D500.3.1

Barriers and opportunities in the present regulatory situation

WP 500

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The FIspace Project

Leveraging on outcomes of two complementary Phase 1 use case projects (FInest & SmartAgriFood), the aim of FIspace is to pioneer towards fundamental changes on how collaborative business networks will work in future. FIspace will develop a multi-domain Business Collaboration Space (short: FIspace) that employs FI technologies for enabling seamless collaboration in open, cross-organizational business networks, establish eight working Experimentation Sites in Europe where Pilot Applications are tested in Early Trials for Agri-Food, Transport & Logistics and prepare for industrial uptake by engaging with players & associations from relevant industry sectors and IT industry.

Project Summary

As a use case project in Phase 2 of the FI PPP, FIspace aims at developing and validating novel Future-Internet-enabled solutions to address the pressing challenges arising in collaborative business networks, focusing on use cases from the Agri-Food, Transport and Logistics industries. FIspace will focus on exploiting, incorporating and validating the Generic Enablers provided by the FI PPP Core Platform with the aim of realising an extensible collaboration service for business networks together with a set of innovative test applications that allow for radical improvements in how networked businesses can work in the future. Those solutions will be demonstrated and tested through early trials on experimentation sites across Europe. The project results will be open to the FI PPP program and the general public, and the pro-active engagement of larger user communities and external solution providers will foster innovation and industrial uptake planned for Phase 3 of the FI PPP.

Project Consortium

- DLO; Netherlands
- ATB Bremen; Germany
- IBM; Israel
- KocSistem; Turkey
- Aston University; United Kingdom
- ENoLL; Belgium
- KTBL; Germany
- NKUA; Greece
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- Kverneland; Netherlands
- North Sea Container Line; Norway
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- BO-MO; Slovenia
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PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Document Summary

Analysis of the present situation, barriers and opportunities in the present regulatory situation in Europe.

FIspace
Business Collaboration

Abbreviations

App	Software Application		i.e.	id est = that is to say
D	Deliverable		IP	Intellectual Property
DoW	Description of Work		IPR	Intellectual Property Rights
EA	Exploitation Agreement		KPI	Key Performance Indicator
EAGF	European Agricultural Guarantee Fund		M	Month
EAFRD	European Agricultural Fund for Rural Development		RTD	Research and Technological Development
EC	European Commission		SLA	Service Level Agreement
e.g.	Exempli gratia = for example		SME	Small and Medium Sized Enterprise
EU	European Union		ST	Sub-Task
FIA	Future Internet Assembly		T	Task
FI PPP	Future Internet Public Private Partnership		UAA	Utilized Agricultural Area
FP7	Framework Programme 7		WP	Work Package
GA	Grant Agreement			
ICT	Information and Communication Technology			

Table Of Contents

1   Introduction

1.1   This document

This document is the Policy and regulation analysis of the FISpace Project. It is a result of tasks in Work package 500 and describes the main roadblocks in order to exploit FIspace as a global platform.

1.2   Objective

The current document will describe what will the main constraints to develop and deploy FIspace at a European level and in other countries and companies outside Europe.

1.3   Main Audience

Mainly FIspace consortium members, and FI-PPP working group on these issues (or the one substituting their activities).

2   Preamble

FIspace fits within the agriculture and logistics framework. These particular markets have very special interest in the data management and privacy. Sometimes in logistics, as an example, the business is focused on what to deliver to who and when. All this data could be contained in the back-end or the different software used to perform business. Hence, the main motivation for this document is to clarify the main problems, issues, road blocks or just difficulties we may encounter if we want to go global.

We have several key questions that have triggered the main discussion points reflected in this document. Questions such as: What happen if we launch this platform tomorrow in the 28 European member states? Could we do that? How am I going to handle the open data? How do we align our priorities with the Digital Agenda? We are going to have SMEs and large companies from all over Europe; do they have the same ways of access? How are we going to manage personal information? Are we incurring in a potential monopoly situation?

The foreseen launch of FIspace raises a number of issues that relate to public policies and regulation. The first and obvious issue, especially in the current post-Snowdon era, is related with data protection and privacy. **Chapter 3** contains all legal aspects, starting from **Chapter 3.1**, Data Protection, where it explains that FIspace itself does not know or store the data of the business partners that collaborate on the FIspace platform. It only stores the meta-data that relate the sender and receiver. FIspace does not know data content. It wraps the incoming data stream in a wrapper and sends it onward to either an app for further processing or another partner for processing. In that sense FIspace is comparable to a telephone company. Nevertheless this might already raise questions and regulatory issues, especially in a global context.

Additional issues rise from the fact that FIspace will enable cross-European (and global) business collaboration, e.g. a Spanish grower of oranges can use the platform to sell his produce to a German retailer, using a French transport company. That will raise legal issues (contracts under Spanish, French or German law?). Or take another example: a French potato grower in Nord-Pas de Calais starts using an app from a Dutch service provider that combines the data from his French soil laboratory, the UK Met office, his (German build, American designed) spraying machine and gives advice on the use of pesticides. Who is liable for a wrong advice as the Dutch app builder was not aware of an update of the French rules for applying pesticides resulting in a wrong instruction to the spraying machine (operated by a Belgian contractor working cross border)?

These questions do not completely hinder the introduction of FIspace from a legal point of view, as these issues are most likely already solved in the current physical world and in rules on web purchases. However with the introduction of FIspace such questions will multiply as many users will be new to cross border business collaboration and especially in using apps from other countries (note that FIspace can partly also help to solve the issue: FIspace can run a Q&A website and at least in theory legal experts can provide apps in FIspace to help creating clear contracts under different law systems).

