A Platform-Expert System to support Business and Society with Compliance for Regulations on Climate Change, GDPR, ADPPA, CCPA, Product Safety, Health, and Supply Chain Transparency

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www.leennoordzij.me

dr.l.noordzij@leennoordzij.nl

Content

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1 Introduction

Recently (2019), The Economist (1) paid attention to business and global warming. Corporate executives remain blind to the physical threats their companies will experience.
The problem is lack of meaningful environmental regulations. Some examples with devastating results are reported. We are confronted with the tragedy of the forest fires in West Coast of the US (California up to Washington -2019 and 2020) and Australia. There are lessons to be learned (The Economist 10).
In addition, there are the effects of shocks in the supply chain. Shocks due to pandemics. Based on these data, the supply chain risks can be assessed using a vulnerability index created based on data.
One of the key issues raised is the obligation of companies to disclose their climate vulnerabilities. Guidelines or rules, voluntary for this are set up by the Finance Stability Board. The pros and cons of compliance with these rules are summarized in The Economist.
What is even more important: are other European regulations interfering with your web-based expert system?
So, other regulations and directives are becoming obligatory for business, like GDPR (General Data Protection Regulation). In the state of California, it is the similar CCPA (California Consumer Privacy act).
Consequently, be prepared to make your system up to date to take care of these new rules and regulations in your expert system.
The next step to be taken is to consider the worst that could happen? From the perfect electro-magnetic storm to the moment AI exceeds human intelligence (The Economist, 15).
Could a platform play a supporting role? I think so. An example is what I call a scenario study on pandemics initiated by the Obama Administration (Fallows). There, the pandemic with which we need to live now, came on the table. The Trump Administration neglected this study. By the way, this study is available in the public domain, online.
At the end of 2020, a flexible platform is extremely helpful to have an oversight of regulations and anticipated regulations to support business supply chains in the Brexit

process, The Economist (25).
So, this article is about the application of a platform. The subject matter is extending quickly. Platforms have an impact on trade flows of companies and countries. An emerging Platform can easily adjust to business demands due to small size.
A platform creates value by facilitating exchanges between two or more independent groups, usually consumers and producers, APPLICO, www.applicoinc.com .

2 A Platform

As mentioned, there are no meaningful global regulations for, i.e., *business and climate change.*
No regulations, no tools for business to cope with regulation, directives, and rules still behind the horizon. Nevertheless, this is changing rather quickly.
On national and local level there are already regulations at work, meaningful or not. Often very cumbersome. A platform or data base, what is in a name, can be helpful. Especially platforms designed for compliance with regulations and directives. For a brief survey on the database business see The Economist, 21.
Think of Oracle (e.g., relational databases), ProductIp (document-oriented databases), SAP (e.g., ERP). Document-oriented databases created to cope with EU product-related regulations offer off-line and on-line support to create, manage and share technical files. These files need to comply with EU product-related regulations. It is about compliance file management. These technical files are mandatory. EU legislation requires a company responsible for putting the product on the EU-market, the importer, or the owner of the product brand, to have a technical file and a declaration of conformity. The purpose of such a file is to prove the product complies with the essential requirements of the applicable directives (See also section 6).
These platform developers and operators should have knowledge of regulations related to the technological subject matter. Consequently, such a platform can be also a helpful instrument for product safety, food regulation, drone's operability, AV's safety, climate change guidelines/regulations and banks systemic importance (The Economist 8).
A platform for these compliance guidelines can be helpful for disclosure of vulnerabilities. As mentioned in the article on Corporate Climate Resilience (The Economist 2), nature has always disrupted business. In this article the issue of ignorance on corporate level is raised. The point is to come to grips with climate risks. Not so much with historical data. Since with climate change, data changes significantly. Historical data is not of much use. Again, there is a broad ignorance for climate risk. Insurance companies will create new policies.
To account for physical risks to corporate assets having any idea about the rules to comply with is of some help.
So it is not so much about installing solar panels on the roof tops of buildings. It starts with to establish under which climate condition the rooftop of a building is blown away.[1]

[1] Another recent problem with solar panels is lack of knowledge for installation. Consequently, these panels easily get fire. Complete buildings can burn down. A serious assurance problem.

It is also about the data of climate vulnerabilities, a database on climate models and how to interpret the results.
The flexibility of Platforms is mentioned. Considering Geopolitics, supply chains will change. It is not just about global supply chains but also about local supply chains. Obviously, a mixture of both. For that reason, it is important to anticipate these kind of changes when developing platforms(The Economist 31).

