

THE IMPORTANCE OF LEGAL KNOWLEDGE IN SUSTAINABLE INNOVATION PROCESS

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ABSTRACT

Legal knowledge has great importance in every step of production and management. During the process of sustainable developments, a close relation between innovation process and law has to be considered. Every step of the innovation process and management depends on legal regulations. The engineers, producers, managers should be aware of law, to avoid problems in the future and not to make mistakes in the production and innovation process. To know the regulations help them in various ways. Accordingly, the knowledge about rights and obligations helps them to negotiate safely with the other parties. They know about the boundaries of their liabilities what they are working on. They keep the protection of their work especially on legal regulations. Additionally, during the production phase the protection of environment has to be considered. There are many international agreements which are signed by the States on environment, climate change, sustainability, waste management, renewable energy, etc. Managers and directors in the innovation process need to know about these complex issues. In this paper, the quintuple helix innovation model will be introduced which describes innovation process based on knowledge circulation between academia, industry, politics and the media- and culture based public for sustainable developments. Afterwards, relevant legal aspects of sustainable innovation process will be clarified by giving examples from the practice in national and international level.

Keywords: Legal Knowledge, Quintuple Helix Innovation Model, Law and Innovation, Innovation Process, Sustainable Development.

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YENİLİKLERE İLİŞKİN SÜREÇ İÇİNDE HUKUKİ BİLGİNİN ÖNEMİ

ÖZET

Inovasyon, günümüzün ekonomik gelişmesinde itici güç haline gelmiştir. Bu çerçevede, üretim ve yönetim aşamasında, hukuk bilgisi büyük önem arz etmektedir. Sürdürülebilir gelişmeler içinde, yenilik süreci ile hukuk arasında yakın bir ilişki vardır. Gelişmenin sürdürülebilir olması için, hukuki düzenlemelere ihtiyaç bulunmaktadır. Mühendisler, üreticiler, yöneticiler, teknik işlerle uğraşan kişiler gelecekte karşılaşacakları sorunları önlemek ve üretim ve yenilik sürecinde hata yapmamak için hukuk kurallarının farkında olmalı ve görev alanları içerisinde bunları uygulamalıdır. Hukuki düzenlemeleri bilmek, yöneticilere ve idarecilere çeşitli şekillerde yardım eder. Buna göre, kendi haklarını ve yükümlülüklerini bilen yönetici, diğer tarafla güvenli bir şekilde hukkuki işlem yapar ve zarara uğrama riski daha az olur, çalıştığı konularda yasal yükümlülüklerinin sınırlarını bilir, faaliyetlerinin hukukten korumasını sağlar. İlâveten, üretim aşamasında çevrenin korunması da dikkate alınmalıdır. Devletler tarafından çevre, iklim değişikliği, sürdürülebilirlik, atık yönetimi, yenilenebilir enerji vb. konularında imzalanmış birçok uluslararası anlaşma vardır. Inovasyon sürecinde çalışan yöneticilerin ve idarecilerin bu karmaşık konuları ve bunlara ilişkin hukuki düzenlemeleri bilmesi gerekir. Bu makalede, sürdürülebilir gelişmeler içinde yer alan akademi, sanayi, siyaset, medya ve kültür temelinde, insanlar arasındaki bilgi dolaşımına ilişkin inovasyon sürecini tanımlayan beşli sarmal yenilik modeli tanıtılmıştır. Makalede ayrıca, inovasyon süreci ile yakından ilgili, ulusal ve uluslararası hukuki düzenlemelerden örnekler verilerek açıklamalar yapılmıştır.

Anahtar Kelimeler: Hukuki Bilgi, Beşli Sarmal Yenilik Modeli, Hukuk ve Inovasyon, Yenilik Süreci, Sürdürülebilir Kalkınma.

INTRODUCTION: THE QUINTUPLE HELIX INNOVATION MODEL

Aiming to combat the climate change and to enable sustainable developments, new innovation processes are closely related with knowledge production in the systems of academia, economy, politics and the media- and culture-based public as well as the natural environment of the society. Sustainable developments need responsible research and innovation processes (RRI) where every system participates collaboratively on the knowledge of other systems. Von Schomberg defines RRI as "[a] transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products in order to allow a proper embedding of scientific and technological advances in our society."¹ For the assessment of responsible research and innovation (RRI), the European Commission publish metrics and indicators, such as gender equality, science literacy and education, public engagement, open access, ethics and governance².

