competitor, but which for some AISAs would be indistinguishable nonetheless. It is this dual aspect of AISA — less in need of protection for some scenarios, more in others, that forces us to rethink what we really mean with the ‘audience’ for trademark law, a discussion that we will now continue with a more detailed analysis of current case law under the TRIPS Agreement.

3. AISAs and Trademark Law: Friends or Foes?

In this section, we try to make sense of the above discussion, asking in particular how we should think of the relation between trademarks and AIs from a normative-conceptual perspective. For human shoppers, trademarks provided a tool — or maybe a crutch — to facilitate the decision-making process and to allow to discriminate, or maybe better discern, between different products on offer.³⁸ Trademarks, so at least one important theory justifying them,³⁹ enable us to get what we really want, by preventing consumer confusion.⁴⁰ Their ultimate aim is to promote the ability of consumers to make purchasing decisions based on accurate information in the market without excessive research costs.⁴¹ At the same time, trademarks protected by law shield the investment of producers in their products. In particular,

³⁸ This notion of trademark has barely changed since the turn of the 19th Century; see: Frank Schechter, ‘Rational Basis for Trademark Protection’ (1927) 40 *Harvard Law Review* 813, 816 [Schechter].

³⁹ See e.g. the reasoning in *See Qualitex Co. v. Jacobson Prods. Co.*, 514 U.S. 159, 163-64 (1995); for an academic discussion see Mark P. McKenna, ‘A consumer decision-making theory of trademark law’ (2012) 98 *Va. L. Rev.* 67, 71. For a similar take on the implication of AI to the one developed here see also Michael Grynberg, ‘AI and the “Death of Trademark”’, (2019) 108 (2) *Kentucky Law Journal* 199, 215.

⁴⁰ Irene Calboli and Christine Haught Fraley, ‘The Trademark Provisions in the TRIPS Agreement’ in Carlos Correa (ed), *Intellectual Property and International Trade: TRIPS Agreement* (Wolters Kluwer, 3rd ed, 2016) 157, 162 [Calboli and Haught Fraley].

⁴¹ Calboli and Haught Fraley (n 40) 162.

a producer need not fear disgruntled and disappointed customers who mistakenly bought a lower quality product from competitor Y because they mistakenly attributed that inferior product to X. Ideally, both consumers and producers therefore benefit from trademarks as an efficient communication tool between them.

However, this second role is functionally dependent on the first: only as long as consumers see the value in grounding a purchase decision (also) on a mark can marks protect the investment and innovation of producers. In this respect new digital technologies affect trademark law in ways different from the dynamic we encountered in the past with other intellectual property rights. When commentators began to speak about the ‘death of copyright law’, they meant a possible failure to efficiently protect the legitimate interests of creators.⁴² In the field of trademarks by contrast, the possible ‘death of trademark law’ is not the result of technology-enabled infringement, but rather that the use of trademarks in the decision-making process gets sidestepped altogether.⁴³

In copyright law, the consumer is obligated to remunerate the creator of the work they want to enjoy, and using technologies to circumvent this obligation is an infringement. In trademark law, the consumer is not obligated to consider a mark in their purchasing decision, and using technology to circumvent the need to rely on marks is not in itself an infringement. Trademark law, as Ridgeway argues, is not primarily aimed at the protection of creators, but fulfils wider social functions, which makes it particularly susceptible to changing societal needs.⁴⁴ As we will see, this asymmetry between the two scenarios also has implications for the way in which the law can and should respond to these new realities.

Trademark law is thus quintessentially a response to all too human cognitive limitations. Our rationality is heavily ‘bounded’ by limited time, limited attention spans, limited memory and an ability for pattern recognition that on the one hand is highly evolved, but also prone to manipulation. In the words of Herbert Simon who coined the term:

Broadly stated, the task is to replace the global rationality of economic man with the kind of rational behavior that is compatible with the access to information and the computational

⁴² Glynn S Lunney Jr. ‘The death of copyright: Digital technology, private copying, and the digital millennium copyright act’ (2001) *Virginia Law Review* 813.

⁴³ Grynberg (n 39) 215.

⁴⁴ William E Ridgeway, ‘Revitalizing the doctrine of trademark misuse’ (2006) 21 *Berkeley Tech. LJ* 1547.

capacities that are actually possessed by organisms, including man, in the kinds of environments in which such organisms exist.⁴⁵

In this definition of bounded rationality, we note the ‘computational element’ — human decision-making is bounded by two factors, the access to information, and the ‘computational capacities’ to make sense of this information. In an ideal world, we would carefully research all our economic decisions: what are the requirements we have for the product? Of all those products that meet these requirements, which ones are ‘the best’, measured against a set of personal preferences? We could carry out tests, or failing that, research the opinions of those who carried out tests. In reality, this is of course not possible. Instead, we will rely on heuristics and cognitive shortcuts.⁴⁶ Some of these will be inductive: we bought this or a similar product from the same brand before and were satisfied, therefore we will probably also be satisfied by their new product. Other decision-making processes are trust-based: Someone whose judgement we value has bought a product of this brand before. In both scenarios, a precondition is our ability to identify the products as coming from the same source, which is where the functionality of trademarks, and in particular its ability guarantee provenance, comes into play.