In the same chapter 3 we discuss the issue that ownership of data is in some cases less clear than one might think. Examples are found in cases where accountants or consultants have an intellectual property right on the farm reports they make. Another case could be a laboratory of a cooperative that analyses the farm's product where the product is still owned by the farm.

Privacy is another sensitive issue. Even if from a regulatory perspective data privacy is guaranteed, the use might be hindered by other attitudes by the users. Especially in farming and some parts of the logistic service industry (independent truckers or river transport) but also in SMEs in trading and food processing, the border between business and private life is fuzzy. Being able to track the ownership of a parcel of land at the cadaster is one thing, begin able to search the cadaster and count the amount of land owned by a certain company / person is something else. In the past we have seen public outcries on making the subsidy data of the European Common Agricultural Policy openly available. Loading

FIspace with a lot of such open data could be a sensitive issue, that on the one hand helps the functioning of interesting apps, but on the other hand could act as a barrier if it creates a negative attitude of 'big data, big brother'.

Another issue in this respect is the access of government agencies to the data in FIspace. FIspace offers options of traceability (tracking and tracing) of e.g. food. This is based on the fact that a buyer by contract asks the supplier to make the data on the history of the product available via FIspace (and which that supplier has arranged with his supplier too, see Poppe and De Smet, 2013, T570 deliverable for an example). In case of an emergency (e.g. a horse meat scandal) or an investigation into food crime it is attractive for a government agency (like a Food Safety Authority) to have access to such data.

The government is not only using the sector data in cases of emergencies, but is a regular communicator with businesses, certainly in the area of logistics and farming. This ranges from subsidies in the agricultural policy to customs services. In this type of data exchange the government is not different in its data collaboration than a large company and could use FIspace to exchange data with e.g. farmers or logistic service providers. This has two advantages that we discuss in **Chapter 3.2**. One is synergy and less administrative burden: farmers that have to provide the same data to their buyers and to the government can do this with FIspace more easily, in one platform. Another is that for this reason and others, governments could help to launch FIspace as a way of innovative procurement.

Chapter 3.4 discusses what Open Data could add to this. It explains how it works technically in FIspace and then discusses bottlenecks and opportunities.

Platforms such as FIspace, if successful, could have strong network effects. This can lead to monopoly power of the platform. This is not necessarily a problem if the platform is based on open source standards and data can easily be exchanged with other, comparable services. **Chapter** 3.**3** discusses this aspect. We conclude with a **Chapter 3.5** on IPR issues of the FIspace software, focused mainly on the components of the core platform in order to have coherence with previous chapters and also clarify terms and last and not least: **Chapter 4: Conclusions**

3   Legal Barriers and Opportunities

3.1   Data protection

In developing IT based communication systems that link different stakeholders for improvements in transparency and management issues in agriculture, food, and logistics, data protection plays a crucial role. From stakeholders' points of view, data should only be accessible to those they are intended for and for the use agreed upon. Furthermore, stakeholders emphasize that data ownership is and should remain with those who have collected them as long as there is no agreed transfer of data ownership. In these discussions, a sensitive element is the place data are being stored. Data storage in the cloud is only considered an option, if stakeholders have the choice between storage inside enterprise borders and the cloud. There is widespread understanding especially among SMEs, that data ownership includes the right to be able "… to unplug…" data bases from links to the outside world. Experiences show, that as long as this option is offered, data storage in the cloud becomes more acceptable as an opportunity. Solutions to find acceptance in the sector need to take this into consideration.

These requirements from stakeholders are beyond any regulatory activities on data protection and require a solution for systems to find acceptance in the sector.

To deal with these issues, appropriate IT based communication systems should involve a number of system features with the following system characteristics:

1. Systems for managing access rights
2. Systems that assure confidentiality in data transfer
3. Systems that assure that data reach intended recipient and only the intended recipient
4. Systems that assure proper use of data by recipient
5. Systems that assure confidentiality of stakeholder data
6. Systems that keep data under owner control
7. Systems that assure that data cannot be corrupted by third parties.

The FIspace concept deals with some of these issues if apps are connected via the FIspace platform. Essential features focus on the management of access rights and the confidentiality in data transfer. FIspace does not know data content. It wraps the incoming data stream in a wrapper and sends it onward to either an app for further processing or another partner for processing.

Stakeholder data can be kept with stakeholder owners and remain under their control. However, flexible communication systems require some data to be kept with the FIspace platform. It involves a.o. the ID of the sender, the ID of the receiver, or some data on these business partners (role like buyer, seller, standardizing organisation, service provider etc). This places high importance on assuring appropriate encryption and platform access control.

Assuring proper use of data by data recipient is not yet a focus activity in FIspace development. However, present technology provides opportunities for checking data use, which could be implemented at later stages of development.

As we mention before, FIspace does not know data content. It wraps the incoming data stream in a wrapper and sends it onward to either an app for further processing or another partner for processing.

FIspace does have to manage how app owners use the data that they process. This is why the consortium is very reluctant to allow apps to access external third party data without having to go through the FIspace platform.

It has become widely recognised in the public discussions on privacy, security and surveillance that the content of a message is far less interesting than the metadata. What FIspace knows and stores, while the "business transaction" keeps going, is the ID of the sender, the ID of the receiver, some necessary data on these business partners (role like buyer, seller, standardizing organisation, service provider etc.) and – for internal use – how they use the FIspace software. All of this amounts to a huge amount of knowledge that is both commercially sensitive (it answers questions like who are my suppliers) and potentially a threat to privacy that we should be able to analyse in detail in next document for M24, when the business cases are clearer and the demos are all set.

