



Business Innovation Observatory



Traceability across the Value Chain

Standards, processes and traceability

Case study 42

Internal Market,
Industry,
Entrepreneurship
and SMEs

The views expressed in this report, as well as the information included in it, do not necessarily reflect the opinion or position of the European Commission and in no way commit the institution.

Traceability across the Value Chain

Standards, processes and traceability

Business Innovation Observatory
Contract No 190/PP/ENT/CIP/12/C/N03C01

Authors: Diederik Verzijl, Elco Rouwmaat & Kristina Derojedada, PwC Netherlands, and Laurent Probst & Laurent Frideres, PwC Luxembourg.

Coordination: Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Directorate J “- Industrial Property, Innovation & Standards”, Unit J.3 “Innovation Policy for Growth”.

European Union, February 2015.

Table of Contents

1. Executive summary	2
2. Standards, processes and traceability	3
2.1. Presentation of the companies	5
3. Socio-Economic Relevance	7
3.1. The market potential of the trend	7
3.2. The social potential of the trend	8
3.3. Value chain dynamics	9
4. Drivers and obstacles	9
4.1. Proof of return on investment	9
4.2. Trust and reliability	10
4.3. Divergent, overlapping, or unclear regulations	10
4.4. Lobbying efforts and the selection and definition of standards	10
4.5. Lack of market and technology maturity	10
4.6. International trade and the globalisation of markets	11
5. Policy recommendations	11
5.1. Introduction of more clarity in the regulations	11
5.2. Improve transparency and equitability of lobbying efforts	12
6. Appendix	13
6.1. Interviews	13
6.2. Websites	13
6.3. References	13



1. Executive summary

Standards and processes as enablers of traceability imply criteria for products, services, and production processes that allow companies to trace their goods and materials through a value chain. Supply-chain actors can increase traceability when they adopt shared standards on specific practices and methods.

Despite the potential benefits of standardisation efforts that enhance traceability, SMEs involved can suffer unwanted consequences that relate to increases in administrative burden, in time and energy spent, and in lost commercial opportunities. As a result, demand for innovative technological solutions has emerged that would allow companies to engage with traceability-enhancing standards in a way that benefits their company. Innovative entrepreneurs now try to address this demand by developing solutions that help companies adopt and adhere to standards that enhance traceability in ways that improve their business processes. These include product authentication and counterfeit protection solutions, cloud-based solutions for document storage and transmission, and identity and access management solutions.

Entrepreneurs in solutions for standards that enhance traceability are convinced of the commercial potential of their products, as they believe traceability-enhancing standardisation will become more important for all industries. However, they are well aware of the impact that government decisions and public policy can have on the marketability of their products and services. Depending on how traceability standards are defined and implemented, their turnover may soar or may fall.

As a result, they are keen to understand and influence the process of government decision making, and they worry about the influence that large organisations with vested interests may exert on the definition of standards that improve traceability. As these entrepreneurs are typically

innovative, technology driven SMEs, they know that large industry players can easily outspend them with any lobbying strategy they might consider.

However, their solutions are important for Europe. The economic recovery the continent enjoys is still modest at best, and economists look at SMEs to drive per-capita wealth gains, economic growth, and developments in innovation. At the same time, these SMEs report challenges that include finding customers, gaining access to finance, and dealing with external regulations. These are precisely the challenges that entrepreneurs attempt to engage with their solutions towards standards as enablers of traceability – although the benefits on offer are likely to become manifest indirectly.

Moreover, developments in international trade and the globalisation of markets, as well as their effect on supply-chain complexity, will increase the need for SMEs to engage with traceability standards, and will solidify the demand for solutions towards standards as enablers of traceability even further. Furthermore, the extent to which entrepreneurs in standards solutions can demonstrate sufficient return on investment to their buyers will influence their potential success, as will their reliability and the trust between them and their buyers.

