

# Legal Incentives and Constraints on Innovation: Keeping the Balance

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**Abstract:** The COVID-19 pandemic forced civil society and business to face a new reality where much greater reliance needed to be placed on networked devices and internet distributed communications, including the provision of services ranging from medical advice to food, entertainment and even the facility to interact with family. The ability to meet in-person with family, friends, colleagues, business associates or customers was severely restricted leaving internationalisation as a utopian dream as borders were closed, students were denied access to a physical classrooms and businesses had to rapidly “pivot” or fail. These alternatives to real life have seemed less appealing to many, with every aspect of life “going online”, whether virtual lectures, exams, meetings, mediations, court appearances, job interviews, shopping for a piece of cheese or starting a new trade relationship. Much innovation over the last two years has been around deploying online business models. There has also been a wider use of artificial intelligence to support “efficient” operations partly stimulated by the falling staffing levels due to the pandemic directly through sickness or forced isolations, or indirectly by a growing sense of the futility of working for a business, known as the Great Resignation (“Over the 12 months ending in January 2022, hires totalled 76.4 million and separations totalled 70.0 million...” indicating a huge refocusing on jobs in the USA) This paper looks at the challenge for legal systems to pivot around the growing trends in deployments of online innovation. Some businesses are now widely deploying software-based analysis systems, such as Airbnb, which is using them to “verify the identity and trustworthiness of a user of an online system” and flag potential guests who may be problematic. Although Airbnb is a multibillion-dollar business, it is a good example of how through using publicly available data, user supplied information, and smart software (artificial intelligence) a business can make predictions on the behaviour of its potential customers. Other AI resources have been creating new gaming scenarios, reporting on the news, and even creating new artworks and music. These kinds of use of AI in the marketplace have challenged the legal frameworks that support individual privacy and also ideas around human creativity.

**Keywords:** legal systems, online innovation, COVID-19, artificial intelligence, great resignation

## 1. Introduction

In March 2020 the world was turned upside down as COVID-19 spread around the world. Countries closed their borders and introduced what were sometimes draconian measures to counter the spread of the disease as the number of hospitalisations and deaths rose exponentially. Suddenly, the lexicon, even in non-English speaking countries included the word “lockdown”. Infected persons and their close contacts were suddenly confined to strict quarantine as were those international and in many cases interstate travellers who were actually allowed to travel. For instance, Australia closed itself off from the world for nearly two years. Mask mandates became the norm and once vaccines became readily available there were vaccine mandates.

The impact on the world economy was enormous (see Table 1). Businesses around the world were confronted with the impacts of the lockdowns, staff shortages and supply chain delays as the global economy contracted. Where possible staff worked from home and online shopping surged. Businesses had to refocus their operations to suit. Unfortunately, not all managed to tailor their operations to meet the new environment – some business failed but others flourished. Suddenly people became very active on social media and suddenly businesses, teachers, university lecturers and conference organisers were learning the intricacies of tools such as Zoom, Microsoft Teams and Skype as well as adapting YouTube from a social media tool to an essential business and learning tool.

**Table 1:** OECD, IMF and World Bank World-wide economic forecasts

Organization	Percentage Change in Real GDP Growth			
	2019	2020	2021	2022
OECD (Sep. 2021 Projections)		-3.4	5.7	4.5
IMF (Oct. 2021 Projections)		-3.1	5.1	4.9
World Bank (Jan. 2021 Projections)	2.3	-4.3	4.0	

Source: (Jackson et al, 2021, p 33)

The academic Andrew Klotz coined the phrase “the great resignation is coming” during the second year of the COVID-19 pandemic (February 2021) (Clark, 2022). Klotz considered that there were four possible reasons for

phenomenon: pent-up resignations from the first year of the pandemic; workers became burnt out; Terror Management Theory – the idea that people when are confronted with serious illness or death reflect on the meaning of life; and people who had worked from home saw the benefits of this lifestyle and wanted to keep their autonomy. In February 2022 4.4 million people left the workforce. This represented 2.9% of the working population and would clearly have a significant impact on the industries in which they work.

This led to the need for innovation at the local level as well as at the “high-tech” global level. At the same time the general populous was knowingly, but more often than not unknowingly, forgoing their privacy as they engaged on social media and provided personal data to online businesses large and small.