In order to put this in our European legal context, data Protection is regulated by the European Directive 95/46 on data protection which has then been implemented in all EU countries legislations. This means that more or less all EU countries are governed by the same principles relating to data protection.

Full text is available in here:

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31995L0046:en:HTML

We analyse data protection and data privacy in the same chapter. In our case, there is no big difference between both concepts, but it is worth mentioning that privacy issues inherent in the FIspace concept are similar to those that a telephone carrier has. Governments can request, legally, information based on transactions (who has done business with whom and when), as well as what information on partners has been stored in the platform. As to requesting information on what actually was transmitted between partners, the FIspace will not be able to answer that question. Note that the Fispace must, by legal requirement, maintain non-repudiation data for data sent between partners. Non-repudiation data is information concerning who sent something when and whether it was acknowledged as received by its intended recipient. This is to ensure that no finger pointing, at least with respect to data exchanges, occurs due to the interaction with an intermediary, FIspace.

Everything in FIspace must be easily configurable as laws and regulations will change substantially over the coming years.

3.1.1   Data Ownership & how to overcome psychological barriers

Data ownership is outside of the FIspace's scope. What happens to a partner's data once they let one of their partners have access to it is up to the data owner's contractual relationship with that partner and the legal system in which the partner operates.

In discussion regarding data protection and privacy consideration, the reality in countries might differ from regulatory requirements. Sensitivity of enterprises as well as people might reach beyond regulatory requirements and constitute a real barrier for the realization of data communication schemes that do not respond to these sensitivities. A case in point is Germany which belongs to the most critical countries in Europe and could be regarded as a benchmark for the consideration of data protection and security.

FIspace does not address the legal ramifications of someone in one EU country using services from a second EU country (or non-EU country such as Switzerland or Norway) and selling their goods in a third EU country (or a non-EU country such as Switzerland). This is the responsibility of the two trading partners, not of FIspace. We may anticipate that third party app developers will attempt to address these issues, but the platform itself does not really care. The transaction is just a transaction as far as the platform is concerned.

One might consider SMEs as less relevant in this respect. However, this is not always true, especially regarding the farming community. A well-known example concerns earlier efforts by retail groups supported by certification organizations to collect extended production data from farms for food safety and quality assurance and control. These efforts failed as farmers flatly refused. An individual farmer (SME) might not be able to object, but a larger group of farmers (SMEs) is able to do. It is especially the smaller companies who do not trust and are afraid that their market power is not sufficient to avoid misuse of data that have left their enterprise. It was interesting to note, that in the example described above, the data collection group was always arguing about data security from a technical point of view, while data owners (farmers) argued from an utilization point of view. Both views could not match and prevented an agreement. This example has left deep impression and has prevented retail groups up til now from organizing another attempt.

However, while this example referred to farms, it is also the bigger enterprises who insist on system realizations that allow them to block data access or data use by third parties.

Developing systems with the ambition to fit requirements all over Europe, one has to consider these psychological barriers. FIspace takes care of this by implementing a platform concept where all production data could remain with the producers who have the right to allow or block data access according to their own interest. This structure does not block transparency as data access might be granted where appropriate or granted as part of a business negotiation process.

It could be envisaged and has been discussed within stakeholders in the food sector that data access rights might become part of trade negotiations and product price calculations. Being able to supporting claims on food safety or quality might become an asset in the future which, in turn would place a monetary value on data ownership and data access.

3.2 Opportunities and barriers related to EC Trade, Agriculture and Food policy

There are several reasons why governments might be interested in FIspace, besides the fact that it is an innovative product that is the result of the FI-PPP research program and has the potential to improve the competitive position of several industries.

A first reason is that FIspace helps businesses and government(s) to realize a number of public issues, e.g. in the domain of sustainability (environmental policy), food safety or health. We discuss this opportunity for FIspace in detail in the next sector.

Related to that is the issue of access to data in case of emergencies, which we discuss in section 3.2.2. This is not only an opportunity but also a potential barrier for FIspace.

The third reason why governments might be interested in FIspace is that government is not only using the sector data in cases of emergencies, but is regularly communicating with businesses, certainly

in the area of logistics and farming. This makes government(s) a potential user of FIspace, as their role in this respect is not very different from that of large companies that have to connect to many SMEs.

3.2.1 FIspace supports public issues

The problems of today are the business of tomorrow, as businesses fulfil needs. An illustration of this can be found in the food chain, as illustrated in figure 1. It shows how for instance the input industries are very active with new GRIN technologies (Genetics, Robotics, ICT and Nano-technologies), the farmers with cost prices, and retail with loyalty (to get the current clients back into the shop in the next days and weeks).

In many cases players in the food chain will also try to address public issues, to differentiate themselves from competitors and to fulfil needs from consumers in such issues. Examples include:

- Feeding the world: Given climate change, depleting resources and the fact that we will have to feed 9 billion consumers in 2050 (that will be richer and for 75% living in cities) there are worries over the food situation. Higher production and productivity will be needed. This is reflection in many government policies, including at EU Level, Horizon2020 and the European Innovation Partnership for Agricultural Productivity and Sustainability. For the supply industry in the food chain (including breeding companies and suppliers of machinery) this is a major challenge and opportunity.