Clear barriers that these entrepreneurs will need to overcome are related to divergent, overlapping, or unclear regulations, to maturity of the market and the technology, and to lobbying efforts and their impact on the selection and definition of standards. In order to help them steer clear of these obstacles, governments and public bodies could attempt even more to deliver clear, straightforward requirements that do not change too often, and that maximise on the possibilities that information and communication technology offers. Also, further steps can be taken to improve transparency and equitability of lobbying efforts.



2. Standards, processes and traceability

The concept of standards and processes as enablers of traceability refers to criteria for products, services, and production processes that help companies to trace their goods and materials as they make their way through a supply chain. Traceability of assets, such as goods, materials, intermediates, and employed production methods, is enabled by supply-chain actors adopting shared standards and providing certificates that demonstrate specific practices and methods.

This case study is part of a series of three case studies on traceability across the value chain. Where the other two case studies focus on the technological innovations that drive developments in advanced tracking systems and new anti-counterfeiting methods, this case study analyses developments in traceability across the value chain specifically through the lens of standards and processes.

For the benefit of this case study, it is relevant to briefly explain what standards are. Standards are collections of voluntary and obligatory criteria for products, services, and production processes, that relate to their technical and quality aspects. Standards may help businesses cooperate and can drive down the cost of consumer products. Standards enable consumers, businesses, and regulators to rely on the quality of the products and services they obtain, in effect serving as a public benchmark. Similarly, certification is a process in which it is determined to what extent a product or service meets the standard, code or criteria developed for that product or service. Certification can relate to the source, substance, quality, manufacture, performance, described features, precision, ruggedness or other characteristics of a product or service.

Standards have clear advantages, and in competition on international markets standards can sway the balance. Standardisation of electronic chargers for consumer products can increase opportunities for economies of scale and can drive consumer demand through the subsequent cost reduction and increased ease of use. Similarly, standards for rechargers of electric cars can speed-up their mass diffusion.

It is widely considered that good standards can ease the life of consumers, will promote sustainability, and may improve European competitiveness and technological leadership.¹ For that reason, the overall objective of standardisation efforts in Europe is to enhance the international competitiveness of European companies by removing technical obstacles to trade. International interoperability encourages the exchange of goods and services through the use of common, aligned technology standards.²

Notwithstanding the potential benefits of standardisation and certification efforts, SMEs involved may experience unwanted effects in terms of an increased administrative burden, time and energy spent, and lost commercial opportunities. This has driven demand for innovative technological solutions that allow companies to engage with standards and certification in a way that benefits their company.

These unwanted effects are especially pertinent in case of standards that relate to traceability across the supply chain. Continued globalisation and the increasing levels of interconnectivity amongst markets, sectors, companies, and consumers has significant impact on the supply chains through which our most every-day products are produced. Manufacturers source materials and components in country A, manufacture their products in country B, and distribute these products to a number of other countries. These products then have to meet the specific requirements and standards applied to them in several different countries. SMEs involved in the manufacturing of these products will have to adhere to each of these standards. To comply with such a multitude of standards is costly, time consuming, and may result in redundant testing. Moreover, if requirements across countries are contradictory or mutually exclusive, it may be necessary to develop several models of the same product in order to access different markets. To combat these unwanted outcomes, harmonisation efforts are conducted on standards, which include finding commonalities in differing requirements, identifying critical elements that need to be retained, and defining a common standard.

At the same time, standards as enablers of traceability in the supply chain have a clear socioeconomic impact. Through standardisation in the field of industrial policy, innovation and technological development is expected to revitalise economic recovery and to aid job growth.³ Recent reforms to improve Europe's system of standardisation have attempted to increase the inclusiveness, speed, responsiveness, flexibility, and transparency with which standards are defined, and to optimise the scope and coverage of defined standards.⁴

As this case studies will show, the process through which standards are defined is of relevance to the companies and entrepreneurs that need to work with them. That is why it is valuable to briefly consider how standards are designed and formulated. European standardisation efforts are typically geared to:⁵



- Aiming for the widest possible coherence between international and European standards;
- Promoting the technical alignment with (or the adoption of) international or European standards outside Europe whenever possible, in order to reduce technical barriers to trade;
- Capitalising on international cooperation in research and innovation to foster the international alignment of technical specifications and requirements;
- Raising awareness and promoting the advantages of European standardisation as a coherent regional system embedded in and fully supporting international standardisation and multilateral regulations;
- Contributing to the bilateral regulatory/policy dialogues between the EU and third countries, as well as to the relevant chapters of free trade agreements negotiations.