3 Some key issues to consider with climate change.

In The Economist (22), a special report on *Business and Climate Change*, attention is paid to:

- The Physical Impact
- Regulation
- Legal Risks
- Technological Change.
- Insurance

In this section I will summarize subjects for consideration related with carbon emissions.
A platform creates information about goals, facts and figures related with the results for decarbonization. Furthermore, information can be collected of coherent and measurable goals.
Business have also started to look at their vulnerabilities to climate change-partly because of pressure from activist investors. In The Economist (14) some examples are presented.
Extreme weather events present threats to businesses seeking investments (The Economist, 17). A platform is in this respect instrumental for Green Investing.

3.1 Construction and use of buildings.

- Wood for construction material, The Economist (3).
Construction material is regulated in most countries. When replacing concrete by wood, bio-based construction materials, a new set of regulations is needed.[2]
- High efficiency home appliances.
- Rooftop solar panels.
- Smart thermostats.
- Zero energy/zero carbon.
- Zero discharge of dangerous particles.
- Building structures to resist flames.
- No homes in forest fire prone places. Infernos are more likely.
- 3D Printing for building construction lowering the carbon footprint substantially.
Construction codes need to be adapted for this new technique. 3D-printing standards are being developed. A new area for platform developers and operators. UL(Underwriter

[2] Keep in mind, a lot of building codes already exists. So, to have a relational data base on building codes is not particularly redundant to say the least. As an example, in the US counties and municipalities are already dealing with some 100000 building codes.

Laboratories) is already active with the subject matter. Guidelines will be included in the new International Residential Code (The Economist, 33).

3.2 Automotive

- Emission regulation in the supply chain.
- Autonomous Vehicles' safety.
- Batteries life cycle.
- EV's noise.

3.3 Utilities

- Accounting rules for climate risk.
- Grid stability and grid integrity.
- Interstate clean electricity transportation: virtual power purchase agreements between companies and suppliers, The Economist (6).

3.4 Technologies

See The Economist (4).

- Hydrogen production, transmission, and storage.
- Hydrogen distribution in urban areas.
- Batteries.
- Burners for heating appliances.
- Electrical heat pumps.
- Steam methane reforming and ccs.
- Membranes.
- Fossil free steel.
- Recycling.
- Cement making.
- 3D Printing for construction of buildings.

3.5 Insurance Industry

The Economist(23,2006), discussed the subject matter in one of their surveys of climate change.

"…….*The insurance industry has a strong interest in the subject matter. In 2002 and 2005, the two most active hurricane years on record*[3]*, weather related losses amounted to $145 billion and $200 billion, respectively*."

3.6 ESG[4] and Climate-Related Disclosures.

In The Economist (30), the issue of climate reporting is discussed. It is about rules forcing firms to reveal how climate change effect their business.

Again, here a platform/database for rule-based assessments can be helpful.

The basic idea is the concern about the threat posed to companies due to climate change.

[3] 2020: the situation has worsened considerably.

[4] ESG: Environmental, Social and Governance

For this reason the Financial Stability Board(FSB) has set up a Task Force on Climate-Related Financial Disclosures(TCFD).

3.7 The Eu's Taxonomy and Green Labelling.

In the very beginning of 2022, the European Commission presented a proposal for classifying varies projects as green, i.e., gas and nuclear energy. Consequently, European firms have to report on the percentage of their turnover fits within the classification/taxonomy. So, this creates an opportunity for rule/data- and document-based platforms, The Economist(36).

4 GDPR, CCPA and a European Digital Strategy (i.e., AI) including Cyber Security.

Compliance costs for the average firm of GDPR are estimated to $2 million. Can an expert system or platform be of some help to reduce these costs? To be clear, this is not about breaking the rules. It is about respecting the rules (The Economist 9). So, you may consider the platform to be authoritarian prove.

As far as privacy directives are involved, platform developers should be aware of the possibility other countries(continents) may be develop their own privacy laws. The Economist (44) *:"America ……. may soon manage to pass a federal privacy law, the American Data Privacy and Protection Act*[5]*, which improves on GDPR."*

CCPA is even more stringent. Is this something to look after by platform companies like ProductIp? I think so. Since a step from complying with Product Safety to GDPR to CCPA is a small one. So, though most US companies do not do business in Europe, a ProductIp tool could be of significant help in the US.

According to The Economist (11), in Europe hardly any significant platform exists. However, it is a huge market *"which no tech titan can ignore."* So, this explains the title of the article in the Business section: *The Brussels effect, continued*. American tech titans (Alphabet, Facebook, Microsoft), distributing their products around the world, are not considering offering different services outside Europe. That is the reason GDPR is becoming a global standard. An opportunity for a European platform to become a significant platform for regulations like ProductIp. Important for large corporations and SME's alike even not located within the EU.