- Sustainability: Farming is nearly by definition an industry that pollutes. Biological processes in the open air under changing and unpredictable weather conditions are difficult to manage without losses of inputs and external effects. This includes emissions of CO_2 and water pollution with chemicals. A more sustainable and resource efficient agriculture is an important policy goal.

- Food safety: although food has never been as safe as it is today, the food chain is from time to time challenged by food scares, like the Dioxine, BSE or EHEC crises. Sometimes this is the result of fraud (liquor in Czech Republic; horsemeat in several countries). Not only the industry itself but also governments have strong incentives to reduce food safety risks and several policies address this, including the work of Food Safety Authorities. Policies on animal health and plant health (although often not a food safety hazard) are comparable.

- Health issues: living a healthy life is a major concern and a public issue. Not only the higher health costs due to the aging population but also the occurrence of obesity (and malnutrition with the poor) are a public concern. In several cases there is a (preventive) link with a healthy diet.

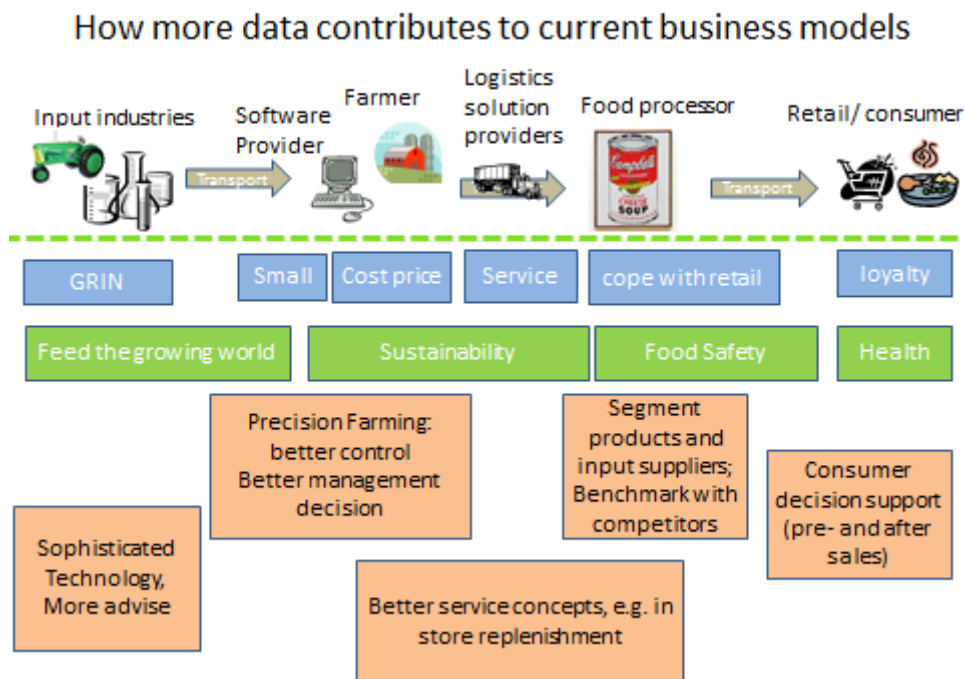## How more data contributes to current business models

Figure 1: *The Food Chain and the need for more data and new business models to address public issues.*

Figure 1 shows how more data intensive business routines, like precision farming, consumer segmentation and consumer decision support might help businesses to integrate public issues like sustainability and food safety into their products and services.

FIspace supports businesses in the more data intensive business routines. This analysis implies that in that way FIspace has the potential to help (governments) to solve public issues by making it easier for businesses to address the public issue in their business process.

3.2.2 Access by governments in case of public interest

Another issue in this respect is the access of government agencies to the data in FIspace. FIspace offers options of traceability (tracking and tracing) of e.g. food. This is based on the fact that a buyer by contract asks the supplier to make the data on the history of the product available via FIspace (and which that supplier has arranged with his supplier too, see Poppe and De Smet, 2013 T570 deliverable for an example).

In case of an emergency (e.g. a horse meat scandal) or an investigation into food crime it is attractive for a government agency (like a Food Safety Authority) to have access to such data. It should be realized that FIspace itself does not contain such data, it only holds the meta-data by which the product can be tracked.

The availability of such data in case of an emergency is makes FIspace interesting for governments. However, such (potential) use can also be a barrier as it might mean that businesses refrain from using FIspace. Therefore it has to be made clear in which circumstances government agencies have access. It would be attractive if these rules are not different between member states, it is unclear if this is within reach.

3.2.3   Government as a partner in data-exchange

The government is a big user of data from business. It often asks businesses to share data in e.g. a procedure to get a subsidy, register a movement of animals or export a product. This ranges from subsidies in the agricultural, environmental and food safety policy to customs services. In this type of data exchange, the government is not different in its data collaboration than a large company and could use FIspace to exchange data with e.g. farmers or logistic service providers.

This has the big advantage of synergy and less administrative burden: farmers that have to provide the same data to their buyers and to the government can do this with FIspace more easily, in one platform.

Some examples might illustrate this. Millions of farmers in Europe have to file each year an application for a direct payment (subsidy) from the Common Agricultural Policy. This file includes data on the crops grown as well as a detailed map (GIS-file) on their farm. In some member states it is possible to generate such forms from the farm management software. Such data (or part of it) is also submitted by farmers to their sugar company and other agri-food industries that use this for e.g. harvest planning and food safety inspections.

Another example is the transport movements of animals and the birth and death of livestock. Such events legally have to be notified with central Inspection and registration data systems. But such data are also used by farmers to inform their breeding organization or their accountant.