Standardisation efforts are typically led by standardisation organisations that facilitate communication, collaboration, and negotiation on standards and certification efforts. In Europe, the most important standardisation organisations include CEN, CENELEC, and ETSI.⁶

Harmonisation of standards may occur at the national level, at the international (European) level, or at the sectoral level. Harmonisation of standards at the international level typically involves the adoption of an international standard prepared by international standardisation organisations such as the International Electrotechnical Commission (IEC) or the

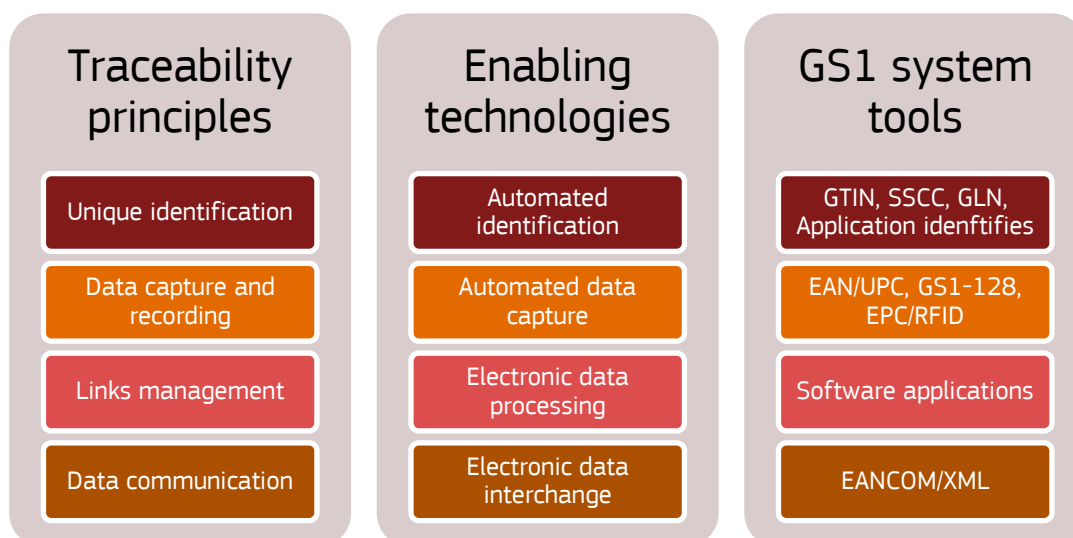
International Organisation for Standardisation (ISO). Such preparations may involve multiple rounds of stakeholder consultation. When support for a harmonised standard is sufficient, an international standard is defined that allows for necessary national differences, while aiming to keep these at a minimum.

In certain sectors, businesses have been hesitant to adopt specific standards that impact traceability, while others have attempted to do so but have not benefited from the positive effects expected from standards in their sector.⁷ However, the increased complexity of international supply chains has created demand for solutions that engage standards and certification as enablers of traceability.

Traceability and visibility of value drivers along the supply chain has become the responsibility of all organisations in the value chain, from the raw-materials provider to the retailer that sells to the end customer. This is due to more extensive regulation, more severe security threats to the goods and materials transported along supply chains, and the demand for fast, flexible, and secure exchange of information on supply chain events such as deliveries, payments, and transportation movements. For illustrative purposes, Figure 1 shows the relationships between traceability principles, enabling technologies, and system tools provided by a standardisation organisation – in this case GS1, which is involved with the design and implementation of global standards and solutions to improve the efficiency and visibility of supply and demand chains globally and across sectors.

Entrepreneurs have engaged these issues by developing solutions to help companies adopt and adhere to traceability standards in ways that benefit their business processes. The solutions featured in this case study are described in Table 1 on page 5.