There is more being summarized in The Economist (11) such as digital strategy (AI, Mitchell). Part of a digital strategy is close cooperation between governments and business where the subject matter is cybersecurity. A platform where government bodies and private firms can share information about threats (The Economist, 14). That is really a big deal. Addressing digital insecurity would also entrail providing better regulation up and down the technical stack in such a way that negative externalities become instead internal issues to be addressed by the companies. Then, we may expect the companies to be responsible for solving the problems. Look at what happened recently in the US with respect to the gasoline pipeline (Tufekci). To cite: *If the pandemic has taught us anything, it is that we cannot ignore*

[5] ADPPA: American Data Privacy and Protection Act.

the warning signs for future catastrophes. It is not just cybersecurity[6]. The subject matter is much broader and complex due to connectivity and network effects. A lot of attention is needed to consider interfaces.
With GDPR comes Data Security and related rules and laws. A critical issue to deal with when developing and operating a platform.
Now caveat developer, you set foot on thin ice. Or better, the terra incognita of the political arena. Since GDPR is about protecting the consumer. What about Data Security? What is going on is about lawmakers and law enforcement involved in a possible detrimental way. Since some political systems, no need to mention any, want to be their data security laws and rules as vague and/or opaque as possible. When you think you are operating your platform within the framework of laws and rules, try to find out whether these laws are poly interpretable. Then, consequently, having created a framework for your platform based on data security regulations and laws, you suddenly find yourself in a cul de sac: your platform can be used against you. Hence, starting to develop or extend your platform on laws and regulations pay a lot of attention to the clarity/nonvagueness of those laws and regulations.

The *Brussels effect* and AI is dealt with in the Europe section of The Economist(32). There, the regulation on AI by the European Union is dealt with. It is about to mitigate the potential harm of AI and to maximise its opportunities. According to The Economist, the EU 'rules are meant to focus on the riskiest applications. A name for the directive or rule book could be "Artificial Intelligence Act"(AIA). Still in statu nascendi , platform developers need to be aware of this situation and think of their business opportunities.
GDPR means work in progress. Think of the conflicting interests of privacy and transparency related with tax evasion information via data swapping. These conflicts are summarized in The Economist (19).
It is to be expected, testing of algorithm becomes more and more important to be compared with testing of medicines. Think for example transparency of algorithms developed for AI. New rules and directives are to be expected.
It is not just about AI-directive(s). It is also to make a platform more efficient and effective. Think of the possibilities of, a.o., ChatGPT(www.chat.openai.com). A major improvement over ChatGTP3 due to the order of magnitude larger number of parameters. With these type of tools relations between directives can easily be optimized, The Economist 41,42.

5 Health Care and Pandemics

Anno 2020, covid-19, it could be described as expedient to have a system available for information on pandemics. Or start to build a system as soon as possible where pharmaceutical industry, hospitals and medical specialist can share information to deal with a world-wide virus-storm. A platform or expert system could be extremely helpful indeed. A consumer version of such a system in relation with consumer organisations could be created

[6] Cybersecurity is still more in the spotlight due to the geopolitical situation to put it mildly(March 2022). Cyberwar, one of the growing number of geopolitical risks government and business face.
The cloud also ask for cybersecurity. May the cloud needs us to redesign cybersecurity.

too. In this way a reputation of being trustworthy can be built by the Tech. Industry (The Economist 12). Is your platform really corona virus proof? It might be expected lock downs due to a virus storm are pushing firms to move more functions online. A cloud-based service will be looked for by corporations.
A platform for medical equipment like (surgical) masks, respirator devices, hand gel, sanitizing wipes. Knowledge of these tools and how these tools are used is necessary. Then, the relevance of standards and procedures are appreciated. In this way, the health care market can be provided with compliant products. Really a matter of life and death for health care workers. Products necessary for companies when the lock down comes to an end should be evaluated in what way these products are supplied to the market.
Product safety got a special meaning considering the so-called offers made for fake masks: business without rules and a quality warranty.
May-June 2020, lockdowns step by step lifted, a market for self-tests is growing. Consequently, consumers are looking for affordable testing systems, easy to use and an important level of accuracy. So, compliance with directives and rules ask for alertness.
Looking back, (The Economist 16), in February a panel of experts of WHO put a list together of disease that posed risks, but for which were few or no countermeasures. This list included "Disease X." End 2019 Disease X turned up.
Platform developers and operators should keep an eye on the business of medicine. Think of the possibilities of artificial intelligence, digital diagnostics, and telehealth. Creative destruction of the incumbents operating in the supply chain of highly regulated health systems can be expected. This supply chain will be disrupted by firms that target patients/clients directly, The Economist(37).
Be not surprised when this gets some critical mass, regulations are around the corner.
There is another issue for platform developers and operators to deal with. Related with the pandemic comes the wish of platform users to move, e.g., ERP to the cloud. In addition, the effect of the pandemic is the need for knowledge about supply chains. Well, the platform can play a role there. Caveat geopolitics and supply chains. See for a brief note chapter 13.
Above, in this chapter, I mentioned the tech industry or sometimes called the tech giants. The dawn of novel issues. Think about, i.e., Google-Health or the Googlization of health care. The European Commission is working on a model for cooperation between the healthcare organisations and. the tech giants. Hence, a policy is needed. With a policy at hand directives are needed. However, first and for all attention should been paid to the (national) healthcare organization to make a platform for compliance with the directives meaningful.
National health care in Europe can be considered to a patchwork of rather be inefficient organisations. So, be sure, before starting to implement a platform, attention is paid to the subject matter by the national governments constituting the European Union.
Additional problems are ,i.e., who owns the data, what about privacy?

