SVENSKT NÄRINGSLIV
SWEDISH ENTERPRISE

Digital innovation and digital innovation processes

IPR ASPECTS ON HOW TO HARNESS INNOVATION
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Preface

The IP policy on intellectual property of the Confederation of Swedish Enterprise's highlights several challenges that need to be solved regarding knowledge-based assets and how they are managed. One of these challenges is a new technical reality. This report explores in detail what this challenge entails and highlights the issues that must be addressed. The report is an updated version of one first published in Swedish in February 2023.

We live in an increasingly digitalised knowledge economy. Digital innovations are of increasing importance for companies and for the economy. It is also the case that digital elements are becoming prevalent in increasing numbers of innovation processes. AI solutions, for example, can speed up previously time-consuming operations.

However, both digital innovations and associated digital innovation processes pose challenges in relation to knowledge-based assets. Can IP protection be obtained for these assets? If so, what does the protection mean? What existing truths might need to be reconsidered?

Sweden is not able to solve these legal challenges on its own, not least because so much of it is now covered by EU law. However, it is still important that Sweden pursues a forward-looking line in international contexts, not least within the EU.

These issues need to be resolved. The outcome should be reasonable solutions that allow Swedish and European innovation and competitiveness to be maintained and developed.

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1. The effects of digitalisation

1.1 Digitalisation

Digitalisation is being increasingly discussed from a range of perspectives. The journey to digitalisation began many years ago. As early as the 1960s, the Swedish government published a report on how training in automatic data processing was required to meet future needs.[1]

This journey of digitalisation has not been a linear one. There have been periods of relatively slower development as well as gigantic leaps in a short period. Among these giant leaps have been the creation of the World Wide Web, the development of smart phones and the emergence of 5G networks. In its own way, the Covid-19 pandemic may also have played a role in these rapid developments, driving a need, for example, for digital meetings platforms and other digital tools for easier collaboration.

Digitalisation can be described in many ways. Basically, however, it is about more and more being handled in the form of binary code. Among other things, this means that what previously had to be dealt with as physical objects can be handled within digital networks. Newspapers and musical recordings are such examples of where a market has gone from physical objects to digital services.

Digitalisation also brings with it the potential convergence of different industries. Only a few decades ago, newspapers were something completely different from television. Today, television channels publish text on their websites, while newspapers publish moving images on theirs.

In industry, digitalisation is – among other things – about new types of processes, where even the sales of most physical objects nowadays also often have digital components and also include different types of service components.

1.2 The impact of digitalisation

Digitalisation does not simply affect individual products or individual industries. We are living in an age of digital transformation. Societies, industries and companies are fundamentally changing, through the increasing use of digital opportunities. We have already seen it in a range of industries, and it is something that will continue at an ever-increasing pace.

[1] See, for example, SOU 1965:56, Fackutbildning i automatisk databehandling (Technical training in automatic data processing).

The new possibilities offered by digitalisation are not merely a matter of technology. Rather, it is a question of what these new technological possibilities mean for human behaviour.[2] Everyone should be able to relate to the fact that the emergence of digital photography is not simply about the adoption of a new technology. Instead, it is about the fact that access to the technology of digital photography has changed our entire approach to images, not least because it has enabled the emergence of social media.

Digital transformation is also leading to new challenges for the legal system. Changes in legislation too often focus primarily on the technology itself. Instead, the focus should be on the new behaviours that new technical possibilities may create.

The overarching ambition should be technology-neutral legislation. At the same time, there should be an awareness that entire societal structures are being affected by technological possibilities. Such ambition may, therefore, be difficult to follow through.

Examples of the difficulties of technology-neutral legislation have been apparent through the centuries. For an example, look at the importance of the railway. Without the emergence of railways, industrialism would not have been able to emerge. With industrialism, came changing family structures. Would we in Sweden have had legislation on cohabitation if railways had not begun to be built? Is even the Swedish Cohabitee Act a consequence of the railroads?

In the mid-1990s, the Swedish government appointed an IT Commission. The first study presented by this IT Commission was titled 'Vingar åt människans förmåga'.[3] This provided an important perspective on the effects of digitalisation; we humans expand our own capabilities.

1.3 What have we seen so far

It is difficult to gain even an overview of the effects of digitalisation on our lives to date. Many of us cannot even imagine an everyday life where we do not have access to digital services. Our consumption has travelled from buying physical items online to using various forms of digital-based services. These include, for example, films and computer games. Nowadays, we no longer buy these, but now access them via streaming services. Many everyday phenomena, such as owning a car, have evolved into different forms of subscription solutions. Our everyday objects are also increasingly connected. Even toothbrushes are sold with an app alongside them.

It is not only our everyday lives that have changed through this increasing presence of digitalisation. Entire industries have been reshaped, whole value chains have been dramatically shortened or completely restructured. Where some companies used to be able make fortunes, their entire market has disappeared. For example, who would enter a physical travel agency nowadays? Who runs around tourist locations searching to buy camera film or flash cubes in order to be able continue taking

[2] See, for example, Helgesson, Claes-Fredrik, Making a Natural Monopoly (1999).

[3] SOU 1994:118. The title can be translated into "Wings for the human capability".

holiday photos, in order to put them in an album? Everything, from the alarm clock on the nightstand to the camera for the holiday, has been replaced by smart phones.

In some sectors, international players have taken over what used to be handled by local 'on the corner' companies. What we can also now see is increasing convergence between different industries. In Sweden an example of this is when the operator Telia purchased the media company TV4.

Of course, all of these changes also affect society as a whole. Digital solutions are also now central to public services. The pandemic showed that systems aimed at the entire population, such as digital COVID passports, could be rolled out quickly. Digitalisation also means that the labour market will be reshaped. The skills and competences that will be needed in employment are changing rapidly.

1.4 What will we see

Digitalisation is not a process that will cease; if anything, in fact, it will continue to accelerate. Many of the different aspects of digitalisation that are now beginning to be observed are yet to realise their full impact. These include, for example, a growing use of AI and an even greater use of additive technology – 3D printing – for manufacturing.

Our everyday lives will be mainly affected by the fact that increasing numbers of devices are connected and integrated with each other. More of the services we use will have a digital dimension, something where AI will play an increasingly important role.

What is sometimes referred to as the Fourth, or even Fifth, Industrial Revolution will continue to affect how companies operate. AI will be increasingly deployed, probably also as part of innovation processes. Additive technologies are discussed from the perspective of their potential for reducing manufacturing costs. Such approaches could pave the way for the reindustrialisation of Europe when the costs of manufacturing personnel are reduced.

These changes have the potential to affect society as a whole. Professions that are important today may become less significant, while professions that we may not yet be aware of, may, within a couple of decades, become the most important part of the labour market. Things that are currently complicated may become simple and straightforward in the future. We can therefore expect large parts of society to be reshaped.

2. Digital innovation

2.1 Defining innovation

Innovation is a concept that is often discussed but rarely clearly defined. What is understood by the notion of innovation differs from person to person. From a political point of view, innovation is increasingly talked about as a solution to everything, from how countries' competitiveness can be strengthened to how climate change can be managed. In the summer of 2022, the EU presented its Innovation Agenda, an example of how important it is politically considered to be to strengthen innovation.