In the broader context it has been argued that “no matter its industry or current standing, an organization cannot expect to maintain a competitive edge if innovation is not part of the overall business strategy” (Purcell, 2019). This paper seeks to recognise, understand, and communicate the legal incentives and constraints on innovation, especially in the last two years of pandemic. It provides a helicopter view and indicates areas for further research.

## **2. Status quo – WIPO and the GII**

Intellectual Property (IP) frameworks are the laws and administrative bodies and arrangements used to implement intellectual property norms, which over the last century have seen growing global harmonisation under international treaties, conventions, and unilateral agreements. National IP processes deploy these frameworks within a country in the name of fostering innovation and creativity as well as achieving other policy goals, such as boosting a particular manufacturing sector. The IP institutions are an important part of a country’s innovation pipeline organisation, which partly determines national innovation competitiveness. There are significant differences in how internationally harmonised IP frameworks are implemented by country specific processes in different countries. Given the variances in outcomes in terms of innovation, it is considered that processes influence outcomes.

IP laws create a bundle of rights and duties through statute or common law, bestowing monopolies with defined limitations, over creations of the human intellect. The breadth of IP has been extended to include many forms of creativity, invention, design, commercial secrets and reputation, plant breeding, control of unfair competition, integrated circuits, and, it is sometimes claimed, even some datasets required for regulatory approvals. Each type of IP has legislative or common law frameworks that prescribe the prerequisites for rights, and their limitations. These rules are implemented through legislative and administrative processes, often involving legal and other expert advisors. There are many transactions and transaction costs involved, which affect the strategic and economic positions of the parties. The application of transaction costs concepts to law and policy reform is illustrated in (Martin and Shortle, 2010).

The coverage of IP and the duration of protection has increased over the decades. This is partly due to international free trade agreements, and global harmonisation of IP rights through the World Trade Organization (WTO) and the World Intellectual Property Organization (WIPO). This evolution particularly reflects the interests of countries with strong IP portfolios and powerful business systems, pursuing national and corporate interests. There is evidence that IP is sometimes used by powerful corporations to suppress competitors, but the extent to which IP is used in this way in Australia, and the impacts of IP based competitive tactics on Australian firms, is not known.

IP processes can be modified to improve the implementation of internationally compliant IP frameworks. Conventions, treaties, and free trade agreements require harmonisation of basic IP frameworks (Perry, 2018), but there are jurisdictional variations (Wan and Perry, 2019). The variations to the innovation process of countries involve IP transaction costs and administrative processes, process impediments to collaboration, and can target support to fields of national advantage. In particular, SMEs find it especially hard to maximise the benefits of IP and can encounter barriers put up by powerful incumbents (Wilkinson and Perry, 2005). For instance, Australia has been attempting improvements to its intellectual property legislation for decades, largely through multiple changes to the Patent Act (2020). The result of many amendments is a comparatively convoluted intellectual property regime, that does not appear to have delivered significant benefit (as indicated by innovation metrics).

### 3. Does the GII Reflect the Reality of Innovation

One of the perennial issues with the GII is that the data array varies year by year and the method of measuring indicators can change. For instance, in the GII for 2021 eleven of the 81 indicators were modified (World Intellectual Property Organization, 2021, p 176). Five indicators involved changed methodology, three indicators were added, two dropped and one indicator underwent a name change. Timeliness is also an issue. The data used in calculating the GII for 2021 included 30.0% from 2021, 41.4% from 2019, 17.5% from 2018, 5.9% from 2017, 1.2% from 2016 and a “small remainder” of 4.0% were from “earlier years” (p 176-177). The GII for included 63 quantitative/objective/hard data; 15 composite indicators/index data: and 3 survey/qualitative/subjective/soft data indicators. (p. 177). It should be further noted that year on year rankings depend on the actual performance of the economy; adjustments made to the GII framework, and the economies included or excluded in the sample (p. 177). Finally,

*A detailed economy study based on the GII database and the economy profile over time, coupled with analytical work on the ground, including that of innovation actors and decision-makers, yields the best results in terms of monitoring an economy's innovation performance, as well as in identifying possible avenues for improvement. (p. 178).*

Stavbunik and Pelucha (2019, pp 13-14) found that all seven indicators consistently correlated against some of the sub-pillars although in some cases the relationships were negative (p. 14). Concluding that higher innovation results in higher competitiveness of an economy as competitiveness is “a multi-faceted and complex phenomenon” (Jankowska et al, 2017, p 90). Redman (2020) opined that:

*Nevertheless, as imperfect as it is, measuring innovation and ranking it remains a preoccupation of administrations around the world . . . So, the issue is not if innovation is going to be measured but how it can be measured in a way that will be meaningful . . . (p 2499 & 2501).*

Even now in 2020, the opinion expressed by Gu (1999) seems prescient. developing nations have greatly differentiated institutional structures policy and measures from one system to another and cannot be simply moved from one jurisdiction to another (p 61). He argues that the National Innovation Strategy (NIS) approach is more appropriate (p 61) as it:

*advocates for a policy process which keeps the most basic principles, such as promoting knowledge inflows and enhanced learning, creating innovative dynamics, facilitating the development of knowledge networking. Detailed policy measures may be better made only based on intimate analysis of local situations in technology, institution, human capital, and other aspects. And as a process an initiated policy must be open to timely adjustment (p 61).*

When even the authors of GII 2021 are against simply use the Global Innovation Index as **the** measure of innovation why do countries still persist in using it exclusively to measure their innovation performance?

### 4. Innovation independent of IP

In recent years, particularly in Europe, increasing attention is being paid to managing IP competitive effects. Europe achieves greater innovation output with IP overall (World Intellectual Property Organization, 2021, p 21), whilst also implementing globally harmonised IP laws (Margoni, 2019). The performance differences in innovation output are due to many variables. The EU has focussed on three policy goals: “open innovation”, “open science”, and “open to the world” (European Commission Directorate-General for Research and Innovation, 2016), aiming to foster access to knowledge for advancement, and overcoming innovation barriers while retaining alignment with harmonised IP frameworks. It is premature to draw conclusions about the effectiveness of the EU approach (Margoni et al, 2016, Guibault and Margoni, 2015, Guibault, 2020).

A recent study by Ji et al (2020) explored open innovation from the perspective of patent citations, focussing on the driver assistance system (DAS) as the research case (p 5). They noted that “the storm of digitization and intellectualization in recent years has forced them to cope with the dual dilemmas caused by innovation and cost” (p. 5). On the other hand, Information and Communications Technology (ICT) companies have entered into the research and development field of driver assistance systems. They found that flow of knowledge that “exists between different types of firms significantly facilitates the [Open Innovation] network” (p 9). They also found that the formation of open innovation networks was improved by the geographic proximities of firms and the number of employees. Their research confirmed that “small firms are more active in OI strategies, as they hope

to rapidly increase their capabilities and quickly bridge funding gaps by marketing their technologies, while the flexible organizational structure within them also indirectly promotes the above behaviour”.

The efficacy of open access publishing continues to draw criticism, especially following the early publications of Jeffrey Beall and his controversial “Beall’s List” which at times conflated “open access” with “predatory” (Krawczyk and Kulczyk, 2021) (p. 1). The criticisms of the Open Access movement often use Beall’s lists and his paradigm for a predatory journal as well as his bias against the Open Access model (p 9). Kumar et al (2022) argue that open access publications are at risk of predatory publications in the internet era and argue for a universally accepted definition of a predatory journal (90). In response to their article, Papanikos (2022) argues that the whole discussion around predatory journals is specious and that the only test that should be that a journal is “demanded” ie “academics read it and researchers submit papers to be considered for publication”.

Collective intelligence of open access journals has been found to create more open innovation than closed access journals (Yun et al, 2022). It increased in response to the digital transformation, with the “increased moderating effects of references on the correlation between collective intelligence and open innovation and the increased references from digital transformation with the growth of Open Access, which created greater open innovation (p 2574-16).

## **5. Impact of COVID-19 on innovation**

The pandemic saw the development of innovative contact tracing applications. Some apps were a success and others were essentially failures (Rowe, 2020) (p. 1). The use of QR codes were widely adopted. Rowe considered that there were three critical conditions for such an *app* to be effective in identifying infected individuals:

- Correct information qualifying individuals as infected and contagious requires that population be tested and that tests are not error-prone,
- High likelihood that when a contagious person meets or crosses another person an infected person both parties have a smartphone,
- A very high proportion of smartphone users download the app (Rowe, 2020) (p. 2).