A third example deals with the import and export of goods. This requires notification with customs and can include export certificates or declarations of origin. Governments (customs, port authorities etc.) run large IT systems to support such paper work and reduce administrative burdens. Such data (e.g. declarations of origin) are also forwarded to business partners.

The point we want to make here is that it is attractive for businesses that government agencies use the same data standards and infrastructure for data exchange (read: FIspace) as business does. This makes life easier for businesses. It reduces administrative burdens and hence costs, which is an important objective of many governments.

The option to use the FIspace platform as an infrastructure to exchange data between business and government implies an alignment between B2B and B2G. That is a logical development but implies an important shift of mind. Many government agencies are used to create their own proprietary systems.

3.2.4   **Conclusion: the case for innovative procurement**

Governments have several options to promote innovation. These include subsidies (including for R&D), mandates (e.g. on environmental standards). In the last years attention has been given to innovative procurement, the government as a launching customer for an innovative product or service. An example is the provision of organic food in government restaurants.

Policy coherence is an important object within government administrations. The analysis above shows that governments can have several interests to promote the use of FIspace. The examples of B2G data exchange that could use the FIspace platform to reduce administrative burdens illustrate that governments could help to launch FIspace in a program of innovative procurement. FIspace also enables government and business to address some of the public issues that the food chain has to cope with: food safety, health, sustainability and resource efficiency issues. Either by improving business processes

that take these issues better into account, as well as in case of emergencies where the government has to act.

3.3   Monopoly Risk or Abusing Position

A monopoly is a situation in which a single company or group owns all or nearly all of the market for a given type of product or service. By definition, a monopoly is characterized by an absence of competition, which often results in high prices and inferior products. In such instances where a single firm holds monopoly power, the company will typically be forced by competition law to divest its assets. Antimonopoly regulation protects free markets from being dominated by a single entity.[1]

We want to tackle this issue in the policy deliverable to avoid any potential misunderstanding that could arise in FIspace further developments, as the platform could be a provider for several customers that will have no choice of a substitute product. In other words, we need to assess whether FIspace is likely to become a monopoly, and therefore enter into the scrutiny of antitrust law. Why could a monopoly arise?

3.3.1   Sources of Monopoly Power

Monopolies derive their market power from barriers to entry – circumstances that prevent or greatly impede a potential competitor's ability to enter, compete in, or get out of, a market. In addition to barriers to entry and competition, barriers to exit may be a source of market power. Barriers to exit are market conditions that make it difficult or expensive for a company to end its involvement with a market. Great liquidation costs are a primary barrier for exiting[2]. Market exit and shutdown are separate events. The decision whether to shut down or operate is not affected by exit barriers. A company will shut down if price falls below minimum average variable costs.

There are three major types of barriers to entry (economic, legal and deliberate) that can lead to the advent of monopolies.[3]

- *Economic barriers*: Economic barriers include economies of scale, capital requirements, cost advantages and technological superiority.[4]
- *Economies of scale*: Monopolies can be characterized by decreasing costs for a relatively large range of production.[5] Decreasing costs coupled with large initial costs give monopolies an advantage over would-be competitors. In FIspace case, as we are experimenting in our own consortium, the time and money invested is quite considerable. Monopolies are often in a position to reduce prices below a new entrant's operating costs and thereby prevent them from continuing to compete.[6] Furthermore, the size of the industry relative to the minimum efficient scale (MES) may limit the number of companies that can effectively compete within the industry. If for example the industry is large enough to support one company of minimum efficient scale then other companies entering the industry will operate at a size that is less than MES, meaning that these companies cannot produce at an average cost that is competitive with the dominant company. Finally, if long-term aver-

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1   Investopedia: Terms/Monopoly
2   Png, Ivan (1999). Managerial Economics. Blackwell. p. 271. ISBN 1-55786-927-8.
3   Goodwin, N; Nelson, J; Ackerman, F; Weisskopf, T (2009). Microeconomics in Context (2nd ed. ed.). Sharpe. pp. 307–308.
4   Samuelson, William F.; Marks, Stephen G. (2003). Managerial Economics (4th ed. ed.). Wiley. pp. 365–366.
5   Nicholson, Walter; Snyder, Christopher (2007). Intermediate Microeconomics. Thomson. p. 379.
6   Nicholson, Walter; Snyder, Christopher (2007). Intermediate Microeconomics. Thomson. p. 379.

age cost is constantly decreasing, the least cost method to provide a good or service is by a single company.[7]

- *Capital requirements*: Production processes that require large investments of capital, or large research and development costs or substantial sunk costs limit the number of companies in an industry.[8] Large fixed costs also make it difficult for a small company to enter an industry and expand.[9] In FIspace we see how we have had the chance to gather a big amount of companies having a quite important investment. This advantage is good for our future positioning.

- *Technological superiority*: A monopoly may be better able to acquire, integrate and use the best possible technology in producing its goods while entrants do not have the size or finances to use the best available technology.[10] One large company can sometimes produce goods cheaper than several small companies[11]. This could be potentially dangerous for FIspace, due to the fact we can consider FIspace as one big company investing in the same thing all together, which is quite difficult to achieve for small companies.

- *No substitute goods*: A monopoly sells a good for which there is no close substitute. The absence of substitutes makes the demand for the good relatively inelastic enabling monopolies to extract positive profits[12]. In our case, we thought about B2B substitutes and B2C substitutes (described in D500.5.1) and the market is quite competitive right now, even there is no product such as FIspace, there are a few current competitors proposing services partially substitutable to FIspace's functionalities.