The focus of this report is digital innovation and knowledge-based assets. In order to explore this topic, it is necessary to describe what is being discussed when talking about innovation. This is particularly important as many people have the impression that innovation only encompasses technical solutions. For example, the EU's Innovation Agenda focuses solely on so-called 'Deep Tech'. However, when it comes to digital innovations, it is often more differing components that transform something into innovation, such as complementing a technical solution with services.

2.2 Innovations reach a market

Sometimes when innovation is being discussed, it is portrayed as results of research or as a novel idea. This is not in line with what is normally understood by innovation. The difference lies in the relationship with the market. For an innovation to be at hand, it is necessary that the idea reaches a market and that there are customers that are willing to use it.[4]

However, in order to reach the market, the research result or idea must have been given concrete form. An idea for a technical solution must have made it past the experimental and prototype stages. An idea for a service innovation must have gone from being something on paper to a service that is actually performed. The innovation in question must also have found its way into a business model, or otherwise have found people who are in some way interested in the innovation and the benefits that it potentially provides.

[4] The scientist who is usually considered to have laid the basis for this approach is Schumpeter, see Schumpeter, The Theory of Economic Development (1934).

When talking about innovation from this perspective, it is possible to consider those factors that make it possible to actually succeed in a market. These involve everything from communication to issues of contractual structures and the management of intellectual property rights. All those factors are potential deal-breakers when it comes to turning research results and ideas into revenues.

2.3 Innovation is not just technology

Sometimes, invention and innovation are considered as one and the same thing. An invention is – according to the definition of patent law – a solution to a technical problem. However, innovation is much more than just new technical solutions. When innovation presents itself as a technical solution, it is also often included with a number of other technical solutions. Thus, what customers may see as a single product in reality may include several hundred, or even thousands, patented inventions.

One definition of innovation that has had a major international impact has its origins in what is known as the 'Oslo Manual'.[5] The Oslo Manual is used – among other things – as a basis for how to collect statistics on innovation. It also often provides the foundation for political positions on innovation.[6] The descriptions of innovation made in the Manual are much broader than simply technical solutions.

Service innovations are an increasingly important component of the modern economy. Service innovations are often digital, but they can also be analogue; by the same token, digital services can also feature analogue components. Anyone who books a car through Uber wants a vehicle, not a fully digital delivery.

In order to function in a market, efficient processes are often required. Process innovations can play an important role in manufacturing goods or in delivering services in ways that use less resources or otherwise means lower costs. When new players take over in a market, sometimes the reason they were able to do so lies in the fact that the new player has more efficient processes.

Another type of innovation is organisational innovation, that is, new answers to the question of who does what when, how and why. This includes developing new forms of organisational structures to produce goods or services. This may include creating more process-controlled organisations or new structures around what is carried out in-house and what is outsourced to others.

Innovation can also be about developing new business models. A new type of business model can be about creating new balance points for what activities generate revenue. For example, it can be about shifting the focus away from selling physical products and onto creating service solutions designed around the physical products. Some digital innovations are based on models where certain elements of the business are offered

[5] Oslo Manual, latest version from 2018.

[6] See for example the description of innovation made in the National Innovation Strategy presented in 2012. https://stik.se/natinnostrat.pdf

to customers for free. One such example is the language learning app Duolingo. Although it is excellent to use in its free version, it is – of course – also available as a premium version that users pay to use. Duolingo was neither first with this type of solution, nor will be the last; we see this approach used over and over again.

This broader definition means that innovation not only originates from traditional scientific fields, often referred to as STEM.[7] New innovation can be constructed based on what behavioural scientists know about customer behaviour or on linguists' insights into how we humans perceive language. Babblarna, which has been a success with many children in Sweden, is based on research on how young children can develop their speech.

The concept of innovation is thus very broad. The most important limitation really lies in the fact that it is innovation only when it finds a market. What constitutes successful innovations is not measured by how innovative the technology is. Successful innovation is more about market penetration or economic success.

2.4 Radical and incremental innovations

Joseph Schumpeter didn't only clarify the fact that innovation is about the relationship with the market. He also made it clear that not all innovation is the same. One type of innovation is the one that involves paradigm shifts. Some people believe that this kind of innovation is radical, and that it is this that can lead to creative destruction. Some can be innovations that will redefine entire industries and sometimes even entire societal structures. Examples of these include everything from bicycles to smart phones.

However, innovation is not simply about creative destruction. Often, the innovations that have a greater practical impact are those that are incremental, building on what already exists. Examples of this include new types of mobile phone antennas or more-efficient batteries. In the long run, these types of innovation may have as much capacity for changing as radical ones, but they do so in small steps.

2.5 Digital innovation and innovation processes

There is no clear definition of digital innovation. However, in order to have something to help relate the concept to the issues of intellectual property, some kind of classification or characterisation of what constitutes digital innovations and digital innovation processes is needed.

Basically, software is essential in order to make digital innovations. However, software itself says nothing about the overall nature of the specific innovation. We can talk about everything from apps and computer games to diagnostics in healthcare via AI solutions. It can be about standalone digital services as well as about digital solutions that are linked to other devices, for example, cars.

[7] STEM stands for Science, Technology, Engineering and Mathematics.

One type of digital innovation is what is often referred to today as 'the Metaverse'. This phenomenon can be described in a number of different ways. One way is to talk about in terms of a 3-D digital world. Another way is to envisage this as the single biggest step towards more people shopping for digital products, such as new shoes for their avatar.

Artificial Intelligence, AI, is becoming increasingly important in the field of digital innovations. For example, AI can be used to improve digital services.

There are different ways to define AI. One is the definition contained in a paper published by the European Commission, which states that: 'Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications)'.[8] Another often used definition comes from the OECD: 'An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments.'[9]

When talking about digital innovation processes, above all these refer to AI solutions. This can be that things have been created by AI, or that certain parts of an innovation process are handled by AI.

There is one particular aspect of intellectual property and digitalisation that will not be addressed. This concerns the role that AI may have, for example, in relation to the data of registration authorities. The issue is controversial and has been raised, not least, by the European Patent Office, the EPO.[10] While cost-effective procedures that maintaining quality are important for the business community with the registration authorities, the focus of this report is on the innovation that emerges from companies.

[8] Trends and Developments in Artificial Intelligence – Challenges to the Intellectual Property Rights Framework – Final Report from the European Commission 2020.

[9] https://oecd.ai/en/ai-principles

[10] https://www.epo.org/news-events/in-focus/ict/artificial-intelligence.html

3. Digital innovations and intellectual property

3.1 Definition of the problems

3.1.1 Digital innovations

In this section, the focus is on digital innovations. One way to describe digital innovations is to say that they are where digital components lie at the heart of the innovation. However, this does not really narrow down the topic sufficiently. In all, different aspects of digital innovation added together sums up to a revolution or even two. This is described as a fourth industrial revolution.[11] In certain contexts, you can look even further ahead and talk in terms of industry 5.0.[12]

One phenomenon that has been raised regularly in the last couple of years is Metaverse, a form of digital world. Other expressions for similar phenomena are XR, extended reality and VR, virtual reality. In these digital worlds, there are inherently digital innovations and there is trade in digital products.