Figure 1: Key traceability principles and implementation grid that links the principles to enabling technologies and GS1 System tools



Source: Adapted from GS1

**Table 1: Overview of the company cases referred to in this case study**

Company	Location	Business innovation	Signals of success
AlpVision	CH	AlpVision successfully deploys Fingerprint™ at the industrial level, a unique and breakthrough covert anti-counterfeit solution that tracks and authenticates mass produced objects manufactured by moulding. It works with eCOM and EPC/ePedigree standards.	<ul style="list-style-type: none"> - In 2001, the company invented a breakthrough authentication technology, widely used today by Forbes 2000 companies; - AlpVision reached profitability in 2003 and has grown steadily ever since; - In 2011, AlpVision was selected as a top 3 finalist at the Swiss Technology Award 2011 among 70 innovative projects.
Prologue	FR	A cloud-based solution that allows organisations to store, sign, time-stamp, and transmit sensitive documents based on regulation, standardisation, and certification of information and documentation requirements.	<ul style="list-style-type: none"> - Prologue has successfully expanded globally, with offices in five countries in Europe, North America, and South America;
BrandBank	UK	A solution that captures all of a products images and PAC data to allow online buyers to know everything there is to know about that product, via digital brand content for food and grocery eCommerce sites, mobile apps, and virtual merchandising systems.	<ul style="list-style-type: none"> - BrandBank's worldwide customers include Asda-Walmart, Booker, Boots, Kiddicare, Makro, Musgrave Group, Sainsbury's, Tesco, Waitrose and many more retailers and wholesalers; - BrandBank also services over 6,000 suppliers and manufacturers of well over 250,000 products; - 'Best Companies 2012' awarded BrandBank two stars, based on employee satisfaction and feedback, ranking them as an 'outstanding' business
Is4it	DE	An identity and access management solution that helps companies integrate their complex system environments in a way that generates increased usability and user-acceptance while increasing system efficiency.	<ul style="list-style-type: none"> - IS4IT was honoured by Bavarian Ministry of Economic Affairs, Infrastructure, Transport and Technology with the Bayern's Best 50 Preisträger 2013; - IS4IT also gained the KONUNU Open Company award

2.1. Presentation of the companies

Problem 1 – With ever more business value being created and exchanged in the digital world, it becomes increasingly important for companies to digitally protect their assets, products, and value drivers.

Innovative solution 1 – AlpVision has developed product authentication and counterfeit protection solutions, e.g. through brand protection and document security. Its digital invisible technologies can be applied to a variety of branded products, including cartons, labels, leaflets and blister packs as well as bottles and caps, electrical appliances, and mechanical parts. It employs digital invisible marking that is printed using regular ink and standard printing processes. It works with eCOM and EPC/ePedigree.

AlpVision Fingerprint is a unique and breakthrough covert anti-counterfeit solution that tracks and authenticates mass produced objects manufactured by moulding.





A regular smartphone equipped with AlpVision's custom product authentication application can also be used to verify the authenticity of a moulded part.



Source: AlpVision

Problem 2 – A growing number of organisations is required to share and transmit ever-more documents digitally, with standards and formats that are becoming ever more complex, while the legal and real-world impact of these documents are intensifying every day.

Innovative solution 2 – Prologue has developed a software solution that helps organisations to handle their documents that are subject to regulation and standardisation of information requirements. The solution allows sensitive documents to be stored, time-stamped, signed, and transmitted via the cloud, including enterprise legal archival centres and private archival centres for individual citizens or employees. By working with cloud-computing technology, Prologue can dynamically adjust the formatting and the structure of these digital documents as formal standardisation requirements and regulations change.

Prologue offers digital archiving for a company's own documents, as well as the possibility of filing any document into the individual Document Safe of its employees, customers and partners.



web

Source: Prologue Group

Problem 3 – When dealing with traditional retail environments, the work processes of manufacturers are well understood. They produce products, source raw materials and put them together, create the packaging, and move them into the retail distribution system to generate value. When broadening their efforts to include online retail environments, some manufacturers find it difficult to replicate these steps in the digital world, to represent their product online with the same ease as they do in stores.