These approaches led to the awareness that the collaboration of academia, economy and politics as the drivers of progress and innovation has to be extended by two more entities: the media and culture-based public and the natural environment of society. Accordingly, Carayannis and Campbell³ developed the Quintuple Helix Innovation model. The model is a communication model which sets the focus on knowledge production and

¹ **Von Schomberg, René** (2013) "A Vision of Responsible Innovation": Owen, Richard/Bessant, John/Heintz, Maggy (Editors), *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, Hoboken, NJ, Wiley.

² **Ravn, Tine/Nielsen, Mathias W./Mejlgaard, Niels** (2015) Metrics and indicators of Responsible Research and Innovation Progress report D3.2. Monitoring the Evolution and Benefits of Responsible Research and Innovation (MoRRI), <https://www.rri-tools.eu/documents/10184/47609/MORRI-D3.2/>, l.a.d. 25.11.2019.

³ **Carayannis, Elias G/Campbell, David F J** (2010) "Triple Helix, Quadruple Helix and Quintuple Helix and How Do Knowledge, Innovation and the Environment Relate To Each Other?", *International Journal of Social Ecology and Sustainable Development*, I: 1, V: 1, p. 41-69.

circulation. The five systems contribute to the circulating knowledge with know-how derived from the knowledge production on the way to responsible innovations. On the other hand, they get knowledge from other systems through the circulating knowledge. Every system contributes with its own capital as a result of knowledge production for the sustainable development: human capital (educational system), economical capital (economic system), political and legal capital (political system), information and social capital (media-based and culture-based system) and natural capital (natural environment). As a consequence, environmental communication and science communication have to include the transformation process of knowledge between the systems of the Quintuple Helix⁴. This innovation model explains the innovation processes as a transformative activity which is not isolated from the processes of other systems.

I. THE FUNCTION OF LEGAL KNOWLEDGE

In social and business life each person is subject to both unwritten social rules and to written laws. Without regulations and legal institutions, life in society would be most probably in chaos. During the history of mankind, people become dependent on rules and laws, as without any rule security of the society cannot be provided⁵. “Ubi societas, ibi ius” (wherever there is society, there is law) is a very famous expression of the Romans which signifies the presence of law in every society.

The law makers during the history, first adopted the moral rules into law. In the formation of written rules, the religion and customs have also played important roles which were the main discussions in the history for the legal philosophers. After the codification movement in Europe at the end of the nineteenth century, many continental European countries had a

⁴ **Peschke, Lutz** (2019) The Impact of Greta Thunberg on Environmental Communication in Germany, Lutz Peschke (Ed.) *Visuality of the Anthropocene. A Concept for a Poster Exhibition*. Norderstedt: BoD.

⁵ **Aybay, Rona** (2012) *Introduction to Law*, 4. Edition, Istanbul, Istanbul Bilgi University Press, p. 4.

codification period, both for public law and private law⁶⁷. In the Anglo -Saxon countries, the concept of uncodified law is effective and is still primary source, for that reason the majority of the legal rules are derived from customary principles and judicial precedents⁸.

Society requires orders to regulate relations amongst its members. To ensure this order, law promotes the common good of the society and resolves the disputes, encourages the people to be honest, act in justice and obey the public order. All the rules and principles that regulate and limit the conduct of individuals in a society may be called law or legal order.

Law is a combination of set of rules which has important impact on the administration of the country, on the development of society and economy. Willis describes law specifically, as a principle, rule, or standart in accordance with which justice is administered⁹. In order to regulate a society, legal rules are set down in written form which are enacted according to the needs and the requirements of their time. Under this context, it is easy to mention that each country has its own national regulations which are valid inside the borders of that country. The fundamental principles are identical in each country, as they are based on mostly foreign doctrines which effect also the national legal systems¹⁰.

In the globalizing world, besides the national ones, there are also international regulations, agreements, treaties. These international regulations are enforced by many countries which are declared as international legal regulations, but are also considered as a part of their national legislation¹¹.

⁶ **Güneş Ceylan, Seldağ** (2004) “The Effect of Roman Law on Modern Legal Systems”, Gazi University Law Review, I: 1-2, V: 8 (1-2), p. 75-93.