6 Product Safety and Compliance

Product compliance with directives and regulations, asks for knowledge how to deal with lots of documents. It is about registration, surveillance, and enforcement.
Well, with a platform one location is available for all these documents. Documents comprising testing reports, certificates, and Bills of Materials.
Importers, brand owners, retailers need to deal with product conformity and compliance.
As an example, for new electrical products appearing on the European market, EU legislation requires a company bringing these products on the EU-market, to have a technical file and a declaration of conformity. In this way the importer proves the product to comply with the essential requirements of the applicable directives. Technical files need to be available for 10 years.
In the European Union market surveillance authorities supervise the safety and quality of products and services in the market. These authorities identify non-compliant products in the market. They are the bodies requiring a technical file to be submitted to them to verify why problems occur with products. They then assess the necessity to stop sales or recall products from the market.
Non-existent, incomplete, or outdated files may thus result in expensive product recalls. This will impose substantial costs on the manufacturer or importer. Several cases are known where massive recalls amounted up to € 5.000.000.
With non-compliant products, there is a fundamental problem in establishing the difficulties in case of insufficient information about the product. Information which could have been available with an accessible technical file in the database.
In the supply chain, suppliers and clients exchange technical documentation as part of the commercial documentation process. Collecting, compiling, and transmitting such information is burdensome and lengthy process taking away attention and resources from the key role of retail and trading companies: buying and selling. Hence the need for a platform to support the exchange of technical documentation.
Directives are laws in the European Union. Product requirements under the European directives should be harmonized. This is not always the case, creating confusion among industries. A platform on compliance can also be effective in this case. The meaning of a CE-mark in relation with the European directives and regulations should be made crystal clear.
So, with a web-based expert system or platform off-line and on-line support is available to create, manage and share the appropriate technical files. Collecting, compiling, and transmitting this information is a burdensome process. With a structured compliance document-exchange-platform with 24/7 access, a web-based expert system provides businesses with relevant technical and regulatory information.
Such a platform is a combination of an independent compliance platform and a distribution facility for technical and regulatory information. Obviously, such a platform is a management tool for the user.
This creates the possibility to show in a cost-effective way, products, and services to comply with the essential directives and rules.

It is about product safety. All products are equal in terms of safety. Some are more equal, e.g., medicines.
These databases comprises a lot of data. Systematically ordering the data, datamining, can create information. For example, using the name of a document-oriented data base could be developed in a *ProductIP Export Index*, say. An additional service for clients. These web-based indicators are attractive due to extensive data. Think of the *Google Price Index* and *Intuit Small Business Employment Index.*
With growing on-line retail and e-commerce in general, the need for accessible directive and product compliancy rules become more and more pressing. Not only in the case of wholesale. The need for this emphasized by the corona crisis. So, platform developers should take this into account.

6.1 Product Safety, Compliance and Brexit

On December 24th, the Eu and the UK have reached an agreement, the TCA[7]. The impact of this trade deal will be significant, to say the least for manufactured goods imported and exported in the UK and EU, respectively. The UK will have per 1st of January 2021 their own product legislation.
Experts on product safety and compliance said not to take this lightly. There will be a lot of new formalities. All those new formalities are relevant if you can legally sell manufactured goods in the UK-market. The products must comply with product legislation before thinking about custom formalities.
Here a sort of concise list is presented to pay attention to:

- Your UK or your EU customer will become an importer with all the obligations.
- A product cannot be placed on the UK market nor the EU market without a local contact address for market surveillance authorities(in the EU) and Trading Standards in the UK.
- You will need to add information to the product now and adapt packaging and labelling artwork at a later stage. Will you have an address in the EU or UK, or will it be your customers, or have you appointed an Authorized Representative?
- The UK will draft its own chemical legislation (UK-REACH) and has its own register for cosmetics.
- Special arrangements for Northern Ireland.
- Notified Bodies.
- In due time the CE-marking will be faded out and the UK-CA marking will be the rule. This UK-CA will have its own documents(technical files).

To have an easily accessible platform for this new situation will certainly be of major importance. I suppose platform developers and operators are aware of what you may call a situation.
In The Economist (26) rules and regulations are presented which businesses must deal with.

[7] TCA: Trade and Co-operation Agreement.