Innovative solution 3 – BrandBank captures all of a products images and PAC data to allow potential buyers to know everything there is to know about that product. Suppliers send product samples to BrandBank, which digitises product images and data, and distributes this content automatically to retailers where it is available for multiple purposes including eCommerce.

As such, BrandBank provides retailers with a fast and efficient way to generate value from new eCommerce e-shops and mobile shopping apps. Also, BrandBank's solution offers an easy and cost-effective possibility for suppliers to distribute their rich brand content in the form of images and product information to retailers.

BrandBank works extensively with product-labelling regulation (EU) No 1169/2011.

BrandBank digitises product images and data, and automatically routes these from producers to retailers



Source: BrandBank

Problem 4 – When handling and protecting their sensitive information, organisations are facing increasing demands of user administration and access and authorisation management, leading to systems that are inefficient, unresponsive, and hard to use.

Innovative solution 4 - IS4IT has developed an identity and access management solution that helps companies integrate their complex system environments in a way that generates increased usability and user-acceptance while increasing system efficiency.



The modular solutions IS4IT form a bridge between on the one side the complexity of connecting different system environments integrated with multiple processes in lifecycle management, and on the other side the simple, understandable implementation and usability required in most working environments.

IS4IT works extensively with IT security standards EDI, EPC-RFID, and MDM.

IS4IT allows organisations to observe all statutory, contractual, and internal rules and prove their compliance on this at any time – while maintaining flexibility, operating efficiency and cyber-security



Source: IS4IT

3. Socio-Economic Relevance

3.1. The market potential of the trend

The increasing complexity of supply-chain risks, regulations, and opportunities, has created a market for solutions that help supply chain actors to adopt and adhere to standards that enhance traceability.

Entrepreneurs in this market believe it to have a tremendous potential. The CEO of AlpVision points to the tobacco industry as an example of standardisation and traceability issues driving demand for their solutions. For decades, the tobacco industry struggles with product counterfeiting and supply-chain irregularities. As tobacco boxes are in very high quantity, and as price efficiency related to tobacco packaging is one of the enablers of competitive pricing strategies in the industry, any solution towards securing tobacco packages throughout their route along the value chain needs to be of very low cost. At the same time, it should not complicate handling of the boxes by transporters, retailers, or consumers, and it should have no impact on the visual identity of the packages.

AlpVision believes the solution it offers to be the best available now and in the foreseeable future. However,

“Our solution is the best. If regulation favours invisible security, brand owners will turn to me and I will get 100% of the tobacco packaging market in Europe. But if I’m not good at lobbying, I will lose all my current revenue.” – AlpVision

optimal deployment of their solution hinges on regulations in the tobacco industry. If these regulations develop towards favouring their solution, AlpVision expects to be able to gain 100% of the tobacco packaging market in Europe, which would effectively quadruple their turnover. At the same time, if the current and future

lobbying efforts coming from the sector lead to regulations that do not favour AlpVision’s solution, the company finds itself exposed to the risk of losing all revenue it currently generates from the tobacco industry.

Similarly, the CEO of Prologue sees a huge market potential for his solution that deals with digitally storing, signing, time-stamping, and transmitting sensitive documents. For

some document types, legal archives require organisations to store data for ten, twenty, and in some cases even fifty years. Also, organisations are continuously pushing for more possibilities for electronic document exchange. In France, Prologue estimates the market size for their solutions at EUR 7 billion per year, including project fees, consulting fees, operation fees, and hardware costs. Between 2012 and 2013, Prologues revenues have increased with 13%. They estimate the market size in the UK and in Germany at EUR 10 billion per year each, and extrapolate this to the European level at EUR 25 billion with a growth perspective of 15% annually.

This line of reasoning can be found throughout the market for solutions towards standards and certification as enablers of traceability. Entrepreneurs expect traceability through standardisation to grow both across industries and across geographies. While this expectation fuels their estimations of the market potential for their products and solutions, they are at the same time very aware of the impact that government regulations and industry-wide decisions have on their business.