At the same time, the existing trademark regime comes with significant societal costs. It creates artificially a scarce resource, the mark, as signs are limited in nature and may thus ultimately constitute a market access barrier for competitors. Trademark costs, or externalities,⁴⁷ can also sometimes offend our sense of fairness.⁴⁸ In various ways, it can also impose limits on the right to free speech.⁴⁹

Finally, trademark law has also been questioned on its own terms: it is in most scenarios not objectively rational for us to pay more for an identical, but branded product than for its unbranded version. Trademarks, if seen in this way, do not so much enable necessary heuristic shortcuts that are the result of our cognitive limitations, rather it exploits them to our

⁴⁵ Herbert Simon, ‘A Behavioral Model of Rational Choice’ (1955) 69 (1) *Quarterly Journal of Economics* 99, 99.

⁴⁶ Roger Frantz, ‘Herbert Simon. Artificial Intelligence as a Framework for Understanding Intuition’ (2003) 24 *Journal of Economic Psychology*, 265.

⁴⁷ David Barnes, ‘Trademark Externalities’ (2007) 10 (1) *Yale Journal of Law and Technology* 7.

⁴⁸ For instance, when a small restaurant is prevented from using the name ‘Olympos’, or when a small local restaurant is prevented to use the name of its owner because it happens to be the same as that of a large multinational chain that had trademarked it.

⁴⁹ Pratheepan Gulasekaram, ‘Policing the Border Between Trademarks and Free Speech: Protecting Unauthorized Trademark Use in Expressive Works’ (2005) 80 *Washington Law Review* 887.

disadvantage. This complaint is not new. In 1929, a trial judge asked pointedly: ‘Why should a vendor be able to collect from a purchaser, as a part of the purchase price, money which has been spent in an effort to mislead that very purchaser in making that very purchase?’⁵⁰ Since then at the latest, there have been calls for changes to the trademark regime in favour of one that is more robust against exploitation by the trademark owners.⁵¹

Drawing lessons from WTO case law, we posit here that there is an opportunity to recalibrate general principles of trademark law and rethink fundamental concepts such as distinctiveness, likelihood of confusion and average consumer, to adapt our legal frameworks to the increasing use of AISAs in the global exchange of goods and services.

4. AISAs under the TRIPS Agreement

As we noted above, AISAs such as *Siri* or *Alexa* operate internationally and across borders. That makes international responses to the challenge that they pose also for trademark law desirable. This section then looks at the way in which the above discussions are conceptually mirrored in international trademark law.

Art. 15 TRIPS introduces a uniform definition of trademark ‘Any sign, or any combination of signs, capable of distinguishing the goods or services of one undertaking from those of other undertakings, shall be capable of constituting a trademark’ the first provision at the international level to do so. While its predecessor, Art. 6quinquies of the Paris Convention,⁵² introduced the notion that a ‘trademark duly registered in the country of origin shall be accepted for filing and protected as is [i.e. ‘*telle-quelle*’ principle] in the other countries of the Union’,⁵³ it contained no definition of the signs capable of constituting a protectable trademark.

Crucially for our purpose, it does not answer the question ‘discernible for *whom*’. As a result, Art. 15 is potentially ‘technology neutral’, which giving the rapidly evolving AIAS market

⁵⁰ *American Safety Razor Corp. v. International Safety Razor Corp.*, 26 F.2d 108, 114 (D.N.J. 1928), revised, 34 F.2d 445 (3rd Cir. 1929).

⁵¹ Stacey Dogan, ‘Bounded Rationality, Paternalism, and Trademark Law’ (2018) 56 (2) *Houston Law Review* 269.

⁵² *Paris Convention for the Protection of Industrial Property*, signed 20 March 1883, as last revised at the Stockholm Revision Conference, 828 UNTS 305.

⁵³ This subject matter was already regulated by the original version of the Paris Convention in 1883. The current version goes back to the Lisbon Revisional Conference in 1958.

bestows it with the necessary flexibility to accommodate many of the aspects discussed above. The Paris Convention declares the law of the country of origin to be decisive with respect to the lacking definition of ‘sign capable of constituting a protectable trademark’.

Under TRIPS then, a sign will be trademarked if it is inherently distinctive, displaying an ability to distinguish products of one enterprise from those of others.⁵⁴ In cases where the inherent distinctiveness is not present at the time of registration, Members have the regulatory prerogative to provide within their national laws an option to register trademarks that became distinctive through use (Art. 15.1, sentence 3). In sentence 1, Art. 15 TRIPS suggests a stringent standard of sign distinctiveness, demanding it to be ‘inherent’ by using the language ‘shall be registered’, as opposed to Art. 15.1 sentence 3, which makes registrability depend on distinctiveness ‘acquired through use’, using permissive language with ‘may be registered’. In both cases however, the trademark capability of a brand must entail an acceptable level of distinctiveness to come under the purview of Art. 15.1 TRIPS.