Another phenomenon is AI, artificial intelligence. As far as AI is concerned, such solutions can be innovations in their own right and can also be component of the innovation process. The use of AI in innovation processes is covered in more depth in chapter 4 of this report. The companies that develop various AI solutions often invest large sums in developing their applications. For this type of investment, the possibility of intellectual property protection can be important. The question is, to what extent can these innovations be protected within the sphere of existing intellectual property systems.

A few years ago, there was a lot of talk about additive technologies, namely 3D printing. There were discussions around the idea that an increased use of 3D printing could lead to lower production costs, which could in turn lead to a reindustrialisation or reshoring of Europe.[13] What we have seen most so far is that 3D printing is being used to produce, for example, prototypes, but the development is fast moving towards

[11] See for example SOU 2022:68, Förnya taktiken i takt med tekniken (Renew tactics in step with technology).

[12] Industry 5.0 is the name given by the EU used as a name to demonstrate an industrial strategy beyond the fourth industrial revolution. https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/industry-50_en

[13] See, for example, the EPO report Patents and Additive Manufacturing from July 2020. https://www.epo.org/news-events/in-focus/future-of-manufacturing.html

manufacturing as well. In reality, 3D printing is not a single technique but rather several different ones, with the common denominator being that the 'printers' produced three-dimensional, more or less finished, objects. These can be anything from concrete houses to food, from blood vessels to car spare parts.

The great effect of 3D printing is somewhat the fact that technology allows 3D objects to be described in binary code, and for binary code to become 3D objects. As music, film and news became rendered in binary code, entire industries changed. An increasing use of 3D printing may have a similar effect on many more industries.

One sector that has its entire base in digital innovation is the gaming industry. Even when the earliest simple games arrived, they were digital innovations. The gaming industry has continued to be characterised both by its digital innovations and by its creation of new business models.

In everyday life, many of us encounter digital innovations in the form of the apps we have on our smartphones. Interestingly, this shows how different digital innovations can coexist on a single platform, the smartphone. This is a clear example of how innovations, perhaps digital ones in particular, often find themselves deployed alongside other similar ones. One effect of this is that it can often be difficult to isolate the various innovations.

3.1.2 The foundations of intellectual property

Intellectual property law primarily works on the basis that what is to be protected constitutes something that is previously unknown when the legislation was created. After all, there would be no point in having patent law that only applies to what we already know. This means that the legislation has a built-in neutrality towards technology.

There are plenty of examples of this. An example can be taken from the kind of digital extensions of reality that nowadays are often referred to as the Metaverse. An early version of this was 'Second Life'.

Sweden was an early adopter of Second Life. As early as 2007, a Swedish embassy was opened in Second Life. This embassy was designed as the Swedish embassy in Washington D.C, the House of Sweden.[14] The architect of the House of Sweden was the renowned Swedish architect Gert Wingårdh. Given that architecture is subject to copyright protection, it was necessary to ask Gert Wingårdh for his permission before the House of Sweden was incorporated into Second Life. Had permission not been acquired, its use would have been considered as a copyright infringement. Although Second Life was a new phenomenon, the legislation worked exactly as it should. In this sense, copyright legislation is technology neutral.

[14] https://www.swedenabroad.se/sv/utlandsmyndigheter/usa-washington/om-oss/ #

However, not all aspects of intellectual property can be considered as technology neutral. One example, from the early steps of digitalisation, is if and how computer programs are to be protected as intellectual property. The solution became an international one, under which computer programs were included as literary works in copyright law. At the same time, patent law now states that patents can be granted on items that are only computer programs.

This solution, with a clear structure for where the computer programs lie, worked well until such computer programs became increasingly integrated into our surroundings. Nowadays, such a structure can lead to many challenging scenarios, and has also led to the collapse of the structure of intellectual property protections. Not least of this is that different parts of the world have come up with different interpretations; in other words, what is patentable differs between different countries.

Another challenge was how holograms should be handled in – among other things, trademark law. Different companies wished to use holograms as trademarks, but registration was denied. Since then, trademark legislation within the EU has changed, and registering holograms as trademarks is now possible. Previously, it had already been possible to register holograms for design protection.

The new possibilities that arise from digitalisation have posed challenges for the rules on intellectual property, although some have been handled within the existing rules through, for example, new interpretations of the legislation. However, some of these solutions are no longer optimal, particularly those addressing what can be covered by intellectual property protection and, if so, which ones.

The other aspect of intellectual property – alongside what can be protected – is precisely what that protection covers. Digitalisation also sheds a light on which actions should be considered as constituting the infringement of a right. Additive technology, so-called 3D printing, means technology that allows 3D objects to become binary code and binary code to become 3D objects. What does this mean for the design of intellectual property rights? Another challenge is when AI is being trained on existing, copyright protected, works. Does that process constitute a copyright infringement?

3.2 Digital innovations in patent law

3.2.1 Protection of digital innovations

Patent law is, to a large extent, hesitant to provide protection computer programs. In order for something to be patentable, it has to be considered to be an invention. Article 52.2 of the European Patent Convention states: 1 ‘The following in particular shall not be regarded as inventions within the paragraph 1: […] ‘programs for computers’ […]’

This exclusion is found also in other international rules on patents and in national legislations. Computer programs as such are not considered as inventions, and therefore are not patentable. However, it is possible to protect inventions that

include computer programs.[15] The line between a computer program and an invention that includes a computer program, can be very difficult to define. However, for those responsible for innovation, such a distinction is crucial, as it determines whether or not their innovation is patentable.

In recent years, these issues have received increasing attention. One reason for this – in addition to the increasing importance of digital innovations – is a ruling by the Enlarged Board of Appeal at the EPO, which addressed precisely the patentability of a digital innovation.[16] There are many details of the ruling, but a brief summary can be made as follows. The practice that has existed in Europe for the patentability of digital innovations is to be maintained. It is therefore still difficult to patent this type of invention in Europe.

This can be contrasted with the situation in the United States. According to US patent law, there are significantly greater opportunities to patent digital innovations.

In practice, it can be said that in the US, there has been a case law that has shifted in terms of the nature of what patentability is. In relation to the situation in Europe, there are more opportunities to patent digital innovation in the US, That is not the same as saying that all digital innovations are patentable there, but there are greater possibilities. It is also not necessarily so that Europe should follow in the footsteps of the United States. Their solution seems to lead to more disputes on patent infringements.

3.2.2 The exclusive right in a patent

The exclusive right in patent law is focused on professional use of the patented invention. If someone desires to make commercial use of a patented invention, this cannot be done without the expressed permission of the patent holder. Examples of commercial use include manufacturing, selling and marketing of the patented invention.

The focus on professional use means that, as a consequence, private use is allowed. Any private person who wants to – for their own use – manufacture items that are covered by a patent right may therefore do so. What has been manufactured may not be sold, but the individual can use it themself.

Normally, this does not pose any real problems. Most private individuals have neither the knowledge nor the ability to do – to some extent – aspects that are covered by patent law protection.