He considered it would be very likely that all of these conditions would be met. Further he noted the inherent dilemma that “[W]hile privacy is a fundamental human right, freedom to move and safety are also fundamental” (Rowe, 2020, p 2). Again, there is another dilemma who or what should be protected. For instance, contact tracing may have the greatest benefit in protecting health workers and the more vulnerable members of the population. Privacy is a major issue and Rowe pointed out that those apps which used Bluetooth technology were subjecting the user to major privacy issues as Bluetooth is “notoriously fraught with data breaches”. Further the haste with which apps were developed often resulted in technological solutions “that runs completely against all socio-technical lessons from IS and other sociotechnical disciplines” (p 4). Fahey and Hino (2020) summed up the situation fairly succinctly and therefore has been quoted in full:

*“The experience of health authorities seeking to rapidly develop and implement digital contact tracing applications in countries around the world should serve as a sobering case study for researchers whose work relies on gathering large amounts of information about individuals – both in public health and across many other fields. The wide divergence of different approaches has revealed a complex set of overlapping national and regional factors related to priorities in research data collection, strength of privacy protection both in law and in common perception, depth of public trust in various institutions, and the ability of national authorities to resist or avoid the path-dependency imposed by the dominance across many fields of a small number of technology companies” (p. 102181-4).*

As developing countries, in general, were impacted more severely by the COVID-19 pandemic the report prepared by Ramalingam (2020) on innovation, development and COVID-19 is enlightening. He used the OECD Observatory of Public Sector Innovation (OPSI) to assess the innovation (pp. 6-7):

- Mission-driven innovation – this includes development of COVID-19 vaccines and arrangements for their equitable distribution;
- Enhancement-oriented improvements – “tracking, tracing quarantining and shielding vulnerable groups builds on lessons learned from previous epidemic responses, with adjustments made for the specific epidemiology of COVID-19”;

- Adaptive innovations – original, simple and locally generated ideas; and
- Anticipatory – governments are trying to rethink the possible landscape of the post-pandemic world.

Hamer and Goldstone (2020) from PricewaterhouseCoopers Australia opined that, as many companies have adopted the “work from home” following its success during COVID-19:

- “The pandemic-induced economic downturn may not necessarily be stifling innovation, but a lack of water cooler talk, and casual communication could”; and
- “Organisations need to find a way to decrease the amount of time spent in structured meetings and increase opportunities for people to be creative.”

## **6. Impact of deployment of AI on innovative aspirations of nations**

The adoption of AI technologies can have a significant impact in agriculture (Galaz, 2020). For this to happen in a responsible way, Galaz argues that the key players “must revise their simplistic assumptions about AI”. He argues that the idea that the benefits of AI will not automatically trickle down to those most in need. The cost of digitalisation of agriculture is likely to require a large investment, developed infrastructure such as internet access and user education. Finally, he argues that “[t]echnology giants, governments and civil society need to work with sustainability scientists to develop strong principles that guide the development of AI towards sustainability for all”. Algorithms already drive drip irrigation, top-soil monitoring monitors, weed-detecting rovers, self-driving tractors as well as combine harvesters (Tzachor, 2022). They are, however, subject to hacking, accidents, malfunctions, and programming errors. As a result, safety should be preferred over speed and AI design for agricultural use should utilise experts from different fields in the process. Rose et al, (2021) consider that responsible development must include those who might be affected by autonomous agricultural robots including manufacturers, regulators, and rural communities. Regulators should develop obligations of the operators of the robots, conditions of operation and responsibility for the safety of the workers and the public.

There is evidence that the AI algorithms are “notoriously prone to biases” (Douglas, 2019). AI researchers have focussed on the development algorithms that are procedurally fair due to the features of the algorithms themselves rather than the impact of their deployment. They propose that the developers focus on maximising the accuracy of the AI design with state regulator ensuring fairness with expert and democratic input. Such an approach has been successful in medicine where the medical practitioners promoting patient well-being whilst health funders and policymakers promoting fair allocation of resources across patients.

AI is being used increasingly in predictive policing around the world but “the apparent neutrality of the data is questionable” (Rowe, 2018). So:

*society needs to maintain a critical perspective on the use of AI on moral and ethical grounds. Not least because the details of the algorithms, data sources and the inherent assumptions on which they make calculations are often closely guarded secrets. Those secrets are in the hands of the specialist IT companies that develop them who want to maintain confidentiality for commercial reasons. The social, political and criminal justice inequalities likely to arise should make us question the potential of predictive policing (Rowe, 2018).*

The impact of the COVID-19 pandemic resulted in the use of Artificial Intelligence (AI) to “respond to the health crisis and mitigate its effect on many industries and society” (Coombs, 2020, p 2). He suggests that there are a number of arguments in favour the increased adoption rates of AI: namely changing consumer preferences, increasing familiarity with IA technologies and increasing business confidence in the technology. On the other hand, there are still a number of influences against: availability of big data and its reliability (GIGO), many tasks are still better done by humans, as AI technologies are still narrow in application and there is a high availability of human workers. Finally, he argues that “practitioners must keep in focus on the limitations of [AI]” (p 4). To ensure the best outcomes: “business leaders may need to consider new job redesign strategies that take into account role changes and new skill requirements for human workers to maximise the return from [AI] investments” (p 4).