If, as we noted above, the lack of explicit definition of ‘audience’ for trademark law creates needed flexibility and technological neutrality, this normative concept can create problems giving the rapid pace of development of new AISA capabilities. As we saw, two visual signs that a human under good conditions could easily distinguish may still pose problems for AISAs now, but may not in the near future. Similarly, two signs that for humans are undistinguishable may become distinguishable for AISAs soon.

Even greater complications arise if we consider AISAs with varying capabilities. Artificial intelligence and machine learning are extremely resource-sensitive, requiring sizeable data models, fast yet energy efficient computation, and data storage capacity. In other words, not all AIs, and not all AISAs, are created equal. Of course, human cognitive capabilities are also not equally distributed across all members of our species, and IP law uses a normative concept of the ‘average’ or ‘typical’ consumer that is not amenable to easy quantification or empirical determination. For AIs however, the situation is considerably more complex still. Different providers compete along different parameters – trading in, for instance, accuracy for computational cost. There is no generally agreed benchmark for AI performance to date. Even

⁵⁴ *Australia - Tobacco Plain Packaging AB*, para. 6.579. For a critical view on the wording of Art.15.1, see: Nuno Pires de Carvalho, *The TRIPS Regime of Trademarks and Designs* (Wolters Kluwer, 4th ed, 2018) 15.8.

the methodology for such a benchmarking exercise is still contested.⁵⁵

Leaving the decision of ‘discernible by a digital shopping assistant but not a human’ suffices for a trademark (and vice versa) entirely to Member States risks fragmentation of markets, a problem especially grave given the global reach of AISAs. There have been international initiatives, supported by international organisations, to create benchmarks for AI for specific applications,⁵⁶ and this could be part of the answer: harmonising standards and benchmarks that allow to decide e.g. if a ‘typical’ AISA is capable of distinguishing between two trademark candidate signs, leaving it to Member States to decide which rank on the benchmark to use for what purpose. This initiative still leaves a problem unresolved: that with rapidly improving capacities (or existing capabilities currently only available for high-performance research institutions becoming available on ordinary machines for everyone in the near future), it may be necessary to move beyond the criterion of ‘discernible at the point of registration’ and has to consider the possibility that a ‘near future’ AI is capable to see distinction that currently are still confusing for both humans and AIs. While far from an ideal solution, this initiative at least aims at creating a framework within which these questions could be discussed.

In addition, the concept of a legally recognized and benchmarked ‘average AI’ should ideally preserve all those aspects of the existing legal concept of the ‘average consumer’ as possible, or rather, as appropriate, because some concessions we make for human frailty may not be relevant for AIs. Against this backdrop, the concept of ‘average consumer’ has not yet been dealt thoroughly in WTO case law. There is, however, rich jurisprudence on this matter under EU law. ‘Average consumers’ are reasonably well informed, circumspect and reasonably observant.⁵⁷ They usually barely have the opportunity to make direct contrast between different trademarks, but have to rely on the imperfect recollection of information retained in their memory.⁵⁸ The level of attention of the ‘average consumer’ is likely to differ depending on the type of goods or services at issue.⁵⁹ ‘Average consumers’ are not just consumers who belonged

⁵⁵ See e.g. Miro Hodak, David Ellison, and Ajay Dholakia ‘Benchmarking AI Inference: Where we are in 2020’ (Conference paper, *Technology Conference on Performance Evaluation and Benchmarking*, 2020) 93.

⁵⁶ See e.g. Thomas Wiegand et al. ‘WHO and ITU establish benchmarking process for artificial intelligence in health’ (2019) 394 (10192) *The Lancet* 9.

⁵⁷ European General Court, Case T-250/15, *Speciality Drinks Ltd v European Union Intellectual Property Office - William Grant* (CLAN), 24 November 2016, ECLI:EU:T:2016:678.

⁵⁸ Court of Justice of the European Union, Case C-342/97 *Lloyd Schuhfabrik Meyer & Co. GmbH v Klijsen Handel BV* [1999] ECR I-03819.

⁵⁹ *Id.*

to the ‘general public’; rather, they belonged to the public ‘specifically targeted’ by the specific goods and services.⁶⁰

Accordingly, the benchmarked AI may not need perfect memory, or analyse all available data, because it too, just like humans, will rely on heuristics and shortcuts, depending on the application and domain in questions. And also just like humans, it will change over time as it learns (or forgets). Just as the ‘average human consumer’ is a legal fiction, so is in many ways the ‘average shopping AI’, yet still such an idealised concept, based on performance data across a range of shoppers, is in our vision needed to move to a world where AISAs augment the audience for trademarks. Translating human centric terms such as ‘reasonably observant’ or ‘Reasonably circumspect’ into benchmarks for an ‘average’ AI (for the domain in question) would be based on a computational legal theory of translation between law and machine code.⁶¹

4.1. Underperforming AISAs

Above, we asked if we should widen the audience of trademark law for the purpose of deciding whether a sign fulfils the *de-minimis* criterion for registration, focussing on those scenarios where the AI’s capability of discernment outpaces that of humans. Here, we ask what type of trademark infringement an AISA may commit, with particular attention to cases where its ability of discernment is less than the average human, resulting in a systematic conflation of two registered marks. Below-average performing AISAs have two explanations: (1) the AI in question, for a variety of reasons, is designed with limited capacity to discern between different marks, or has not learned to identify them - the AI is working as intended, as it did in *Lush* and *MTM* and (2) the AI is duped into conflating different marks through an intentional attack by a third party; in this case, the AI does not perform as its user/owner/developer thinks it should, and may manipulate the customer into harmful (for them) behaviour, giving an advantage to the attacker. Let us explore both explanations below.