However, digital innovations create uncertainties. One is that – to the extent that computer-implemented inventions can be covered by patent protection – they are as easy to copy as other digital material, although it may of course also be possible to set up technical barriers for copying.

[15] See Horn, Anna, Patent Protection for Computer-Implemented Inventions – A report for the Confederation of Swedish Enterprise, November 2020.

[16] G 1/19.

Another aspect that may put the design of exclusivity under pressure is the increased possibility of manufacturing 3D objects with 3D printers. So far, the printers available for private use are rarely sufficiently advanced that this poses a real problem, but their rate of development is rapid. It is possible to imagine a future where private individuals can print patented objects at home. Under such circumstances, it may be necessary to discuss whether the use by private individuals should also be restricted to a certain extent.

However, it is clear that if private individuals hire companies to use 3D printers to make things that are patented, this constitutes a patent infringement. The person hired is considered as a professional user and his work thus falls under what is the patent holder's exclusive right under patent legislation. All in all, patent law may have to be developed to better balance the rights of different stake holders.

3.3 Digital innovations in copyright

3.3.1 Protection of digital innovations

According to the Berne Convention, copyright is an intellectual property right that arises when works are created. Thus, no registration is required in order for a work to be covered by copyright protection. The protection covers everything from music and film to construction works, from consultant reports to sculptures.

At EU level, copyright protection for computer programs is covered by a special Directive.[17] Article 1 in that Directive states that computer programs are to be protected by copyright.

However, this is not quite as simple as all digital innovations receiving copyright protection by default. The construction of the copyright protection does, in itself, pose a challenge when it comes to digital innovation. When the concept of copyright protection was developed, the focus was on protecting artistic and literary works in a rather narrow sense.

Copyright protection does not cover ideas behind a work, or even the facts in the specific work. The copyright protection covers the actual expression of the author. What lies behind it can instead be protected as primarily trade secrets. One consequence of this is that the protection may exist but is relatively simple to circumvent.

There are also other dimensions to this. Many digital innovations are based on managing large amounts of data – something that applies, not least, to a range of AI solutions. Data itself cannot be protected by any intellectual property exclusivity, meaning there is no ownership to data as such. However, it may be subject to the protection of databases in copyright. The protection of databases is largely harmonised within the EU Database Directive.[18]

[17] Directive 2009/24/EC on the legal protection of computer programs.

[18] Directive 96/9/EC by the European Parliament and by the Council of 11 March 1996 on the legal protection of databases.

The EU Database Directive came into being in the mid-1990s. At this time, the view was that databases were created by actively collecting data, a costly and time-consuming process. Databases were considered as being the result of investing in collecting data. The value of the database lay in the fact that the data had been collected, and the protection mainly includes copying large parts of the database. Examples of databases that were in focus at the time were product databases and digital 'telephone directories'.

What has now changed is both how databases are created and the ways in which they are being used. Nowadays, data is frequently collected through the use of digital services. For example, many of the services that customers perceive as being free of charge actually rely on a construction where the customers pay with their data. The perspectives on how datasets are created are therefore not the same as when the Database Directive was first set out.

The same goes for how the data from these databases is being used. Big data – databases of various kinds – are used in a huge range of ways. Data is crucial for many aspects of digital innovation; without analysis based on large data sets, we would not be able to have self-driving cars or other AI solutions. Without high quality data, AI is impossible.

In 2020, the EU adopted their data strategy, which included the creation of a Data Act and changes to the protection of databases. In spring 2022, the European Commission proposed new rules for databases in the Database Directive. The proposal means that machine-generated data cannot be covered by the protection of databases in copyright. When it comes to how the protection for these databases ought to be developed, the proposal is silent.

The proposal for new rules for databases has not been adopted as yet, and is currently undergoing the usual EU legislative processes.

There is one more perspective on copyright and digital innovation, linked to the increasing use of non-fungible tokens (NFTs).[19] Copyright has its origins in protecting art and literature. Through history, copyright and, for example, collectors have had a shared view on the importance of an original. This is particularly true for artworks; there is the original work, then there are the copies.

In a digital environment, all works become binary code. It does not matter whether it is music or a drawing, a book or a film – it is all binary code. It also barely matters what is the original. This is also the situation for photographs and lithographs. Traditionally, this has been handled by using numbered series. In the digital world another solution has been developed, the NFTs. These are being used as a tool to help identify originals in a world of binary code. It is a digital solution to a problem created in a digital reality.

[19] See about NFTs and more in Renman Claesson, Katarina, Crypto Market, Blockchain, Non-Fungible Tokens (NFTs and Digital Art – How Does Law Work in This One environment?), NIR 2022 pp. 356–375.

3.3.2 The exclusive right in copyright protection

Copyright protection is broader than just covering the right to make copies of protected works. In the EU, copyright protection is – to a large extent – harmonised, not the least through the Infosoc Directive and the DSM Directive.[20] The interpretation on what the limits are to the copyright protection has also been interpreted several times by the European Court of Justice. In addition, somewhere along the line, there is also national legislation.

After the dawn of digitalisation, it became clear that copyright protection needed to be developed. This is the background behind the Infosoc Directive. All issues that needed to be addressed, however, were not covered by that Directive. To give an example, the development of the platform economy was not foreseen when the Infosoc Directive was being set out.

In both the Infosoc Directive and in the DSM Directive, the issue of what the copyright protection was to cover was in focus. To put it simply, what precisely should be covered by the exclusivity?

An important development, via the Infosoc Directive, was the introduction of 'communication to the public' as part of the exclusive rights of the copyright holder. Here, it became clear that the decision to post something online requires the copyright holder's permission, an approach that now has been implemented in the Member States. The European Court of Justice has also had the opportunity to clarify how this is to be interpreted in specific situations.

Through the DSM Directive, rules have come about on platform liability, in the form of the much-debated Article 17 of the Directive. This Article was subject to considerable debate during the legislative process. It was even brought to the European Court of Justice, as the legality of the Article was questioned.[21] The Article withstood the test and has now been implemented in the Member States.

This is not the end of the discussion on the scope of copyright protection in a digital world. One issue that remains under debate is the construction of the actual protection, if this construction is still fit for purpose. Not the least has the last developments regarding use of AI sparked this debate.

Copyright protection does not cover underlying ideas, as described above. For software professionals, this becomes particularly apparent. What receives protection is the actual code, not the idea of solving a particular problem with a software. The protection does not cover the calculation model, but rather what has been written in the program.

[20] Directive 2019/790 of the European Parliament and of the Council of 17 April 2019 on the harmonisation of certain aspects of copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC. DSM stands for "Digital Single Market", a desire to reach a Digital Single Market information society.

[21] C-401/19

As a result, the copyright protection of software can often be circumvented. It is possible to develop software that works basically in the same way, as long as the programming is concretely designed in a different way. If there are complex systems, it can obviously require a significant effort to rework to circumvent copyright, but it is doable after all. The copyright protection thus serves primarily as a basis for licenses and against direct copying; the protection it offers does not provide anything broader than that.