However, this is not cast in iron yet. Hence, a platform with an option for a so-called dashboard function could be attractive. Such a dashboard map and tally with all the actual reported regulations and laws on the subject matter. A dashboard for work in progress.
It will complicate to do business. However, there is some silver lining. *Pharmaceuticals with representation in the EU and the UK markets will benefit from a highly regulatory regime.*
In The Economist(28), an example to illustrate the need for a dashboard function of a platform to make rules and laws accessible as fast as possible is given. The "*supply chain problems are hitting companies very hard*", according to a representative of BDI, the main association of the German industry. On short term British customs will introduce new rules. Bureaucracy related with customs is a big business risk. This bureaucracy will not go away. The problems are related with incomplete or inaccurate custom forms. The main issue is the proof of origin from the EU required under the trade agreement between the EU and Britain. In The Economist (29), Britain Section, *Counting the Cost*, the subtitle shows the direction for a platform to develop: *Delays to exports are not just teething troubles. The red tape is here to stay.* What is mentioned above, the rules of origin requirements, sanitary rule, export health certificates of every country the cargo pass through. A veterinarian must sign of the documents. See the other article in the Britain section of The Economist 29: *Pig Pharming.* Again, the role of the platform is to facilitate 'paperwork'.

7 Water Risk

A platform dealing with this risk. It is just about water use. There are various issues to deal with.

- Weather station data,
- Laws and regulations,
- The chances of drought,
- The chances of flooding,
- The financial impact.

The Economist(27) paid attention to the subject matter in their Finance & Economics section.

8 Caveat RegTech

Business is not eager to implement regulations with a long-term effect like regulations for climate change. So, it is not always obvious, to say the least, to anticipate regulations which deal with, i.e., climate change.
However, being active in the supply chains of the European market, businesses-small and large- must comply with European directives. Directives related with Product Safety including the machine directive and for example REACH[8]. The system of REACH is overseen by ECHA[9]. The enforcement is done by national agencies .

[8] REACH: Registration Evaluation Authorization Chemicals.
[9] ECHA: European Chemicals Agency.

To have these directives accessible, a platform is very cost effective.
Then, a step to incorporate a framework for climate change regulations is a small one.
Early movers with respect to make a platform available, i.e., ProductIp, have a substantial advantage with respect to knowledge and experience. Make a platform attractive and do not play the fear factor card.
In section 6.1 Brexit is discussed and there will be a UK-REACH. HSE(The Health and Safety Executive) will play ECHA's role. Then there should be a most important pivot: to have a database like ECHA's.

9 Transatlantic Cooperation, TTC

The Economist(39) reported an initiative on cooperation of America and the European Union during a meeting on the 15th and 16th of May 2022 in Paris, the TTC[10]. Cooperation covered by working groups are:
- Technology Standards,
- Secure Supply Chains,
- Investment Screening,
- Climate and Cleantech.

Since the subject matter is about regulation, directives, and laws a platform covering these issues is of significant help.
I think trade secrets could be added to the platform related to secure supply chains.
Intellectual property plays a key role. The Economist(40) denoted this "*IP Audits"*.

9.1 Supply Chain Transparency

In The Economist(45) the subject matter is analysed and discussed.
Jumping to the conclusions: a new subject for platform developers-and operators.
A platform can be instrumental to support business being obliged to deal with abuses in the supply chain. Abuses of human-rights and environmental standards.
A European Directive(CSDDD) on the subject matter is in the making. However, a caveat for platform developers-and operators, in e.g., Germany and The Netherlands the rules for supply chain transparency the national laws are considered to be stronger than the European Directive. However still fuzzy, fd.weekend. Another caveat: civil-society activists will show up in the courts in order to force companies to act according the civil-society activists interpretations of the laws. In The Netherlands the courts are arresting the role of the legislators in Trias Politica.

10 Education and Training.

Our education curricula at least in the field of business education should expand in Regulation. At least for those who just started a company. Also, MBA programmes need to pay attention.
Various platform developers, such as ProductIp, are aware of the added value of educational

[10] TTC: Trade and Technology Council.

programs. Programs to communicate the essentials of European directives and regulations such as Reach. Essentials inclusive basic knowledge to understand chemical compliance. Examples are, e.g., toy safety, medicine safety.
These training programs are a tool for SME's to understand the technicalities of Directives and Regulations.
The need for large companies to join these programs is less due to massive staff support.