- *Control of natural resources*: When a single company has the control of a key natural resource critical to the production of a final good, that company has a monopoly situation. This particular source does not apply to FIspace.

- *Network externalities*: The use of a product by a person can affect the value of that product to other people. This is the network effect (In economics and business, a network effect [also called network externality or demand-side economies of scale] is the effect that one user of a good or service has on the value of that product to other people. When network effect is present, the value of a product or service is dependent on the number of others using it[13]). In that case, there is a direct positive relationship between the proportion of people using a product and the demand for that product. In other words the more people are using a product the greater the probability of any individual starting to use the product. This effect accounts for fads and fashion trends.[14] It also can play a crucial role in the development or acquisition of market power. The most famous current example is the market dominance of the Microsoft operating system in personal computers. Right now we have 0 commercial demand, but we have many important EU players involved and we expect to benefit from some strong network effects. It is however not possible to predict the trend here.

- *Legal barriers*: Legal rights can provide opportunity to monopolize the market of a good. Intellectual property rights, including patents and copyrights, give a monopolist exclusive control of the production and selling of certain goods. Property rights may give a company exclusive control of the materials necessary to produce a good. FIspace aims to provide an open source platform, so this would not apply either.

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[7] Frank (2009), p. 274.
[8] Samuelson & Marks (2003), p. 365.
[9] Goodwin, N; Nelson, J; Ackerman, F; Weisskopf, T (2009). *Microeconomics in Context* (2nd ed. ed.). Sharpe. pp. 307–308.
[10] Nicholson, Walter; Snyder, Christopher (2007). *Intermediate Microeconomics*. Thomson. p. 379.
[11] Ayers, Rober M.; Collinge, Robert A. (2003). *Microeconomics*. Pearson. p. 238.
[12] Wikipedia: Monopoly
[13] Carl Shapiro and Hal R. Varian (1999). *Information Rules*. Havard Business School Press. ISBN 0-87584-863-X.
[14] Pindyck and Rubinfeld (2001), p. 127.

- *Deliberate actions*: A company wanting to monopolize a market may engage in various types of de-liberate action to exclude competitors or eliminate competition. Such actions include collusion, lob-bying governmental authorities, and force.

3.4   Open Data

Open Data refers to data which typically has been collected by governments or government agencies, and which historically has been "locked up" either because it was not made public or because the formats in which it was made public were not machine readable (e.g. pdf, Word). In order to be considered "open data", a data set needs to be "available for anyone to use, for any purpose, at no cost" (ODI n.d.). Historically, the movement for Open Data has its origins in a number of different initiatives or ideas. One important influence has been the emphasis on greater transparency in politics and that political actions should be more "data driven" (McClean 2011). Another influence has been the phrase and subsequent dictum in computer science that "information wants to be free", attributed to Stewart Brand in 1984[15]. This has had considerable influence on Silicon Valley and the political influences emanating from there. Finally, and perhaps most importantly, Tim Berners-Lee proposed a set of principles for publishing data as Linked Data (Berners-Lee 2006) as part of the effort to promote Semantic Web technologies. This initiative led to the creation of the websites data.gov (in the US) and data.gov.uk (in the UK) and these in turn have been imitated across the world. More recently, there also has been a great emphasis on the release of social and commercial value in Open Data, specifically in enabling commercial and non-commercial organisations to build services, applications or other activities based on the available data. There is a strong push towards Open Data across a variety of political actors in the EC (i.e. both national and supra-national) including EC directives (2003/98/EC). In addiiton, the EC is providing a variety of non-legislative support measures to increase the take up of Open Data[16].

The data sets governments have published have usually reflected a wide range of topics, to some extent corresponding to the data collected by the statistics services of the respective country. Typical data sets include (from the UK) school performance tables, health statistics, indices of deprivation by geographical area, traffic information and crime statistics.

Open Data does not involve only government agencies. Data industry organisations including companies that have a traditional business model in collecting and selling data are finding that a move to Open Data is often constructive and positive for their economic viability. There are also many start-ups that are collecting and processing data and then making them available under various business models to third parties. For example, the ODI incubated OpenCorporates (http://opencorporates.com) has data on nearly 70 million companies world wide, and provides that data free to users under certain conditions (Share Alike) or for fee under other conditions.

Worldwide, intellectual leadership, training and support is provided by the Open Data Institute (http://theodi.org) and the Open Knowledge Foundation (https://okfn.org). Apart from the original initiatives in the UK and US, there are now Open Data providers at national and international level around the world. Examples include the EC (http://open-data.europa.eu/), World Bank

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15 http://edge.org/documents/archive/edge338.html

16 http://ec.europa.eu/digital-agenda/en/non-legislative-measures-facilitate-re-use**Fehler! Hyperlink-Referenz un-gültig.**

(http://data.worldbank.org   ),   many   national   governments   (e.g.   http://www.data.gouv.fr,
http://data.gov.au   etc.),   and   many   regions   and   cities   (http://www.dati.piemonte.it,
http://open.glasgow.gov.uk   ).   A   survey   of   worldwide   initiatives   may   be   found   here
(http://globalopendatainitiative.org/survey-and-interview-report/).