3.3.3 The copyright holder

Copyright protection arises from the creation of a work. The original copyright holder is, in many jurisdictions, the one actually creating the work. In such jurisdictions, anyone who wants to use a protected work must reach some kind of agreement with the original copyright holder. For example, for those wanting to use a computer game, they must have a chain of agreements that stretches all the way back to those who sat at the keyboard when the game was created.

Many digital innovations consist of several copyrighted works. Games consist not only of computer programs, but also of visual creations, of music and of a 'storyline'. All of this is not usually done by one and the same person. As a result, therefore, copyright is actually spread out across a large number of people. This means that the company that wants to commercialise the innovation has to deal with a large number of copyright agreements.

Many digital innovations consist of creations by many; they are the result of co-creation. This leads to another issue, the question of whether or not there is a clear ownership. In some legislations, co-creation also leads automatically to co-ownership. In Article 2.2 of the Computer Program Directive, this is expressed as '… shall be owned jointly'.

If someone wants the rights to be handled in an easier way than negotiating with all co-creators every time, it is possible but requires some kind of action. Anyone who invests in digital innovations that are subject to copyright protection must ensure that structures of the copyright agreements are built in such a way as to allow the innovation to be used as intended.

When it comes to computer programs, in the EU there are rules on transfer of rights when the creator is employed. In the Computer Program Directive Article 2.3, it is stated that '… the employer exclusively shall be entitled to exercise all economic rights in the program so created, unless otherwise provided by contract'.

To a large extent, this makes the situation easier for computer programs – but only for computer programs. In many digital innovations the programs are essential, but they are not the only protected works.

Another problem is the implementation of Article 2 in the Member States. In Sweden, there is a teacher's exemption for patentable inventions. In practice, it is often interpreted as also covering other protected creations. Many consider that researchers at academic institutions also own the rights to computer programs that are developed

while they are employed at for example a university. However, when reading the Section 40a in the Swedish Copyright Act, that interpretation is not available. It is the academic institution that shall be entitled to exercise all economic rights according to how section 40a of the Swedish Copyright Act is written.

3.4 Digital innovations in trademark law

3.4.1 Protection of digital innovations

Trademark law is the intellectual property law that has progressed the furthest in EU harmonisation. It is also a type of intellectual property that, quite recently became the subject of a rather far-reaching modernisation.[22] One of the things that it entailed is connected with what can be protected under trademark law.

Prior to this, there was a requirement that the trademarks would need to be able to be reproduced graphically in order to be registered as such. One reason for this was that previously this was the only way to handle the registrations. With new technology, it has now become possible to register things other than those that can be set out on a piece of paper. As a result, many digital phenomena can therefore be registered as trademarks. These include, for example, holograms and moving images. For trademark law this was a significant revolution.

3.4.2 The exclusive right to a trademark

The exclusivity of trademark law has not undergone as much of a change as that of what can be protected. Fundamentally, the exclusive rights under trademark law have remained relatively stable, with developments in recent decades mainly taking place through rulings by the European Court of Justice.

There are, however, certain new challenges that may call for legal changes. One phenomenon that has emerged in recent years is brand bidding. Put simply, brand bidding is about paying to get higher rankings in search engine result lists, such as through AdWords. It is these results that customers then see most prominently.

However, the position of the European Court of Justice so far has been that the use of services in brand bidding has not been considered to harm the advertising function of the brand.[23] However, the question is whether this is fully equivalent to the type of behaviour that brand bidding entails. The Interflora case clarifies that the brand's investment function can be damaged by the use of AdWords.[24] So there is some kind of limit, not least when it comes to brands with a particularly strong reputation.

[22] The basis of the EU trade marks is Regulation (EU) 2017/1001 of the European Parliament and of the Council of 14 June 2017 on the European Union trade mark. In addition, there is a directive harmonising national rules. Directive (EU) 2015/2436 of the European Parliament and of the Council of 16 December 2015 on the designation of the laws of the Member States relating to trade marks.

[23] C-236/08-238/08 (joined cases) and C-323/09.

[24] C-323/09.

However, the European Court of Justice have – in rulings concerning Google and Louis Vuitton – given some kind of guidance in another direction.[25] The conclusions there was that Article 5 of the Trade Marks Directive and Article 9 of the Trade Marks Regulation are not applicable to search engines. The question is whether this would stand up even when assessing brand bidding in the form in which it now occurs; that is to say that the search engines are free of liability in trademark law. Further clarification is needed here.

Another challenge for trademark law is the relationship with domain names. For digital innovations, the trademarks and domain names can be absolutely crucial. This is in part because they are the basis for building a relationship with customers and also because they are the basis for all communication. Domain names are governed by a completely different set of regulations than trademark law. To some extent, it can be said that those who have a trademark have better chance to also get the right to domain names, when the registration of a domain name is done in bad faith.

The problem with trademarks in relation to domain names is that trademarks can be the same in a completely different manner to a domain name. For example, there is Ariel the detergent and Ariel the Disney princess. Which should be entitled to the respective domain name?

An increased use of 3D printing can also pose challenges for trademark law. There are many three-dimensional trademarks, in the form of design, that are subject to trademark protection. As with patents, the private use of trademarks cannot be prevented.

What can pose a challenge may in the long run be what happens with the object that someone has printed at home. Traditionally, when a trademark holder manufactures a product and then sells it, the trademark rights themselves are consumed for that item. The product can therefore be sold second-hand, something which is important in a circular economy.

The basis for consumption under trademark law is that the product is released on the market with the permission of the trademark holder. When it comes to items that consumers themselves print with 3D printers, normally this has not been the case, meaning that such goods may not be resold.

The motives for this are simple to understand. The trademark holder does not have the opportunity to check the product and see that it corresponds to what the trademark holder strives for in terms of, for example, quality. Trademark law also has an important function for warranties. Every consumer who buys an item with a certain brand on it should know that the product corresponds to what the trademark owner says he wants to release on the market.

[25] C-236/08-238/08 (joined cases).

However, in the long run, this may have the effect of making a circular economy more difficult. Goods in this case will not be able to be subject to resale in several stages along a value chain. Is it reasonable to stop circularity due to use of domestic 3 D-printers?

3.5 Digital innovations in design law

3.5.1 Protection of digital innovations

Compared to many other intellectual property rights, design protection has been harmonised relatively late. In fact, harmonisation has still not reached the same levels as exists, for example, for patents or copyright.[26] The legal protection for design is mainly obtained through registration and covers the visual appearance.

By the turn of the millennium, harmonised rules on design protection were introduced at EU level, in the form of both a Community Design Regulation and Directives for harmonising national legislation.[27] Design protection is currently under review in the EU, as part of the European Commission's Intellectual Property Action Plan.[28]

With the protection of design being so fresh at EU level, a great deal of consideration for digital innovation was already taken into account when creating the harmonised rules. This means that design protection at EU level from the start covered aspects such as screen layout and fonts. This is an element of design that is important for digital innovations, which often have websites or apps as an interface with users.

From the time of the creation of the EU design protection, it was also made clear that holograms could be covered by this. This modernisation took another decade in trademark law. In all, this means that the design right works well for digital innovations in many ways.

3.5.2 The exclusivity in the design protection

The design protection granted is, to a large extent, similar to the exclusive rights granted for patents. This means that the protection aims to cover professional use (see Article 19 in the proposed Design Regulation). The exclusivity covers aspects such as manufacturing, selling and marketing what is protected.