⁷ **Güneş Ceylan, Seldağ** (2011) “The Affect of Classical Law Period on Corpus Iuris Civilis and The Reflections on Modern Laws”, Maltepe University Law Review, V: 1-2, p. 93-113.

⁸ **Sims, Vanessa** (2010) English Law and Terminology, 3. Edition, Baden Baden, Nomos, p. 19.

⁹ **Willis, Hugh Evander** (1925) “Definition of Law”, Virginia Law Review 12, p. 203-214.

¹⁰ **Ansay, Tuğrul/Wallace, Don** (2011) Introduction to Turkish Law, 6. Edition, Ankara, Wolters Kluwer/Seçkin, p. 1.

¹¹ Turkish Constitution Article 90 declares that treaties concluded with foreign states and international organisations on behalf of the Republic of Turkey, shall be considered inside

Legal rules are applied in range of situations, and relationships in daily life, as housing, neighborhood and community matters, in educational and public institutions, family relations, commerce, purchase and sale, work and employment and many more¹². In the last years, as a result of the developments in technology, new legal fields are suggested and new legal contents are formed.

High technology industries require wide range of legal topics according to their needs like, robotic law, data protection, intellectual property, aeronautics and space law, IT law and many others. New legal regulations are formed parallel to the implementation of industry and technology. For example, IBM as a technological company, has generated legal knowledge to perform a strategic plan to deliver specific technologies to the software commons. The combination of specific knowledge with specific software technology makes IBM's legal knowledge exclusive and exceptional¹³.

Today, the economy has its own regulations, sometimes it is affected by the customs, sometimes by the culture, but the legal rules are put into force to keep the safety and the security of the people in every condition.

Currently, in the global world commercial life is growing rapidly. By the adoption of new technologies, the goods are produced in a very fast and easy way. This rapid production brings discussions and litigations additionally. Conceiving an economy which includes the production, management and technology, is very complex and there is a need to know legal regulations. Legal literacy is a key factor for the long-term success in the business life. Law provides numerous sources both facilitative and adversarial, to gain and sustain strategic advantages¹⁴.

of the national legislation when they are adopted by the Turkish Grand National Assembly by a law which approves the ratification.

¹² **Halliday, Simon/Morgan, Bronwen** (2013) "I Fought the Law and the Law Win? Legal Consciousness and the Critical Imagination", *Current Legal Problems*, I: 1, V: 66, p. 1-32.

¹³ **Orozco**, p. 714.

¹⁴ **DiMatteo, Larry A.** (2010) "Law as a Source of Strategic Advantage", *American Business Law Journal*, V: 47, I: 4, p. 727-794.

In the responsible innovation, it is important to balance stimulating technology and the protection of fundamental rights and values. Legal knowledge is unique in management and innovation process, as it combines knowledge of attorneys and managers to a new and enhanced understanding of legal structures inside the organization which includes compliance offices, grievance procedures, rules and action plans.

II. THE ROLE OF LAW IN THE INNOVATION AND MANAGEMENT PROCESS

In the development process of production and technology, law is an indispensable element which effects the influence of the companies as well as the countries. The development of a country depends on how the rule of law is applied, which means justice and equality for everyone. In this sense, the respect of legal rules brings the success and wealth to the society and to the economy. In the business life there are many regulations for different cases which take place in different levels of the innovation process¹⁵.

There are many scholars who recognize that legal mechanisms play an important role in the strategies of the firms. Because of the new approaches, in the innovation process legal knowledge plays an important role. High technology industries mostly deal with securities, tax, contract, patent, tort, labor, and other legal issues¹⁶. There are also fields which are uncertain and unrestrained. The technology changes so quickly that traditional legal procedures and institutions are mostly unable to catch up these new developments.

Law touches actually on many aspects of management activity. Managers comprehend the strategic aspects of decision making on legal matters, as well as their administrative affairs¹⁷. For that reason, there is quite

¹⁵ **Marks, Susan** (2011) "Law and the Production of Superfluity", *Transnational Legal Theory*, I: 1, V: 2, p. 1-24.

¹⁶ **Wessel, Milton R.** (1988) "What is Law Science and Technology Antway?", *Jurimetrics Journal* 29, p. 259-267.