3.4.1   Open Data in Agri-food

There has been a substantial growth of Open Data concerning the agri-food system and more and more is of practical use for the sector. There has been a long standing commitment to open data from the UN Food and Agriculture Organisation much of which is currently available as AGRIS (http://aims.fao.org/openagris). This brings together mostly bibliographic data as well as some statistical data from the food and agriculture domain around the world. Obviously, the growing set of national and international Open Data sets have included data relevant to the food and agriculture sector. The following are some examples:

United Kingdom:

- http://data.gov.uk includes many data sets of relevance to food and agriculture including food standards and hygiene data from the Food Standards Authority, data on food law enforcement, agricultural land in Scotland, Nitrous oxide emissions, real time weather data, etc.

- http://www.ecmwf.int

European Commission

- http://open-data.europa.eu provides data sets on food additives, food enzymes, permitted pesticides and herbicide levels, price data for food and agriculture products, common catalogue of seed and plant varieties, etc.

The Netherlands

- https://data.overheid.nl includes data concerning export certificates, and land use data. The emphasis on export certificates for food reflects the fact that the Netherlands is the largest food exporter in the EC.

France

- http://www.data.gouv.fr – a growing collection of data is being made available, not just from government sources but also private commercial or non-commercial entities. Data sets include lists of certified food processing establishments, annual milk production data, surveys of agricultural production by year, etc.

A major concern in most jurisdictions is data protection and privacy (see 3.1). Thus, even though it would be of great public interest, data sets on Common Agricultural Policy subsidies are not generally published. There is a fine line to be tread between serving the public interest in making data public (and thus usable for public and private purposes), and protecting commercial interests. Food scandals and emergencies are driving the push for greater transparency and consequently for more open data. The conflict between greater openness in the food system and commercial interests is an ongoing struggle that various researchers and commentators have noted.

3.4.2   Open Data in Logistics

The portals noted above also include data of relevance to logistics both strategic and on a data to day basis. Understanding transport infrastructure, changes in populations, and the interactions of logistical demands with changes in food production are all areas where open data sets will contribute to potential services. Weather data is an obvious area of relevance.

Potentially, as the move to Smart Cities becomes more apparent, real time data on traffic, weather and other data sets will be available from municipalities and other local authorities which could be a great use to transport companies.

3.4.3   Implications for FIspace

As a platform seeking to provide support for a variety of applications and the integration of those applications into business processes, FIspace needs to bear in mind in its design, architecture and governance models the existence of Open Data and the large variety of potential "apps" built on open data which could be offered on FIspace. The most typical use case will be advice services or decision support systems which integrate local contextual data (from the end user) together with external data either from Open Data sources or from commercial services. Put together, the data would enable a specific advisory service, prediction or decision support system to be offered within the platform. At one level, Open Data is *just* data and thus equivalent to any other data that passes through the FIspace platform. From another perspective, Open Data is qualitatively different in that it tends to be from government agencies, and carries a degree of validity that other data does not. However, provision of government data by intermediaries may dilute the confidence that end users have.

There are number of aspects to consider:

1. **Architectural infrastructure** which enables easy integration with existing data providers (open data portals, application develops associated with them) will greatly facilitate the uptake of the FIspace platform.

2. **Provenance** i.e. quality and validity of data. Clarity must be established in order for end users to know where to turn in order to ensure that the data (and corresponding decision support) is based on valid data. Note the parallel with law concerning consumer purchases. In most EC jurisdictions if there is a problem with a product the retailer is legally responsible (even if they try to push the responsibility off to a supplier). If FIspace is seen as the "retailer" (in some metaphorical sense) then data integrity becomes an issue.

3. **Privacy and Commercial Confidentiality.** There are strict laws emanating both at the EC and national levels governing the protection of privacy. Equally there is strong pressure to protect data that is seen as commercial sensitive or which could potentially weaken the competitive position of companies. However, data integration from multiple sources has great potential to eliminate such privacy. This danger needs to be borne in mind and balanced against the huge potential for these data sets to be beneficial both to the agri-food and logistics sector, and to wider society.

Case Study: Homologa

Homologa (http://www.homologa-new.com) is a Geneva based company which brings together pesticide and herbicide data from government agencies around the world. This data arrives in a variety of formats and is processed and cleaned by them and then provided to food companies around the world. The data they collect is in varying degrees "open" in the sense that it may reside in legislative documents, pdf files or machine readable formats. The added value of their service is that food producers can know exactly what is permitted and what is not in the use of pesticides as well as knowing Maximum tolerance levels for agri-chemicals. This kind of company is an obvious potential user of FIspace. Currently it offers its data through entirely traditional means (subscribing to data sets, or receiving specially generated reports). There is no integration into other platforms or any "apps" or crop advisory services.

3.5   IPR Issues

Policy and regulation could easily include IPR issues due to the close relation between them. Finally, we decided to keep IPRs in his own deliverable included in T550 in order to link it with the exploitation and business models, so we do not create an IPR policy in an isolated way, but in constant coherence with the exploitation plan and the future potential outcomes so we can facilitate also internal discussion.

What we want to include in this deliverable about IPR is mainly a summary of the different licenses used in the project: components, background and apps.