The consequence of this is that private individuals are free to produce things that are covered by design law protection themselves. This means that those who print something at home using a 3D printer are not infringing on the protected design.

[26] Design protection is covered by the Paris Convention, but the rules are so openly written that they do not constitute a stable ground for harmonisation. Currently, there is a discussion on international rules on design protection at WIPO.

[27] Council Regulation (EC) No 6/2002 of 12 December 2001 on Community designs and Directive 98/EC of the European Parliament and of the Council71/EC of 13 October 1998 on the protection of designs.

[28] https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/intellectual-property-action-plan-implementation_en

If and when private persons are able to print 3D objects in greater quantities, this may overturn entire industries. 3D objects are becoming binary code, and it may affect industries in a similar way to how it impacted the music industry, which changed out of all recognition when music became digital.

In the proposal for a new EU Regulation, the European Commission has proposed changes to Article 19 in order to tackle these challenges. The proposed Article 19.2 (d) states that the protection also shall cover: 'creating, downloading, copying and sharing or distributing to others any medium or software recording the design for the purpose of enabling a product referred to in point (a) to be made'.

This proposal has not as yet become reality, but it does not seem to aim at the disruptive power that may arise when even 3D objects are converted into binary code.

3.6 Digital innovations as business secrets

3.6.1 Protection of digital innovations as business secrets

If design protection was harmonised late, this was even more the case when it comes to the protection of business secrets. The protection of business secrets has been partly, but not fully, harmonised within the EU.[29] The relevant Directive came about as late as 2016, and was to be implemented in the Member States by 2018.

The other protections mentioned in this report are exclusive rights. The protection for business secrets does not provide an exclusive right. The protection only covers responsibilities for unlawful acquisition, use and disclosure of trade secrets.

Trade secrets fulfil several important functions relating to digital innovations. One is that the protection of trade secrets is important when it comes to those innovations that will ultimately be patented. The patent protection has a strict novelty requirement, which means that the information must not have become known before the date of the patent application.

Another important feature of trade secrets is that they are often the glue that holds complex innovations together. Trade secrets can consist not only of just technical information, but also commercial and administrative information. Such information can be crucial to making digital innovations work and – not least – to getting them to market.

In order for information to be covered by the protection of trade secrets, it must be identified and kept secret. It must also have a commercial value, because it is secret (see Article 2 1 of the Directive on trade secrets).

[29] Directive 2016/943/EU of the European Parliament and of the Council of 8 June 2016, on protection against non-disclosed know-how and business information (trade secrets) are unlawfully acquired, exploited and disclosed. What is not covered by the Directive includes the criminal liability contained in sections 26 and 27 of the Swedish Trade Secrets Act.

3.6.2 The undermining of the protection for trade secrets

The protection of trade secrets contained in the EU Directive and in the Member States has its shortcomings. One such problem is that the Directive does not address several important issues such as whether the 'information' described in Article 2.1 also includes 'data' and whether all kinds of information are covered by the same protection.

By far the biggest problem currently, however, is that there are several proposals for new pieces of legislation that will undermine the protection of trade secrets.

It is mainly at EU level that this type of proposal is in place. One such proposal is that of a new Data Act.[30] This would make it more difficult for companies to use the protection of trade secrets for key knowledge-based assets.

Other proposals that risk reducing the possibility of protecting trade secrets are those on digital product passports and for regulation on AI. In particular, the proposal for the EU rules on AI could completely undermine the ability to protect information on digital innovations, including trade secrets.

It is a major problem that while the protection of trade secrets is becoming increasingly important due to increased digital innovations, the legislator seems determined to rather act on several fronts to undermine their protection.

3.7 What the legislator has done

The legislators, both at EU and national level, have taken steps to update the law to the new digital reality. This is evident when looking at different pieces of legislation mentioned above in this report. The fact that it is now possible to protect holograms as trademarks, and that there now are rules on platforms in copyright legislation, are examples of an active legislator.

In some areas, such as patent law, there is still the need for reform. So far, however, this has not been in focus for the legislator. In part this is due to the structure of the legislation, which makes reforms difficult, something that is elaborated on later in this report.

When the legislator is approaching issues on new technology, it seems as if there are difficulties in putting the legislation into context. It seems rather that the legislator is trying to solve the problems that may arise in theory, rather than those that will actually arise in connection with digital innovations taking an increasing place in the economy.

In several areas, the importance of legislation being technology neutral is highlighted. In many ways, in fact, the basics of intellectual property have stood the test of time through technology shifts. However, specific rules for certain aspects of technology

[30] https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3491

are becoming increasingly common. The consequence is that the fundamental structures of intellectual property are not as stable they were previously.

One example is the protection of computer programs under copyright law. The choice to use copyright law as the main vehicle for protection of computer programs was done at international level. At the time, it seemed a simple solution.

However, computer programs are not the same as many other works. The creation of a computer program does not have the same objective as, for example, a sculpture. The commercial use of a computer program is not the same as for poetry. The entire structure of copyright legislation in the EU does not function effectively when it comes to computer programs.

This is most evident when it comes to the handling of employers' rights in the Computer Program Directive[31], where the employer obtains the copyright in a totally different way compared to, for example, texts written by journalists.

Another example of digital phenomenon and non-technology neutral procedures in copyright law are the new rules on liability for platforms; Article 17 in the DSM Directive.[32] Indeed, the rules on platform liability are far from technology neutral. The implementation of them in several Member States has led to even more non-technology neutral solutions. It is also evident that 27 different implementations of rules on a phenomenon such as platforms – which do not need to be hindered by national borders – is not the best possible approach.

3.8 Necessary reforms

3.8.1 Layers of different rules make reforms more difficult

There are certain complications to be considered when it comes to modernising intellectual property laws. One example is that legislation consists of several layers of rules. One layer is the international conventions, such as the Paris and Berne Conventions. Both of these conventions have around 180 signatory states all around the world. Many of the major conventions are managed by the World Intellectual Property Organization (WIPO), which is a UN body.

Added to this is the TRIPS agreement, which is part of free trade in the world.[33] The countries that become part of the World Trade Organization (WTO) undertake to adopt rules on intellectual property that fulfil certain demands. There are currently 164 countries that are part of the WTO.

[31] 2009/24/EC is the latest version of the directive.

[32] 2019/790.

[33] TRIPS stands for Trade-Related aspects of Intellectual Property rights.

Both WIPO and the WTO have had problems for decades in developing new legislation. One obstacle is that much of their efforts get stuck in international politics with intransigent positions. This is compounded by the fact that, over the last few years, increasing numbers of countries are adopting protectionist positions. One consequence of this is that it is difficult to achieve legal changes at international level.

Unfortunately, these difficulties are also found at European level. In the field of patents, much in Europe is governed by the European Patent Convention, EPC, which lays the foundation for European patent cooperation via the European Patent Office, the EPO. This cooperation includes 39 countries. The EPO has, on different occasions, demonstrated that it is not an EU institution.