¹⁷ **Orozco, David** (2010). "Legal Knowledge as an Intellectual Property Management Resource", *American Business Law Journal*, V: 47, I: 4, p. 686-726.

close relation between law, innovation and technology. Under these conditions, the firms should be aware of the new regulations and develop their legal policies in their working fields. Currently, artificial intelligence, advanced robotics, wearables and 3D printing are used in the productions. For example, robots started to enter into the business life and the lives of the individuals. Robots are working in households, in the factories, inside the hospitals, in the offices, even in the public transportation. In the last years, there is a big discussion on legal and ethical issues of their legal status, autonomy and liability.

Today's technologies are concentrated in certain industries with the automotive, electronics and aerospace sectors. In these areas, the products are designed, produced, assembled, distributed, consumed, serviced, disposed and even reused. The global supply chains have formed to deliver goods. Hence, the legal regulations effect the whole technology production process and the management phase¹⁸.

Innovation process is influenced by many branches of law. In the commercial world, many litigations occur because of trademark, false advertising, unfair competition, rights of publicity, post sale confusion, sponsorship and etc. related within the subject matters and the policies of the companies¹⁹.

In the last years, the number of innovation and knowledge based companies are increasing rapidly. Intellectual property right is one of the most controversial issues of the companies which are the key beneficiaries of the marketplace. These companies successfully execute intellectual property strategies which support high level strategic vision and goals. Intellectual property is protected in legal regulations under patents, copyright and trademarks which the people can get financial benefit from what they invent or create²⁰.

¹⁸ **Cornish, William** (2006) *Intellectual Property*, 5. Edition, London, Thomson/Sweet&Maxwell, p. 20.

¹⁹ **Fang, Anyu** (2012) "Trademark Law and Industry Myths", *Journal of High Technology Law* 13, p. 88-136.

²⁰ **Sims**, p. 140.

Some companies use legal knowledge to combine patents and trademarks to increase customers' switching costs. There are some models which analyse the strategies of the firms during innovation period²¹.

All the firms want to protect themselves from any kind of infringement against their companies. The creations of the mind, like inventions, literary and artistic works, designs and symbols, names and images which are used in commerce are also protected under intellectual property law.

Some firms produce legal knowledge that matches the firm's unique strategic vision. These strategies, which combine commercial and legal issues, are considered to be very effective. Due to the nature of intellectual property assets, which has different rules and variation of foreign intellectual property regulations, there is a need for strong legal protection. Intellectual property owners are particularly vulnerable when they are in international trade²². However, many risks can be reduced with a well-planned strategy and legal knowledge.

Copyright is also an important issue which can be seen in every step of innovation process. The protection of copyright was started to be used in the 18th century²³, since then it is changed according to the time and the needs of the society.

Copyright protects the owner with powerful remedies against the person who violates his work, including a precaution to avoid infringing his rights, the impoundment and destruction of all reproductions of his work which violate his rights, a recovery of his actual damages and any additional

²¹ Orozco, p. 713.

²² Chester, J.F./Hsu, Sophilia (2012) "Going Global: A Legal Primer for Innovation- and Knowledge – Based Companies", *International Trade Law Journal*, I: 2, p. 3-20.

²³ Copy right law was adopted from England relating to literary and artistic property which was valid in USA. The Act of 1710 assured protection to the author for his assigns of any map, chart or book for fourteen years. By the end of the 19th century, International Copyright Act of 1891 was enacted in USA which made the copyright available for the foreigners first time.

profits or legal losses realised by the infringer or a recovery of statutory damages and attorneys fees²⁴.

The problems arising from intellectual property, copyright, patent, trademark are the most observed legal issues which affect the innovation and production phases in a company²⁵. Patent law uses legal rights to stimulate private investment in new, useful and beneficial technologies. Patents give exclusive rights to their owners for the commercial exploitation of inventions to secure the profits of the owners. Today, many firms have their own patents or they are using the patents of the others by the permissions of the owners of these rights under patent regulations. The limitations on the duration of protection under copyright and patent law are related to the issue of balancing the optimal degree of public access to intellectual property and the property rights of the owners of the protected material²⁶.