This is the information we have so far about the components:

Nr.	Component	License	Background
1	SDK	Apache 2.0	No GE background
2	Front-End	Apache 2.0	Store - Wstore, Application Mashup - Wirecloud
3	Data & System Integration	Apache 2.0	Mediator GE
4	EPM	CEP GE License	CEP GE
5	BCM	Apache 2.0	No GE. Based in BizArtifact
6	CSB	Private Software	No previous GE : Terms and conditions to be defined
7	Store	Apache 2.0	Wstore
8	IDM	FRAND	Content Based Security GE
9	Content Based Security GE	FRAND	Identity Management GE, Access Control GE

10	Access Control	TBD[17]	Access Control GE
GE	Mediator GE	Apache 2.0 + FRAND	WSO2 ESB + ICT-Service
GE	Store - Wstore	European Union Public License (EUPL) 1.1.	None
GE	Application Mashup - Wire-cloud	Open Source	None
GE	CEP GE License	Apache 2.0	None
GE	Content Based Security GE	FRAND	None
GE	Identity Management GE GCP	FI-PPP Collabora-tion Agreement	None
GE	Access Control GE THA Impl	TBD by Thales	None

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[17] Following procedures from FIware

4   Concluding Remarks

Fispace is essentially a communication platform that links partners and their own 'ecosystems' to each other and to 3rd parties who provide or process data.

FIspace therefore performs the following duties;

1. Setting up any requested link between partners and data providers based upon the protocols required, the envisaged volume and the regularity of the needed data.
2. Proving the link and testing the data transmission to sign off by the partner.
3. Managing the communication flow.
4. Resolving issues, ensuring data security during the period it moves it between partners and effi-cacy i.e. data arrives in the same format it was sent.

It engages with partners at two levels;

1. Through an initial agreement with the partner stating the ownership of liability for the use of the data, the resolution process for disputes, the terms of use of the platform etc.
2. Through agreements per communication message that state the parties sending and receiving the data, the regularity of the data, the size of the data packets and other base information.

The underpinning principle of the FIspace platform is that it provides enabling technology and is not interested in the nature of the data being moved. It stores no data apart from the basic essentials to enable the data movement and certain details about the partners sending and receiving the infor-mation. This last element is to allow better problem resolution.

Therefore, the only direct constraints on the FIspace platform to allow it to perform its function are data privacy laws and the usage of the stored data.

The impact of indirect constraints however needs to be considered when analysing the barriers to successful exploitation.

4.1   The challenge of financial liability for failure of the platform

The major concern however is around the issue of data ownership and corrupt data files preventing the proper working of the platform. As FIspace is intended to be a business enabling technology then many organisations will be relying upon it to function correctly to allow them to exploit their commer-cial opportunities. Should the platform fail for whatever reason then they could incur financial loss which they would look to mitigate somehow. The normal method to do this would be through imposing penalties on the platform for not meeting an established agreement. If FIspace is successful there could be many of these types of agreements in place and therefore any failure could be very expensive. FIspace would look to offset this liability to the partner / app developer who may have created the fail-ure through poorly written code or data corruption. However, the same financial liability would now be placed on this organisation / individual and therefore this could also be very expensive, if not ruinous, to them. This issue could prevent the full exploitation of the platform as no-one wishes to have to sign a 'blank cheque' for a single failure that disrupts the entire platform. In actual fact, this issue becomes even more challenging as 3rd party organisations who are supplying data to the partner via FIspace may

be the cause of the issue but they would have no liability apart from what they have agreed with the partner. So the failure may not be the partner's problem but they then become liable.

To resolve this challenge, the FIspace platform needs to continue to work even if there are processing issues with certain files. The technical challenge is to guarantee that there is 100% up time even if certain processes do not complete correctly. It is also to ensure that the failure in one partner's process does not have a consequential impact on all other partners.

The limitation of liability must also be restricted to the amount of money that the partner puts into the FIspace platform originally unless there are legal exceptions.

The financial liability issue must not be a barrier to uptake of the FIspace platform.

4.2   The challenge of jurisdiction

FIspace is designed to be neutral but it has to operate within a legal framework. This would normally be the laws operating in the country where the FIspace is incorporated either as a Foundation or any other legal organisation. As FIspace will cross borders with regards to data communication then the laws that can only be applied will be the ones in the incorporated country. This would need to be clearly stated in the agreements with the partners. If the laws are different in the countries they wish to operate in then it would become their responsibility to ensure they were complied with.

This does require the partner to understand the nature of the laws in operation in the countries using their application. This is not a barrier as such to FIspace but does place constraints and potentially barriers to the partners wishing to exploit the platform.

4.3   The challenge of flexibility vs. legal constraints

FIspace needs to be able to balance legal obligations with the freedom of app developers and organisations to create new business models and opportunities.

It is imperative that the minimum amount of legal constraints needs to be placed on the partners using the platform. Rules constrain creativity and a 'light touch approach' towards the use of the platform needs to be maintained to encourage greater acceptance and exploitation. There will be an ongoing challenge to FIspace to ensure that legal considerations do not become a barrier to usage.

4.4   Overall conclusion

Creating a neutral platform for businesses to collaborate across borders is somewhat more challenging than normal cloud based solutions, in that, commercial exploitation requires risks to be taken, investments to be made and commitments of time and energy to be undertaken by the partner community. The FIspace platform enables new opportunities for these partners but at the same time they are placing considerable reliance back on the platform to perform effectively. Individuals using cloud solutions may not lose out financially if their platform is unavailable but commercial organisations will.

FIspace therefore needs to balance the constraints of having to work within a legal framework for its own protection and at the same time provide flexibility to the partner community to create their new business opportunities. The power of harmonising rules over data security and usage across the participating countries can therefore also not be underestimated.

Therefore the exploitation of FIspace as an opportunity for new business models is a balance between the constraint of the legal framework it needs to work in and the flexibility required by the partners. This needs to be maintained throughout the evolution of the platform. It is crucial that this balance is identified and enshrined somehow in the principles of FIspace so that one element does not compromise the other and ultimately kills the opportunities provided by the platform.

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