The consequences of this are that the EU finds it difficult to act in the field of patents. One area where this has been seen to fail is in the case of biotechnological inventions from 1998.[34] The relevant Directive has been implemented in the Member States, thereby harmonising national legislation. However, the EPO has clearly indicated that they are independent of the EU and therefore not bound by the Directive. One example of this is has been by interpreting patentability in the area of biotechnological inventions differently than what has been communicated by the European Commission.

If the EU were to act on the patentability of digital innovations, there is a great risk that the situation will be the same. The EU does not have decision-making power over how the EPC develops. If the field of patents is to be developed, it needs to be done via channels other than EU law.

The situation is basically just as complex in the field of copyright. The harmonisation of copyright has been achieved through some 15 Directives and two Regulations. This means that harmonisation is not comprehensive, only covering certain specific parts of copyright legislation. This poses challenges, particularly when new types of digital innovations come about. It can often be difficult to even know whether the issue should be resolved with by the EU or by national rules.

3.8.2 Need for consistency

When there was talk of the ‘information superhighway’ in the 1990s, one of the things that was emphasised was that the internet made national borders less important. What can be handled digitally can also easily be transported across national borders. Since then, we have seen that quite a few countries seek to block certain aspects of internet use, but fundamentally, digital innovations can be managed internationally at the same time. They provide an opportunity for companies that are ‘born global’.

At the same time, intellectual property is based on a principle of territoriality. Legislation is bound to a certain geographical area, such as the EU or the various Member States, depending on whether the specific field is harmonised or not.

[34] Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions.

This creates a great need to ensure uniformity in the legal regulation of the knowledge-based assets in relation to digital innovations. Differences between rules in the various countries can create obstacles for innovation, which in itself affects competitiveness. Different rules in different countries also lead to higher transaction costs for any company that wants to operate in multiple markets. What is allowed in one country may be prohibited in another.

This hits small countries particularly hard. Companies that have a large home market can grow strong there before they have to take on the costs of growing into new markets. Companies that seek to be 'born global' can often be blocked from doing so, because it becomes too costly to investigate if there are any legal concerns in different countries. Currently, we even have a situation where Swedish companies that seek to enter the Finnish market cannot do so without having to conduct legal analysis or investigations. They also cannot use the same agreements (and contract templates) in Finland as they do in Sweden.

Digital technologies could promote digital innovations. Instead, however, we have rules and structures that clip the wings of the power of innovation.

4. Digital innovation processes and intellectual property

4.1 The importance of innovation processes

Innovation processes are often complex. In contexts where innovation policy is being discussed, a fairly linear innovation process is often depicted. Such discussions are often centred around a scale of Technology Readiness Levels.[35] The discussions are also often based on a view that if collaboration is to take place, it will be between a limited number of actors.

In reality, however, innovation processes nowadays are often more circular than linear, and where launches take place at almost the prototype stage. The innovation processes can also often be open, where several actors are able to enter and leave the process at different stages.[36]

From a policy perspective, the basis for decision making is however seldom linked to the practical reality. When policymakers are discussing innovation, it seems as if they consider a linear process, that has the same actors in the beginning and the end. Ideally, from a policy perspective, someone also controls the entire process.

The gap between the perspectives of the policymakers and the innovators causes problems It is also the case that more circular and open innovation processes can create intellectual property challenges, not least in Swedish law.[37]

4.2 Digital innovation processes

There are several different ways of defining digital innovation processes. In this report, the focus is primarily on circumstances where digital tools have independently contributed to the results of the innovation process. For example, AI can be used in various ways to create things that could normally be covered by intellectual property protection.

[35] https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level The notion "technology readiness levels" was originated at NASA.

[36] See, for example, this thesis on using design as a process: HYPERLINK "https://gupea.ub.gu.se/handle/2077/33428"https://gupea.ub.gu.se/handle/2077/33428

[37] This is due, among other things, to what the co-ownership rules for intellectual property rights look like in Sweden.

There are those who may object that AI will not be able to create things for many years to come, AI as an originator is something that we are unlikely to see for some time. Despite this, however, there are that are already in use today where AI makes the kind of decisions that an engineer or a journalist would normally make. There are even those who believe that, in the future, AI will be able to be used extensively for parts of innovation processes. Some even believe that skills issues concerning engineers should be viewed in a new light. With an increasing use of AI for innovation, we are unlikely to need as many engineers as now.

When it comes to digital innovation processes, it is important to distinguish between two distinct categories.[38] One is when the entire innovation is created by AI; the second is where AI has been used as part of the innovation process while the other aspects have been developed by humans. These are commonly referred to as AI-assisted inventions.

From this perspective, the function of AI can be considered as having a structure as follows[39]:

1. Input
2. Learning algorithm
3. Trained algorithm
4. Output

It is normally people who are involved in providing input and in creating the algorithms for AI systems to start learning. However, the training can become increasingly independent, which in turn can then lead to independent output.

The reason why digital innovation processes pose a challenge for intellectual property is that many of the intellectual property rights work on the basis that it is a human being who has been behind the creation. Primarily, this applies to both patent and copyright law. In order for a patent to be granted or for copyright protection to arise, what is protected must have been created by a human being.

Historically, this basically excluded animals as holders of copyright protection and had thus been a rather peripheral issue. However, with the emergence of continuously improving AI solutions, this challenge is becoming a reality.

[38] See WIPO's third dialogue meeting on AI and intellectual property on 5 November 2020. This approach to the issues was also addressed in the report Trends and Developments in Artificial Intelligence – Challenges to the Intellectual Property Rights Framework – Final Report from the European Commission 2020.

[39] See Axhamn, Copyright and Artificial Intelligence – with a focus on the area of music, Festskrift til Jørgen Blomqvist.

4.3 The challenges of digital innovation processes

4.3.1 Patent law

In order for an invention to be patented, it is required that it has been created by one or more physical individuals. This means that if there a situation where items have been entirely created by AI, patent protection is not available.

There are already some practices in this area. The greatest attention has been given to the DABUS ruling from the EPO's enlarged Board of Appeal.[40] In that, an AI solution had been listed as the inventor, so there was no natural person named as being involved in the invention.

There are also those who believe that there is a long way to go before AI alone can truly create inventions that meet the requirements for patent protection.[41] Even if patent applications have been filed, this does not mean that there is enough advanced AI to independently take an innovation process from start to finish.

The situation is different when it comes to situations where AI has been used in some part of the innovation process; AI-assisted inventions. One way to look at this is to view AI as simply a tool like any other. It goes without saying that various tools can be used in the innovation process without detracting from the fact that these are inventions made by humans.[42]

However, with the decision from the EPO in the DABUS case, it may need to be clarified who made the crucial decisions that made the invention reach the inventive step. If the decisions that form the basis for the leap in technology have been made by an AI, should patents be out of the question.

What remains unclear where the different boundaries lie. To what extent can AI be used in the innovation process? In which parts must AI have – or have not – been used?

On these issues, the legal position remains unclear. As far as Europe is concerned, it is mainly the EPO's practices in this area that will have an impact. Traditionally, its attitude has often been relatively conservative, which makes legal progress proceed with 'baby steps'.