In the production process, generally every firm has its own trademark which is protected according to the legal norms. Trademark law deals with balancing the rights of trademark owners and the others which prohibits the competitors from using the same symbols of their own wares that indicates the same names and slogans of their goods and services²⁷. But, knowledge of trademark law alone, however is not sufficient to generate a value to a firm, unless this knowledge is combined with financial and marketing knowledge²⁸.

In the production phase also the protection of environment is another important subject. Environmental law is a branch of law, which has a mixed character between public law and private law²⁹. In the international level, there

²⁴ **Brown, Ralph S./Denicola, Robert C.** (2005) Copyright, 9. Edition, New York, Foundation Press, p. 4.

²⁵ **Goldstein, Paul/Reese, R. Antony** (2008) Copyright, Patent and Trademark and Related State Doctrines, 6.Edition, New York, Foundation Press, p. 17.

²⁶ **Dreyfuss, Rochelle Cooper/Kwall, Roberta Rosenthal/Strandburg, Katherine/Zimmerman, Diane L.** (2010) Intellectual Property, 2. Edition, New York, Foundation Press, p. 2-3.

²⁷ **Goldstein/Reese**, p. 17.

²⁸ **Orozco**, p. 689.

²⁹ **Hannes, Veinla** (2000) "Codification of Environmental Law", *Juridica International* 5, p. 58-67.

are many agreements which are signed by the States on environment, climate change, energy efficiency, waste management and renewable energy³⁰. Ozone treaties, Kyoto Protocol, United Nations Framework Convention on Climate Change are the main international treaties on the protection of environment. Although these international treaties are all valid and binding for the signatory countries, sometimes it is hard for the producers to understand these new developments because of their complexity. Most of the signatory countries have national regulations on the protection of environment, and besides the international treaties are prepared for the good of all humankind³¹. So these regulations are valid world wide for the companies which are from the signatory countries. These companies respect the provisions of the agreements on environment during their production and management³².

Today there are changes in the regulations according to the needs of the commercial life. In some fields, law makers have the difficulty to catch the current developments and form legal regulations. In these cases legal rules are formed later on, according to the new requests from the economy and society. By the influence of innovation Technologies, the legal needs of the society and business life increases rapidly which causes new legal norms to be formed.

Currently, the point of control over the IT systems has shifted from hardware to software which shifts further to information technologies. In the last decade, the ability to store and process large quantities of data and the development of more sophisticated software have enhanced the ability of IT systems to make markedly accurate predictions about people and events³³. Data miners create databases of personal information, such as contractual informations, purchasing histories, and profiles of personal interests³⁴. As a

³⁰ **Birnie, Patricia W./Boyle, Alan E./Redgwell, Catherine** (1994) *International Law and Environment*, Oxford, Oxford University Press.

³¹ **Sands, Philippe/Peel, Jacqueline** (2018) *Principles of International Environmental Law*, 4. Edition, Cambridge, Cambridge University Press.

³² **Alca, Süheyla Suzan** (2011) "The Liability Principles in the Protection of Environment in the Frame of Supreme Court Decisions", *Yeditepe University Law Journal (YUHFJ)*, I: 1, V: 8, p. 40.

³³ **Wessel**, p. 262.

³⁴ **DiMatteo**, p. 739.

result of that, the presentation and control of data became much more competitive and there is a big discussion in the last years in the legal understanding of privacy.

Internet has accelerated the collection of data and the collection, storage, usage, dissemination of information and the access to databanks became the connecting links between information technologies and legal rules³⁵. Data of the individuals are protected in many countries all around the World in the national level³⁶, although in some countries it is a new regulation³⁷. In Europe, EU Directive 95/46 which was being used since years, has been abolished with the adoption of new regulation General Data Protection Regulation (GDPR) in 2018. So each company in the innovation should declare their privacy and security policies with regards to national data protection codes or acts including EU regulations. In the last years, law firms are being asked by their clients to provide Data Loss Prevention (DLP) tools to secure the flow of their data³⁸.

All the companies in Europe besides the companies out of Europe in the World which have commercial relations with them have to adopt the new regulation and store or share their data, accordingly. These companies should put into action clear and well-communicated policies how to handle and share the confidential information. All firm members should have security education regularly and be informed about the new legal changes. So the legal norms on data are improved according to the current developments and the needs³⁹.