11 The Complexity of Reality

The complexity of reality? Or the other way around? What does this mean?
Whether we like it or not, at least in Europe, we have to deal with, i.e., the General Data Protection Regulation (GDPR), The Economist (5). Better to prevent questions in this respect is to make a platform (expert system) GDPR proof. Consequently, as a bonus, a platform on climate change includes as an addition for an expert system on, a.o., GDPR. Connectivity, sort of.
As a developer or operator of a platform on Climate Change, we think we can neglect GDPR. However, suddenly clients are interested in the data of privacy issues. Again, at least in Europe. Business can try to explain the privacy issue away. Clients will not agree. What to do? There is no simple answer, a threat, or an opportunity. Think of it as an opportunity. There will be regulation on GDPR. Make use of it. Listen to your clients and adapt your platform. Anticipate! This create a new market niche.
Complexity is all around us.
Your expert system will be web based. So, wait and Internet Regulation appears above the horizon. Here SME's are again sitting in the corner to take the blow of cumbersome regulation. (The Economist 7). Companies are required to design services in ways that make it harder to spread content in the first place. Expert systems are all about content. Design your system in such a way to be able to make clear how the various rules interfere with each other.
Let a platform/expert system support your operations. In The Economist (8) the operational difficulties are illustrated for banks.
"Banks operates in many countries. It is about information and money. Banks systemic importance means they are hedged about with tough detailed laws that differ between jurisdictions. That require fast compliance departments, stuffed with lawyers, accountants, and box-tickers. Tech firms used to have limited staff ……."
Here, a platform /expert system can be of significant help. For example, to clarify relations between rules and directives. May be, politicians are interested in such a tool. Since a system of rules and directives should be built in such a way that complexity resulting into chaos be prevented. Methods should be developed to evaluate regulations for "*what if*" situations. A basic rule is preventing as much as possible interconnectivity between rules.

12 Platform Business Model, Scaling and Valuation

In this section I present a valuation of the Platform.
A key issue is whether a platform is scalable. If, for example to deal with product safety a

laboratory is needed as testing facility, the platform is not scalable. Another problem can be the need for ID's (Internet Detectives) to find out about fake information. Caveat: AI in the recent past was not of much help. Change a few pixels and AI mistakes a car for an ostrich (Mitchell). The "*AI Winter*." Now, June 2022, AI has made a considerable step forward with so-called Foundation Models, The Economist (41, 42).
Caveat: AI still based on data [11]
I will consider the valuation of the company, V_c, with the NPV method:
$V_c = (1-s)(T - C_{ns}) \sum_{i=1}^{n} (\frac{1+g_{ns}}{1+r})^i + sT \sum_{i=1}^{n} (\frac{1+g_s}{1+r})^i - sC_s \sum_{i=1}^{n} (\frac{1}{1+r})^i$,
where
- s is the scalability vector, $0 < s < 1$
- T is net turnover at the end of the first year of the investment period n,
- C_{ns} are the costs of the non-scalable business at the end of the first year of the investment period n,
- g_{ns} is the growth factor of the non-scalable business assumed to be a constant over the investment period,
- r is the discount factor assumed to constant over the investment period,
- g_s is the growth factor of the scalable business assumed to be a constant over the investment period, and
- C_s are the costs of the scalable business at the end of the first year of the investment period n,

The above formula represents a rather simple model.
Obviously, the model shows the change of your business in a more scalable business creates value.
To find out about the order of magnitude effect of scalability or recurrent income, we can simplify the above formula which present the sums of geometrical series:
- we can assume $\frac{1+g_{ns}}{1+r} \cong 1$. Consequently, the first sum becomes an arithmetic series:
$n(1-s)(T - C_{ns})$, and
- with $\frac{1+g_s}{1+r} > 1$, to give an idea $g_s = O(10^{-1})$, say 25%, and $r = O(10^{-2})$, say 5%.
The second sum, a geometrical series becomes
$sT \frac{(\frac{1+g_s}{1+r})^n - 1}{\frac{1+g_s}{1+r} - 1} = (1+r)sT \frac{(\frac{1+g_s}{1+r})^n - 1}{g_s - r}$, and
- with $\frac{1}{1+r} < 1$,we have for the third sum of a geometrical series
$sC_s \frac{1-(\frac{1}{1+r})^n}{1-\frac{1}{1+r}} = (1+r)sC_s \frac{1-(\frac{1}{1+r})^n}{r}$.
Hence to estimate the valuation of your investment, the formula to be used is

[11] Douglas Hofstadter, the American cognitive scientist explains why, despite their extra ordinary accomplishments artificial neural networks today are not conscious, The Economist June the 9th 2022, by invitation.
Conjecture: AI as we know it will never be conscious as long as it is based on known data. Human beings have to create new data to feed the AI models.

$V_c = n(1-s)(T-C_{ns}) + (1+r)sT\frac{(\frac{1+g_s}{1+r})^n - 1}{g_s - r} - (1+r)sC_s\frac{1-(\frac{1}{1+r})^n}{r}$.

In addition, the time horizon of the investment is $n = 10$(years).

Three examples:

- $s = 0$,

$V_c = 10(T - C_{ns})$.