For those companies already working on the front lines of what is possible with AI, this legal uncertainty is unfortunate. In order to decide to make specific investments, uncertainty over which rights may exist can play an important role. Intellectual property rights can be central to ensuring a return on that type of investment. If such protection cannot be obtained, the investment may not happen.

[40] J 8/20.

[41] See the discussion in Artificial intelligence & intellectual property – a thought paper from the Swedish Patent and Registration Offices, p. 6-7.

[42] See the discussion in the aforementioned report from Swedish Patent and Registration Office.

4.3.2 Copyright

In the field of copyright, things that are created by AI – or are otherwise machine generated – are becoming increasingly common. The previous year, text generation has been under discussion, centring around the topic that students can use it to cheat on exams. It also occurs in the form of images, where AI will create images based on instructions given. AI- generated music has been around for years; there are any number of videos on YouTube that use AI-created music.

Copyright protection came about to in order protect intellectual achievement. The copyrighted works are even considered the author's children, as they are born from the author's intellect. Copyright, therefore, also has a given role as a human right, for example in Article 27 of the UN Declaration of Human Rights. The requirement that it must be a human being who is behind the creation of the work is completely in line with this.

When it comes to entities created entirely by AI, copyright protection is considered out of the question in many countries. In order for protection to exist, the decisive decisions in the design of the works must have been made by one or more individuals.

At the same time, this means that there is an opening to provide copyright protection where AI plays a part in the creation of a work but is not the only part. As with patents, it is difficult to say where the boundaries lie. Basically, the limit should be whether a person has been sufficiently involved in the creative process to give the work its originality.

As AI has become increasingly adept, decisions on where to draw the lines between what can and cannot benefit from protection can have a major impact. For example, say that AI is creating increasingly and increasingly better works in the form of music. This will probably not be to the detriment of the big artists. However, it may be to the disadvantage of those who work with forms of music such as jingles. Will such a copyright market even survive?

Another question is whether AI might be used to circumvent other people's copyright. Copyright protects actual expressions. As an example, copyright protection vis-à-vis a text can be used. The subject of copyright protection is not the content per se, nor the plot of the story. What benefits from protection is how the text is structured, the choice of words and use of style figures.

It is possible to imagine deploying AI to use information content or a theme, but making sufficient changes to fall outside the scope of protection. This is something that could be exploited by actors who do not wish to pay copyright compensation or otherwise take the measures required by copyright.

4.3.3 Other rights

The design protection also requires that is a human being who is behind the creation. As far as it has been possible to investigate, questions surrounding AI in the innovation process have not been discussed when it comes to design protection. However, these questions should arise here also. Not least, AI should be able to play a role in innovation

processes in something that can be covered under design protection. It is feasible that certain calculations on strength of a material can be undertaken using AI, while the purely aesthetic decisions are made by a human.

For trademark law, it is unimportant who created a trademark. This means that it is possible to get protection even for trademarks created entirely by AI.

When it comes to trade secrets, the situation is similar. There is no requirement in the legislation that the information that constitutes a trade secret should originate in an individual's creation. The information must be at hand, it must be kept secret and it must have a connection to the business activities. How the information has been obtained plays a subordinate role, subject to what is covered by Article 2 of the Trade Secrets Directive.

4.4 Necessary reforms

4.4.1 Layers of different rules make reforms more difficult

For companies that are at the digital forefront, there is a need for effective innovation processes. There are clear advantages in using AI in innovation processes in order to cut lead times. Innovation can require extensive resources, therefore any savings that can be made are important. Not least, it can be important that the length of the innovation process can be reduced.

Just as in the case of the description of digital innovations, the opportunity to make reforms to digital innovation processes is strongly affected by the fact that the rules around the knowledge-based assets exist in so many different layers. There are international conventions, trade agreements, EU rules and national legislation. Changing legislation at all these levels, if not virtually impossible, is extremely difficult.

4.4.2 Need for consistency

Legal uncertainty over how much AI can be used in innovation processes and still obtain protection is problematic. Since the results of the digital innovation processes could be intended to appeal to an international market, it is problematic that the rules differ and those that are in place are insufficiently clear.

However, this is not something that individual Member States – or even the EU for that matter – can solve. In a world where almost all companies are involved in, and reliant on, global value chains, harmonised rules are needed. This is also important for ensuring similar conditions for companies in different parts of the world. The EU should take a proactive role in achieving harmonised and modernised intellectual property rules.

5. Policy proposals

5.1 Run ahead?

Anyone who visits the Supreme Court of the United States sees a symbol in many places on the premises; a turtle. The symbol was selected to indicate that legislation should be developed slowly. Admittedly, both the legislature and others need to keep their ear to the ground if they are to maintain an up-to-date picture of the latest situation. However, this is not the same as the legislator being an early adopter and adjust legislation before the new technology has lead to for example market failure.

At the moment, the EU is working on developing legislation in several areas, but is doing so without yet being able to demonstrate market failures that require to be resolved through legislation. The legislature should not be seeking to solve problems that do not yet exist. Examples of where the EU-level legislator is trying to be a front runner are the Digital Markets Act, the Data Act and the AI Act.

The legislator is supposed to resolve problems. If the legislator tries to solve problems before they actually arise, the risk is that we will have legislation that is as relevant as that of a man walking in front of the car with a red flag.

5.2 Need for harmonisation

Country borders are one of the first things that digitalisation can erase. We have come a long way from the time where transport between different areas was complicated and when trade was something that would be made more difficult, at almost any cost.

However, the law can put up such barriers. Legal differences between different parts of the world can have major impacts. This can affect innovation and thus competitiveness, not least for those countries where the companies' home market is small. Sweden may have an important role to play within the EU in driving forward harmonisation efforts in the field of intellectual property. EU, meanwhile, can play that role on an international level.

5.3 Technology-neutrality

The legislator should pursue technology-neutral legislation as far as possible. Currently, the legislator has a tendency to accomplish the opposite, creating special legislation that is relevant only to certain types of technology.

5.4 Principles-based legislation

Legislation on innovation and innovation processes should be as principle-based as possible. Legislation should only be considered when there are market failures that cannot be addressed by existing legislation.

At EU level, for example, a great deal of legislation has been developed to deal with the reality that the digital economy has seen the emergence of some large players, not least in the form of platforms. Instead of relying on the competition law that already exists – which, among other things, prohibits abuse of a dominant position – fresh legislation has been developed.

The consequence of building a legal order out of special legislation is, among other things, that it will be increasingly difficult to keep pace with further developments. The legislation is in danger of quickly becoming obsolete. Principle-based legislation, as far as possible, is the preferable approach.

5.5 Doing nothing is not an option!

It may seem that the option of doing nothing is attractive one. Trying to develop new legal rules and practices around digital innovations and digital innovation processes is complicated. The problem, however, is that reality does not stand still; it is always moving forward. Legislators must ensure that the intangible infrastructure provided by the legislation works effectively for digital innovations as well as for horse-drawn carriages.

For Member States, the challenge is that much of the legal development in this area should take place at EU level, and that this should happen as soon as possible. The EU must take the initiative in, for example, harmonising copyright legislation within the EU, thus creating a single market in the field. The EU must also undertake initiatives to modernise patent legislation.

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