³⁵ **Kilian, Wolfgang** (1981) "Information Technology and Law" Victoria University of Wellington Law Review 11, p. 81-92.

³⁶ The Federal Data Protection Act in Germany came into effect in 1978.

³⁷ **Güneş Peschke, Seldağ/Peschke, Lutz** (2016) "New Media Between Communicative and Normative Studies": Güneş Peschke, Seldağ/Peschke, Lutz (Editörler), *New Media and Law: A Comparative Study*, Ankara, Yetkin, p. 19.

³⁸ **Donato, Brian/Gossmeier, Michele/ Moore, Kevin/Segger, Jon** (2018) "What Do You Need to Know About Cybersecurity?", *AALL Spectrum*, p. 15-17.

³⁹ **Voigt, Paul/Von dem Bussche, Axel** (2017) *The EU General Data Protection Regulation (GDPR)*, Heidelberg, Springer, p. 2.

Private ordering mechanisms such as contracts, are essential elements of legal knowledge and span companies with varying degrees of resources and managerial ability. Contract is a promise which has legal consequences⁴⁰ and is the indispensable legal instruments of the production and management process. There are several competitive advantages of contracts which are the strategic tools for the companies in the business life. By the technological developments, the importance of contracts have grown over the last decades, as they are also used to create new information products. Specific contracts create strategic advantages and give value to the companies. However, these contracts are often designed to advance one party's competitive advantage at the expense of the other contracting party⁴¹. In the business life one of the most used contract is the sale of goods⁴².

By the technological advancements, the legal gaps in the regulations became wider, especially in innovation technologies. In the technology landscape, new competition rules are valid among producers and countries. Although the legal systems of North America, Europe and Asia (China, Japan and South Korea) are different, they are the competing leaders of the world technology. New technologies have not disrupted all industries in the same way and at the same time. Sometimes, even within the same industry, the technologies have a dramatically different impact and value.

When managers and lawyers enter into group learning, which turns to an organizational routine, at that moment new knowledge is generated. In this sense, legal knowledge may add value to the firm, and expands the behaviours of the managers according to their specific expertise. For that reason, the manager, directors of the companies, especially who are in the decision

⁴⁰ **Willis, Hugh Evander** (1925) "Definition of Law", Virginia Law Review 12, p. 203-214.

⁴¹ **DiMatteo**, p. 729; Eren, Fikret (2015) Law of Obligations, Istanbul, Yetkin, p. 3.

⁴² **Schlicht, Ekkehart** (1996) Firms, Markets, and Contracts, Heidelberg, Springer; In the global commerce there are basic legal agreements like United Nations Convention on the Contracts for the Sale of Goods (CISG) which is one of the most used convention in international trade. With this convention international uniform rules are created to govern contracts for the international sale of goods. Besides, this convention develops commerce in international level and removes legal barriers in different social, economical and legal systems in international trade .

making positions should be trained in legal issues and according to each case they should examine carefully their rights and responsibilities.

CONCLUSION

The peculiarities of commercial life render some rules for the regulation of commercial transactions. Companies and countries have launched significant transformation and policy initiatives on innovation processes, production and technology. In this context legal regulations play an important role in the production process and technology. The future of production and technology depends on the needs of the governments, companies and societies as well as the sustainable innovation processes. The pre-requisite is an effective collaboration inside the Quintuple Helix with a balanced exchange and circulation of knowledge through all five systems. The political system contributes with its political and legal capital. Hence, to neglect the knowledge of legal rules would weaken the potential of sustainable innovation processes, especially in business life. In the field of production, legal norms are enacted and applied according to the requirements. Technological innovations can be used every phase in the production where they are allowed by the legal rules. Each phase of the production is engaged with different legal issues.

The legal rules related with production and technology are regulated in different branches of law. Governments, businesses and members of the civil society foster a growing production system by adopting the new Technologies. Under these conditions, in every step of production, management and technology, there are legal issues which regulates the system.

As a result, today, decision makers in the system of economy must be aware of legal regulations besides the innovation processes. The companies are obliged to rethink and retool innovation processes according to their development strategies. Firms have to set right policies, make ready their work forces, infrastructure and develop new technologies within the limits of legal regulations to guarantee efficient and sustainable developments inside the Quintuple Helix collaboration.

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