4.2.1 AISAs’ Unintentional Non-discrimination of Trademarks

⁶⁰ European General Court, Case T 697/19 *Teva Pharmaceutical Industries Ltd v European Union Intellectual Property Office* [2020] (not yet published), 19.

⁶¹ Existing models of computational copyright law could provide a blueprint for this, e.g.: Alice Witt, Anna Huggins, Guido Governatori and Joshua Buckley, ‘Converting Copyright Legislation into Machine-Executable Code: Interpretation, Coding Validation and Legal Alignment’, (Conference paper, *International Conference on Artificial Intelligence and Law*, June 2021) 139. <<https://doi.org/10.1145/3462757.3466083>>.

Above, we discussed the *Cosmetic Warriors* case, whereby the manner in which the Amazon AISA worked was deemed to have interfered with the rights of the *Lush* trademark by ‘conflating’ it with the one for Amazon’s own product. We noted that AISAs with limited discriminatory capabilities could therefore weaken an existing trademark, in a process that is similar to a genericized trademark – all bath bombs are *Lush* for them. Crucial for this case however was the level of control exercised by Amazon, and the self-serving nature of the manner in which its code responded to user queries. Amazon had plead that their search engine merely responded to past behaviour of the customer, driven by the profile the underlying AI had made for them. The court rejected this argument, not because it was irrelevant, but merely because it did not accept the factual account posited by Amazon of how their search engine worked, and the amount of direction it received from Amazon. Amazon’s system did not so much reflect a user preference in treating *Lush* as a generic term, but instead created one.

In the evolving use of AISAs, as discussed above, neither condition will hold. The AISA will typically be provided by a third party with no direct interest in the goods sold or bought, and the ‘confusion’ or ‘non-discernment’ may be the result not of a rule explicitly coded into the AI by the developers, but rather learned and acquired during use. The AISA may indeed learn from its owner that ‘Lush’ is a term they use for any bath bomb. Or they may learn it from a large language model that takes as input massive linguistic data from Internet communications. In that case, it would be an empirical fact about common word usage that the term has been, or is in the process of, becoming genericized. The AI simply reflects this emerging usage, as a result amplifies it, and in doing so may undermine active attempts by the trademark holder to prevent just that development.⁶²

4.2.2. AISAs and Possible Trademark Infringements

We can now further distinguish two scenarios along the lines indicated above. In the first, the AISA merely gives information to its user, and leaves any purchase information to them. This resembles closely the facts of *Cosmetic Warriors* but with the difference that the AISA is not controlled by a competing seller who directly benefits from the customer’s decision. Applying

⁶² This is similar to the way in which AIs can pick up discriminatory and biased attitudes from learning statistically from large language models. For an in depth discussion, see: Emily Bender, Timnit Gebru, Angelina McMillan-Major and Shmargaret Shmitchell, ‘On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?’, in: (Conference paper, ACM Conference Proceedings on Fairness, Accountability, and Transparency, March 2021) 610. < <https://doi.org/10.1145/3442188.3445922>>.

the rationale seen in *Australia-Plain Packaging* to this, our first scenario from above, trademark rights under TRIPS are not infringed in cases where distinctiveness is lost due to an ‘innocent’ inability of a third party’s AISA to properly distinguish one brand from another.

The reason for this result is that Art. 16.1 TRIPS provides the trademark owner only with a guaranteed minimum protection.⁶³ More specifically, in accordance with Art. 16.1, sentence 1, the owner of a registered trademark has the exclusive right to prevent all third parties not having the owner’s consent from using in the course of trade identical or similar signs for goods or services which are identical or similar to those in respect of which the trademark is registered, where such use would result in a likelihood of confusion. However, there is no obligation for Member States to maintain market conditions that would enable circumstances, such as a likelihood of confusion, ‘to actually occur in any particular situation’.⁶⁴ Rather, Members have the right to prevent unauthorized use, should the circumstances arise.⁶⁵ In *Australia - Tobacco Plain Packaging*, the Panel asserted that:

Article 16.1 does not make Members responsible for the conditions in which those infringement criteria, such as a ‘likelihood of confusion’, can be fulfilled, let alone obligated to refrain from regulatory conduct that might impair a trademark owner’s ability to maintain the distinctiveness of a sign in order to satisfy the ‘likelihood of confusion’ criteria.⁶⁶