(Drydakakis (in press) developed a 10-item scale to assess AI usage in Small and Medium Enterprises (SMEs) in London, England (no pagination). He analysed their AI roles in marketing, sales, communication, predictions, pricing and cash flow, fake reviews, cybersecurity, recruitment, and legal services. He found that the business risks caused by the COVID-19 pandemic declined with the use of AI applications. A literature review conducted

by Kumar and Kalse, (in press) concluded that adoption of AI can improve the conditions of SMEs especially after the pandemic. They found that adoption of AI will benefit SMEs in roles such as those investigate by (Drydak, in press) above. It “will also help in achieving sustainability because of less usage of physical resources, economies of scale in production, and transition towards technology” (Kumar and Kalse, in press). Eighteen semi-structured interviews were conducted by Baez and Igbekele (2021) to investigate challenges of AI adoption in Swedish SMEs (p 16). The research found that organisational change is a “fundamental challenge of AI adoption” (p 21). Another challenge is that “[a] previously failed project might demotivate others to initiate a similar project (p 22). Data was “seen as one of the biggest challenges “. The business problem must be identified first before adopting AI and not the other way around (p 23) and the development team must consist of more than AI specialists and include other specialties including the business owner or expert that understands the business issues and can “translate” them to the rest of the AI implementation team (p 24).

## **7. Discussion**

This paper has given a helicopter view of legal incentives and constraints on innovation, particularly during the current pandemic. The first issue that was raised was the impact of big business particularly the pressure that can be applied to negotiations in free trade agreements and at the World Trade Organization by the economically powerful economies to the detriment of their developing neighbours. Clearly, the developing economies would benefit from Open Intellectual Property frameworks, but will such a system be acceptable to the large economies such as the United States which have a strong IP enforcement culture?

Whilst the Global Innovation Index has been largely accepted as a measure of innovation there is enough evidence to suggest that countries need to delve into the data rather than just seek to improve their ranking. Focussing on areas to improve the ranking will not necessarily lead to a more innovative economy. What they must do is focus on their particular needs to develop a national innovation framework.

Open innovation is becoming more pervasive, particularly in the area of academic publications. Even some books are being published to join the plethora of Open Access journals which provide ready access to ideas. There are no doubt predatory journals but as suggested by Papanikos (2022) the best test is whether the journal articles are read, and researchers submit papers. Open access in the areas of patents is a much more fraught area and it is considered that many battles will be fought before it is a widespread phenomenon.

Innovation came to the fore during the COVID pandemic particularly in the response to the health emergency. It also led to the development of AI solutions, some which were a success and others that we an abject failure. Privacy was often poorly considered. The development of AI solutions requires a multi-skilled team and should not rely solely on IT professionals.

## **8. Conclusion**

A number of priority areas for further research have been identified in this study. These include:

- Countries take pride in their advancement in the GII ranking. Recent research has called the efficacy of the GII into question as countries strive to improve their ranking by focusing on key elements of the GII, rather than taking their own national view of what types of innovation should be focused upon for internal gains. In this case the research question would be *“Does the GII Reflect the Reality of Innovation within a jurisdiction?”*
- The drive for open innovation, particularly in Europe, has been studied but the possibility of transplanting such a system into developing countries is more problematic as much of the innovation is imported. This requires further investigation to see whether open innovation is possible where much of the innovation has been developed in a different jurisdiction.
- COVID-19 brought about many innovations at both the global and local levels. There is already a significant literature available on the impact of COVID-19 on many areas of life, including innovation. Not all of the innovations have been successful. This needs to be further investigated at both the enterprise and global level. At times it will focus on an industry and at other times may have more global implications.
- Although there have been rapid recent advances, artificial intelligence and its deployment on a broad scale is still very much a work in progress. The areas for legal and scientific research are open ended.

## Acknowledgements

This research is supported by an Australian Government Research Training Program (RTP) Scholarship to the first author.

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