- $s = 0.5$, $r = 0.05$ and $g_s = 0.25$,

$V_c = 5(T - C_{ns}) + 1.05 \cdot \frac{1}{2} \cdot T \cdot 23.6 - 1.05 \cdot \frac{1}{2} \cdot C_s \cdot 7.7 = 17.4 \cdot T - 5 \cdot C_{ns} - 4.0 \cdot C_s$.

- $s = 1, r = 0.05$ and $g_s = 0.25$,

$V_c = 1.05 \cdot T \cdot 23.6 - 1.05 \cdot C_s \cdot 7.7 = 24.8 \cdot T - 8.1 \cdot C_s$.

Note: for $s \neq 0$, we set C_s, at the beginning of the investment period, equal to a percentage of T . For the rest of the investment period T and C_s are disconnected. In the real world this will certainly not be the case. Consequently, in reality the factor of C_s will be larger and V_c will be lower. See footnote 10 below. There the ratio between net turnover and costs is a constant. In the formula of V_c

$(1+r)sC_s\frac{1-(\frac{1}{1+r})^n}{r}$ changes into $(1+r)sC_s\frac{1-(\frac{1+g_s}{1+r})^n}{r-g_s}$.

Hence

$V_c = n(1-s)(T-C_{ns}) + (1+r)s(T-C_s)\frac{(\frac{1+g_s}{1+r})^n - 1}{g_s - r}$.

A further refinement of the model could be:

- with a startup, C_s is small, i.e, much smaller than unity,
- with accelerating growth, T and C_s are disconnected,

and

- with maturity T and C_s are connected,

a saturation model, S-curve, logistical growth.

Scalability falters when the software of an expert system or platform must be customized. In the data business this could be the case when a unique footprint is thought to be essential (The Economist 20). However, when designed for EU directives and regulations a platform can be scalable. A cloud-based system supports scalability.

A scalable technology allows Platforms to add users rapidly without jeopardizing reliability.

Another issue here is valuation of digital platforms. Above, we derived a rather simple model. There is some statistics about digital platforms. A few cases can be found in financial publications and newspapers. For example, a real estate platform with sales/turnover of about € 35 million and profit of about € 15 million is valuated between € 350 million and € 450 million. Multiplier of about 10.

To conclude, the average prize sales ratio of digital platforms to be 10 is premature? In a study by Accenture a mean value for emerging platforms of about 5.3 is mentioned.

Obviously, including a healthy net profit perspective of about a 1/4 of net turnover.[12]
An important parameter in valuation is Pricing Power. *"Identifying firms with Pricing Power is crucial for investors."* To summarize " *Businesses 'ability to pass on costs is highly prized by investors,"* The Economist(35).
There are exceptions : Snowflake, a cloud-based data platform is valued at $140 bn.
Valuation can become difficult when a platform is essential for regulated markets. This is the case when politics/authorities think the subject matter is too important to leave it to the platform developers and operators.

13 Geopolitics.

Geopolitics will change supply chains and is just one of the bottlenecks. Consequently, it will influence logistics, see The Economist(43). With a platform arranging transport of cargo from A to B, the efficiency of the freight-forwarding industry can be enhanced. The Economist mentioned the example of start-up FORTO. It is about to make transport management systems more intelligent.

14 The future: Caveat Platform Developers and Operators. New Rules and Regulations.

In the introduction section, Brexit has been mentioned. In The Economist (26) attention is paid to regulating technology. Under the heading: *An assertive tech watchdog is introduced:* DMU[13], in Britain. It is about regulations, which regulate big companies how they should behave.
The European Commission presented the drafts of legislation to rule big technology platforms: DSA[14] and DMA[15]. The silver lining here: it is about big companies with a market capitalisation of € 65 bn. Only SAP is in the crosshair. However, there are the US big five. Two of these five, Facebook and Google are in the crosshair of the US Regulators and State Regulators. DMA/DSA, directives for, a.o., the internet, are approved by the European Parliament(July 2022).
Another possible subject matter for platform developers is information about minerals vital to economic and military security. There is a strong relation with supply chains (The Economist 31).
Developing a platform is business as usual: for a start-up heavy losses in the pursuit of growth. It is not a law of nature for shareholders to be willing to finance these losses. Especially in the case where a platform has a strong relation with regulations, directives, and nothing to offer in addition to make the platform attractive. Compliance with directives and regulations is indispensable. However, the platform developer(m/w) should realize if the market consider this compliance a nuisance, market penetration of a platform/document-based data base is a long-winded affair. This will determine the valuation of this type of

[12] This estimation is based upon a growth of profit of 25% year on year, an investment horizon of 10 years and a discounting percentage of 4%. So, the valuation is: $\frac{turnover}{4} \cdot \frac{(\frac{1.25}{1.04})^{10}-1}{\frac{1.25}{1.04}-1} \cong \frac{turnover}{4} \cdot 26$.