In other words, the exclusive rights conferred by Art. 16.1 are intended to protect the source-identifying function of a trademark (guarantee of origin) against actual infringements by third parties. The negative nature of the right in Art. 16.1 ‘to prevent infringing uses does not extend to an entitlement to maintain or extend the distinctiveness of an individual trademark.’⁶⁷ The rights conferred are thus not intended to protect this source-identifying ‘function against waning distinctiveness due to other reasons, such as changing market conditions’ or changing consumer preferences.⁶⁸ The Appellate Body concurred with the Panel, stating that nothing in the TRIPS Agreement nor the Paris Convention suggests that there is ‘a positive right to use its

⁶³ This section is partly based on previously published work, see: Mariela de Amstalden, ‘Trademarks: Rights Conferred under Article 16 TRIPS’, in: Peter Tobias Stoll and Holger Hestermeyer (eds), *WTO: Trade-Related Aspects of Intellectual Property Rights, Max Planck Commentaries on World Trade Law* (Brill, forthcoming 2022) vol 7.

⁶⁴ *Australia - Tobacco Plain Packaging*, 7.2000.

⁶⁵ *Australia - Tobacco Plain Packaging*, 7.2000.

⁶⁶ *Australia - Tobacco Plain Packaging*, 7.2010.

⁶⁷ *Australia - Tobacco Plain Packaging*, 7.2015.

⁶⁸ *Australia - Tobacco Plain Packaging*, 7.2011.

trademark or a right to protect the distinctiveness of that trademark through use.’⁶⁹ In addition, the Appellate Body stated in the same report that Art. 16.1 does not provide criteria for examining whether unauthorized third party ‘use of similar signs “would result in a likelihood of confusion”’.⁷⁰

Crucially, Members are not responsible for safeguarding the distinctiveness of a sign, either before or after such signs have been registered as trademarks.⁷¹ In practical terms, if AISAs change the way we shop and their technical limitations (or capabilities) mean that marks may lose their distinctiveness, this alone does not require Member States to prevent this technology or sanction such conduct. This argument was reflected by council for Amazon in *Lush*: Trademark law should treat lightly when preventing otherwise useful technologies from reaching the market. Only if the choice of algorithm benefits directly the retailer who also *controls* the AI in its daily operation, even if they may not have developed it in-house, is trademark law the right legal framework.

4.2.3 Do AISAs ‘use’ Trademarks ‘in the course of trade’?

We noted above that AISAs in their development stage may learn supervised or unsupervised. If they learn supervised, they are trained against an ontology, a formal and explicit representation of the domain for which they are trained can include categories such as ‘trademarks’, and on the lowest level include as ‘atoms’ existing registered trademarks. Is this use of the expression, for the purpose of training an AI, itself use ‘in the course of trade’?

According to the prevalent understanding, any use in a commercial or economic context could constitute use of a trademark in the course of trade. In turn, a narrow interpretation may only regard use for economic purposes as use in course of trade.⁷² Since Art. 16.1 does not elaborate on the term ‘course of trade’, its definition is up to national legislators, although there is guidance to be found in the analysis of the Panel in *Australia—Tobacco Plain Packaging*, where the Panel interpreted the term ‘in the course of trade’ in the context of Art. 20.⁷³ First,

⁶⁹ *Australia - Tobacco Plain Packaging* AB, 6.586, 7.7-7.10.

⁷⁰ *Australia - Tobacco Plain Packaging* AB, 6.601.

⁷¹ The Panel further elaborated that: ‘[t]he importance of use of a trademark is recognized in the TRIPS Agreement by conditioning measures that encumber such use in the context of Article 20, and by recognizing the right owner’s interest in using the trademark to maintain distinctiveness as a factor in determining permissible exceptions in the context of Article 17. At the same time, it is clear that obstacles to trademark use can and do legitimately exist, and that Members retain the authority to encumber the use of trademarks under certain conditions’, *Australia - Tobacco Plain Packaging*, 7.2028.

⁷² Anthony Taubman, Hannu Wager and Jayashree Watal (eds), *A Handbook on the WTO TRIPS Agreement* (Cambridge University Press, 2012) 67.

⁷³ *Australia - Tobacco Plain Packaging*, 7.2261-7.2264; See also: Mariela de Amstalden, ‘Trademarks: Special

the Panel stated that the term ‘use’ as referring to an objective fact of use in the course of commercial activities.⁷⁴

While acknowledging that trademark functions of product differentiation and promotion of qualities may overlap in practice, the Panel further stated that the term ‘use’ shall not be limited on the basis of a notion of function or purpose thereof.⁷⁵ This conclusion is in line with WTO TRIPS precedent in *US-Section 110(5) Copyright Act*⁷⁶ and *Canada – Pharmaceutical Patents*⁷⁷, whereby it is for the rights holders to decide whether and to what extent to exploit or make use of their exclusive rights to extract economic value from those rights in the marketplace.⁷⁸ Secondly, and considering the ordinary meaning of the term, the Panel concluded that ‘in the course of trade’ covers broadly the process relating to commercial activities, going beyond the basic understanding of ‘trade’ as only ‘buying and selling’.⁷⁹

This WTO interpretation could be potentially reconciled with recent European case law as it relates to online search engines and platforms under EU law.⁸⁰ Some AISAs are indeed best understood as search engines with more advanced user interfaces and, as long as the control over the result that led to explicit and intentional manipulation of the consumer is lacking, the mere passive and technical evaluation of information to provide a service would not constitute infringing behaviour, as the rationale of the service is, arguably, very different in nature than selling the product.

However, questions remain unanswered in cases where direct control by the human user of the AISA is eliminated. We contemplate here two main scenarios. In the first one, we may ask our AISA: ‘Where can I get Perrier?’ and it correctly interprets the use of ‘Perrier’ as generic, advising accordingly (and as noted above, possibly explaining why it also covers ‘Highland

Requirements under Article 20 TRIPS’ in Peter Tobias Stoll and Holger Hestermeyer (eds), *WTO: Trade-Related Aspects of Intellectual Property Rights, Max Planck Commentaries on World Trade Law* (Brill, forthcoming 2021) vol 7.

⁷⁴ *Australia - Plain Packaging*, 7.2284.

⁷⁵ *Australia - Plain Packaging*, 7.2284.

⁷⁶ WTO Panel Report, *US – Section 110(5) of US Copyright Act*, WT/DS160/R (adopted on 27 July 2000) at 6.165 [*US – Section 110(5) Copyright Act*].

⁷⁷ WTO Panel Report, *Canada – Patent Protection of Pharmaceutical Products*, WT/DS114/R (adopted on 7 April 2000) at 7.54-5 [*Canada – Pharmaceuticals Patents*].

⁷⁸ *Australia - Plain Packaging* at 7.2286; in line with international trademark law theory, the term ‘use’ under Art 20 TRIPS is hence not limited to the use of trademarks for the sole specific purpose of distinguishing the goods and services of one undertaking from those of other undertaking.

⁷⁹ *Australia - Plain Packaging* at 7.2261.

⁸⁰ Joined Cases C-236/08 C-237/08 and C-238/08 *Google France SARL and Google Inc. v Louis Vuitton Malletier SA* (C-236/08), *Google France SARL v Viaticum SA and Luteciel SARL* (C-237/08) and *Google France SARL v Centre national de recherche en relations humaines (CNRRH) SARL* [2010], and Case C-324/09 *L’Oréal SA and others v eBay International AG and others* [2012] All ER (EC) 501..

Spring’ in its answer). In the second variation, the AISA now orders directly ‘Highland Spring’ (and may even earn a commission, although ex hypothesis this did not influence its analysis). The question that we need to answer is whether this second, autonomous operation qualifies as ‘use of a mark in the course of trade’ in light of TRIPS and is, thus, constitutive of infringing behaviour.

The AISA, in this scenario, only processes our instruction (‘Perrier’) internally and generates text that uses other marks of sparkling water (‘Highland Spring’) to post the order. The owner of the Highland Spring mark is of course delighted, but as a mere passive bystander not otherwise involved. Is Alexa’s use of the ‘Perrier’ mark problematic use ‘in the course of trade’, thus bringing the case under the purview of Art. 16. 1 TRIPS after *Australia - Plain Packaging*? If so, how would it be different from the findings in *Google France*? Our analysis suggests that there is a better solution to address the type of challenges posed by AISAs as illustrated above: to treat them analogously to a search engine that merely advises, and extends through an a fortiori argument the reasoning in *Lush* that also considered the use of trademarks for the Google auctions as non-infringing.

The rationale of this conclusion is motivated by our examination of the objective of trademark law: its purpose is to help consumers make decisions that respect their cognitive shortcomings and do not exploit them. AISAs serve the same objective, and as long as their user is satisfied, there is no need to limit their usefulness. If, of course, the AISA misread our intention and ordered Highland Spring although we would really prefer Perrier, then this is a dispute between us and the company that provided the service - possibly also a contractual dispute between us and the merchant that supplied the water to provide appropriate remedies. However, this is a normative evaluation that privileges the interest of consumers over those of trademark holders, in line with the quote above that it seems unconscionable that ‘a vendor be able to collect from a purchaser, as a part of the purchase price, money which has been spent in an effort to mislead that very purchaser in making that very purchase?’

If the interests of mark holders were given greater prominence, a different outcome may be preferable. One possibility would be to leave the (specific) clarification of the term ‘in the course of trade’ in Art. 16 TRIPS to Member States, which in turn could result in a potential fragmentation of the market. The interpretation given by the Panel in the context of Art. 20

TRIPS should then be read flexibly as to accommodate the peculiarities of new technologies. Given the global reach of AISAs who do their shopping online, often times across jurisdictional borders, a harmonised clarification through TRIPS would, perhaps, be preferable.