[13] Digital Markets Units.
[14] Digital Service Act.
[15] Digital Markets Act.

business(See chapter 12). So, make your platform attractive.
Furthermore, to develop a market for your platform keep in mind not to start with the incumbents. Most of the time they have a massive ITC department sensitive to the "not developed here" syndrome. SME's are a far more attractive market segment. In addition, your platform can be made more easily attractive for this market segment.
One of the critical issues of directives and regulations is the role sanctions can play. Think of what is going on between the USA and China. Geopolitics can disturb your platform operability. However, geopolitics is an opportunity for platform developers. New rules and regulations are to be taken care of. For example the FDPR[16], The Economist(46). This is about export-compliance law.
The monopoly issue is on the political agenda. So, stay away from insinuations in this respect.
A platform should be flexible since there can be tendencies of forced operability between platforms. Especially developing and operating you platform in politically sensitive regulated markets.
Now, as a platform developer you might ask yourself about a choice: develop a platform for a particular market or a platform "one size fits all."
The Economist(34) pays attention to developments in China with respect to digital regulation. It is about new laws and regulations for tech firms. Consequently, it applies to platform developers. China's new rules are much stricter and more wide-ranging than, a.o., GDPR. A PIPL[17] comes into effect on November 1st 2021. Shorter and less detailed than GDPR. The upside is to keep pace with fast changing technology. The downside is the vagueness of the rules. Here the CAC[18] comes into play. It is about the rules for the use of recommendation algorithms.
In March 2022 a more stringent Eco-design Directive is proposed by the European Parliament. The directive is about spare parts, lifecycle of the product and easy to repair.

15 Conclusions.

Climate change should become a major issue in the board room.
Technology development is about zero carbon emission.
In The Economist (4) a picture is presented, to be updated on a 5-year base of global energy related CO_2 by sector. A picture to help setting priorities for rule making.
The costs to companies of complying with all legal requirements are huge. Large companies must spend more than $40 million a year on keeping documents merely to respond to potential regulatory requests, concludes a working paper based on a survey of 128 companies by William Hubbard at the University of Chicago Law School. Smaller companies cannot afford to keep documents on this scale, putting them at risk of breaching statutes even if they have done nothing wrong. A platform for SME's embedded in an ERP system can be a supportive a tool.
A Platform developed as a web-based expert system of global/regional regulations for climate change. Such a platform should accommodate the sense of urgency in the market.
A prominent issue for this climate change expert system is the connectivity with other regulations, like GDPR, CCPA, Internet Regulation, and related compliances regulation in Europe. This creates an opportunity for a platform/expert system. Alas, a threat too: a

[16] FDPR, Foreign Direct Product Rule
[17] Personal Information Protection Law
[18] Cyberspace Administration of China

platform with a lot of connectivity, *"people in charge of data come from different industries without a common vocabulary and talk business,"* The Economist (13). Not easy to deal with. Obviously, there is not such a platform or expert system "one size fits all." Well, soon there may be a prominent issue in relation to operate in the cloud. It is thinkable to have various clouds on a geopolitical basis (The Economist 24).
A platform should reflect a so-called minimum viable product. Consequently, to accommodate the various problems, various platforms/expert systems are needed. However, keep in mind the connectivity or network covered by the subject matter. It is about complexity.
To make it a bit more difficult, to say the least, Caveat Greenwashing. So, make your platform Greenwashing proof. Prevent keeping up appearances.
Furthermore, a platform may reflect a missionary, sort of, character. Try to prevent this. Make it an intrinsically attractive tool. Being in the business of facilitating export and import, your clients should be convinced to have their data protected and backed-up.
Caveat Tech Industry. In Britain, the CMA (Competition and Markets Authority) a regulator, is working on a regulatory framework specifically for online platforms. To cite The Economist (18): *"These could include forcing companies to share data with competitors, making it easier for consumers to switch platforms and mandating the separation of data from different services owned by the same firm*".
To do business in the aftermath of Brexit can be done more efficient with a document-based platform.
Another point to focus on is the attractiveness of a platform dealing with regulations and directives. It is important to integrate your platform in the usual business processes to make these processes more efficient.
A new opportunity for a platform could be related with the changing global investment climate. There are two critical issues: i) the unknown unknowns about the related regulations and ii) the meaning of those regulations. Will there be laws or are these regulations be determined by the geopolitical situation? Be prepared. In a special report, The Economist(38) paid attention to the subject matter: *The Business and the State, the new interventionism.* This creates again an opportunity for platform developers. Summary of important items: New industrial policy, Antitrust revival, Government regulation and Corporate taxes, Navigating sanctions.
Regulation of digital technology is no longer behind the horizon. In the section on China, The Economist(34) paid attention to the subject matter. This could be another opportunity for platform developers and operators.

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