4.2. Manipulated AISAs

The final scenario to discuss is scenario 2d from above. Here, the AISA has been manipulated by a third party, typically, but not necessarily, a competitor of the owner of a trademark. AISAs can be subject to adversarial attacks on their machine learning capabilities that disadvantage them in comparison to humans. These vulnerabilities could be exploited in numerous ways, some of which also raise trademark issues. Some of these possible attack vectors are already known from problems with search engines. Their results can be manipulated for instance by ‘swamping’ their machine learning algorithms with misleading queries that create spurious associations between terms. Known as ‘Google bombing’ (in itself an interesting example of generification) or ‘spamdexing’⁸¹ it has been used for commercial, political and satirical purposes. What they have in common is their method of attack: if a search engine receives a significant number of queries that combine two terms, it will learn that there is a connection between them. This can then be used to artificially increase the ranking of a website, or manipulating the autocomplete function, for instance, to expand ‘Lush’ to ‘Lush and GenericBrandX’. The issues that these and similar attempts to fool search engines raise for trademark law have been discussed in the context in the past.⁸² We mention them here too in an attempt to ‘demystify’ AISAs; for a significant part of their functionality, they are best understood as a form of search engine, with all the technical and legal issues that these raise. In particular for our purpose, we argue that trademark law is not the appropriate remedy *against* the AISA provider if these are manipulated into confusing brand marks.

More interesting for our purposes here are novel forms of AI manipulation, in particular *adversarial examples*. These are inputs to machine learning models intentionally designed to cause the AI to make a mistake. In an elegant formulation, Goodfellow and others call them

⁸¹ Paul Przemyslaw Polanski, ‘Spam, Spamdexing and Regulation of Internet Advertising’ (2008) 2 (2) *International Journal of Intellectual Property Management* 139.

⁸² See, inter alia: Stanley U. Paylago, ‘Trademark Infringement, Metatags, and the Initial Interest Confusion Remedy’ (2000) 9 (49) *Media Law and Policy*; Gregory Lastowka, ‘Search Engines, HTML, and Trademarks: What’s the Meta for?’ (2000) 86 (4) *Virginia Law Review* 835.

‘optical illusions for machines’.⁸³ In an influential paper by the same authors, a particularly intuitive example of such an illusion is on display.⁸⁴ The task that the AI in the example has to solve is to correctly identify a photo of a Panda. The attacker starts with an image of a panda, and then adds a small perturbation, invisible to the human eye, that has been calculated to make the AI misclassify the image a gibbon with high confidence. Crucially, this effect is intended and predicted. We can easily transfer this experiment to a trademark setting. A robotic AISA that shops for its owner in a supermarket scans the isles for a visual trademark, e.g. the logo of a brand of baked beans- let’s call them *Hinz*. A competitor has labelled his tins with a logo that for any human shopper correctly shows his logo, *Kunz*. However, using the same technique as in the Panda example, a minute manipulation of the logo will cause the AI to ‘see’ *Hinz* and add them to the shopping basket instead.

Intuitively, *Kunz* violated the trademark of *Hinz*. However, the label on his tins are indistinguishable, for a human, to the mark registered in his name, and very dissimilar to the one of *Hinz*. In this case, did *Kunz* ‘use the mark of *Hinz*’? Not if the audience of trademark law are humans only, and the identity criteria for a mark is defined by how they are perceived by humans. Following the logic of our analysis above, however, in an environment where a significant amount of shopping is carried out by AISAs, this answer is not any longer adequate. It may be that in some jurisdictions, a purposive interpretation of their trademark law already permits the desired result to be reached. Art 16.1 TRIPS gives the owner remedies if ‘identical or similar signs for goods or services which are identical or similar to those in respect of which the trademark is registered where such use would result in a likelihood of confusion’ are used. While confusion is not only likely, but in the case of AISAs rather a mathematical certainty, the marks are not identical. However, it may be possible to extend the meaning of ‘similar’ in an AI environment, to also cover ‘similar from the perspective of an AISA’. This is not just mere semantics. A more transparent solution however would be to explicitly recalibrate applicable law to the new realities of technological innovation.

⁸³ Ian Goodfellow, Nicolas Papernot, Sandy Huang, Yan Duan, Pieter Abbeel and Jack Clark, ‘Attacking Machine Learning with Adversarial Examples’ (2017) *Open AI Blog*. <<https://openai.com/blog/adversarial-example-research/>>

⁸⁴ Ian Goodfellow, Johnathon Shlens and Christina Szegedy, ‘Explaining and harnessing adversarial examples’ (2014) *arXiv preprint arXiv:1412.6572*.

4. Imagining the Future of Trademarks after AISA Disruption: Policy Recommendations

Our analysis emphasized the need for a better understanding of the impact of AI, and AISAs in particular, on international trade and the underlying mechanisms for IP protection. AISAs are undoubtedly changing the current ways in which consumers choose between competing products, and with that inevitably raise also issues for trademark law.

This paper started from the premise that it is reasonable to question whether the functioning of AI in the form of AISAs renders fundamental concepts of trademark law irrelevant. Our analysis suggests that a *sui generis* framework applicable to trademark rights in the age of AI is not necessary, because current rules — particularly at the international level through the TRIPS Agreement — allow for sufficient flexibility to accommodate the peculiarities presented by the new technology. Indeed, our first contribution in the form of a policy recommendation entails that the law must provide, and can indeed provide, enough flexibility to adjust decision-making in line with rapidly changing consumer habits and expectations. International trademark law, as discussed, does not require governments to create an environment that is de facto favourable to the use of trademarks, and trademark law should not be used to shore up aging business models. The main challenge that AISAs provide for mark owners is not best understood as infringement, but rather technological obsolescence. If AISAs achieve for consumers what marks historically aimed to do, without unduly and intentionally favouring competitors or retail platforms (the last element that allowed the court in *Lush* to favour the mark owner), then trademark law is an inappropriate framing to address this change in consumer behaviour. Our second policy recommendation proposes therefore that AISAs be given greater flexibility to substitute brands, also in light of the socially undesirable costs of a rigid trademark regime.

However, as we discussed the court in *Lush* sensed, correctly, the considerable power to change and manipulate language that comes with the control over consumer data that Amazon in particular has achieved. *MTM* by contrast rather naively put the consumer in charge, an approach that in the light of the new business models discussed above is as problematic as the overly paternalistic reasoning in *Lush*.

To account for the power over language that AISA developers have, an obligation to equip them with an ability to explain their recommendation, and alert the user that a substitution took place and the reasons behind it, would be desirable. In *Lush*, the courts asked for this as a right of the mark holder. We however argue that this explanation should now not be owed to the mark

holder as a matter of trademark law, but to the users whose habits, language use and preferences are profiled by the AISA. A duty to *explain automated recommendation and shopping decision* towards the user may already be an obligation under the European GDPR⁸⁵ in data protection law. Especially in those business models where the AISA instigates a new purchase (and thus changes the legal position of its owner) and uses a ‘shipping then shopping’ model (and thus at least initially makes the purchase decision fully automatically), the conditions for Art 22 and Art 15 GDPR seems to be fulfilled.⁸⁶ Similarly, the proposed new European AI Act requires explainability of AI recommendation at least for high-risk applications. While shopping recommendations arguably do not fall into this category, the Act recommends industrial standards and best practice guidelines also for lower risk uses of AI.⁸⁷ Listening also to the voices of trademark holders in the drafting of these standards, even though the right ultimately is one of the consumer, is desirable also to protect the latter from manipulation.

AISAs can be manipulated, and therefore could also give rise to new forms of manipulation from the competitors of a mark owner. Some of these practices as we argued above can be addressed within the existing trademark regime, through changes in the way marks are registered and evaluated — for instance by also asking if they are intentionally designed to mislead a digital shopping assistant. Other attacks, such as the intentional manipulation of the logic of a recommender system, are however best relegated to competition law or indeed criminal law if they amount to an attack of a computer system under the nationally applicable hacking laws.⁸⁸

⁸⁵ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

⁸⁶ For an overview Bryan Casey, Ashkon Farhangi, and Roland Vogl. ‘Rethinking Explainable Machines: The GDPR’s “Right to Explanation” Debate and the Rise of Algorithmic Audits in Enterprise’ (2019) 34 *Berkeley Tech. LJ* 143. Sceptical Sandra Wachter, Brent Mittelstadt, and Luciano Floridi, ‘Why a right to explanation of automated decision-making does not exist in the general data protection regulation’ (2017) 7(2) *International Data Privacy Law* 76. With a very similar logic to our proposed here: Lilian Edwards, and Michael Veale, ‘Enslaving the algorithm: From a “Right to an Explanation” to a “Right to Better Decisions”?’ (2018) 16(3) *IEEE Security & Privacy* 46.

⁸⁷ Martin Ebers, ‘Regulating Explainable AI in the European Union. An Overview of the Current Legal Framework (s)’ (August 9, 2021). Liane Colonna and Stanley Greenstein (eds), *Nordic Yearbook of Law and Informatics 2020: Law in the Era of Artificial Intelligence*.

⁸⁸ Catalina Goanta and Gerasimos Spanakis. ‘The commercial unfairness of recommender systems on social media’ in *Artificial Intelligence and the Media* Edward Elgar Publishing, (2022). Ihsan Gunes, Cihan Kaleli, Alper Bilge, and Huseyin Polat. ‘Shilling attacks against recommender systems: a comprehensive survey.’ (2014) 42(4) *Artificial Intelligence Review* 767.

Lastly, due to the increase in integration of AISAs in human's purchasing decision making process — which in turn leads to changes in consumer's purchasing behaviour— it is highly likely that notions of 'distinctiveness', 'confusion' and 'average consumer' require revisiting to ensure proper trademark functionality. Overall, we suggest that there is an opportunity for greater international harmonization of trademark *practice* more than substantial regulation, if we expand the audience of trademark law to AISAs. As we illustrated in this paper, TRIPS has the ability to provide a framework that set the terms of trademark debate if we accept that the 'silent audience' changes from a purely human-centric perspective to a market populated also by autonomous software artefacts.