Therefore, they are very keen on understanding and influencing lobbying efforts and processes, and lament the influence that larger organisations with vested interests may have on standardisation outcomes. These entrepreneurs understand that even though

“I am not heard. When I see the budget of some of the lobbying parties here, they are 100,000 times my budget.”

AlpVision

standardisation efforts to enhance the traceability of products will increase, they will be left out if standards are shaped in a way that disqualifies their solutions. As a result, they fear their typically smaller size will negatively influence the extent to which they can make themselves heard. Compared to large, established companies, smaller companies typically have less resources available to conduct lobbying efforts, and consequently face more challenges when bringing their innovative solutions to the fore.



3.2. The social potential of the trend

As nearly 99% of European companies are SMEs, their role in the European economy is crucial.⁸ They play an important role in the creation and retention of private-sector jobs, and generate more than half of the added value in Europe. SMEs are considered to be of key importance to per-capita wealth gains, economic growth, and developments in innovation and R&D.⁹

At the same time, SMEs in Europe bear the brunt of the global economic downturn. In most countries, developments on indicators such as value added by SMEs, number of SMEs, and people employed by SMEs has stagnated or worse.¹⁰ Entrepreneurs involved in SMEs report that their most pressing challenges include finding customers, gaining access to finance, and dealing with regulations presented by governments and industry organisations.

The innovations presented in this article show a clear social potential through two lines of reason. Firstly, their deployment can engage the challenges faced by SMEs, and secondly, their development generates work and employment across SMEs in Europe.

Regarding the first argument, the solutions presented in this case study have the potential to address and alleviate the challenges to SMEs described above. BrandBank can help SMEs increase their online e-commerce potential and allows them to operate more efficiently when dealing with retailers. The tools offered by Prologue offer the possibility of improving their electronic communication with banks, regulators, pension funds, and other organisations that require accurate and secure handling of administrative documentation. Moreover, standards have the potential to create a level playing field on which SMEs compete, to help improve allocation of resources, to allow access to state-of-the-art technology.¹¹ As such, standards are a very important factor for SMEs. Therefore, it is of great importance that SMEs understand how standards can add to a business environment that is more conducive to smaller companies, and that they gain insight in the ways in which they can participate in processes that change and improve standards.

The second argument can be supported in similar detail. Entrepreneurs in solutions towards standards and certification as enablers of traceability typically are small to medium-sized high-tech enterprises. AlpVision reports to have forty competitors in its market space alone, all small companies with ten to twenty highly skilled employees that work on high-tech, cost efficient solutions. This shows that the development of the type of innovations described in this article is done by small, high-tech companies of the sort that is known to generate jobs and economic growth.

The benefits that standards solutions promise to SMEs are likely to become manifest indirectly. For instance, standards and certifications that enable traceability can reduce costs by limiting the need for an excessive inventory of products, parts, or materials. By driving down excessive inventory, both on sites and in-transit, and by proactively responding to incoming and outgoing information, SMEs can reduce costs and have less waste in their supply chain.¹² The significance of these advantages can be demonstrated by two examples that will be described below.

Influencing supply-chain costs constitutes a first example of an indirect manifestation of the benefits that the trend of standards, processes and traceability offers to SMEs. Rising supply-chain costs constitute a major issue for European SMEs, and for most entrepreneurs they are one of their top priorities. They try to address them by improving their systems and processes, both within their own organisation and between them and their buyers and suppliers.

Research done by the Aberdeen Group¹³ shows that high-performing companies are 1.85-times more likely to redesign their sourcing activities, and that they are 1.62-times more likely to optimise their supply-chain logistics. The study suggests that high-performing companies attempt to improve their supply-chain efficiency through higher levels of control and coordination with their buyers and suppliers. Moreover, the high-performing companies that work internationally with buyers and suppliers and manage to increase their supply-chain efficiency do so by adopting specific standards, such as GS1 standards for electronic communication between organisations. The study by the Aberdeen Group suggests that these companies are two times more effective at managing their supply chain.¹⁴

A second example of advantages that standards and certifications as enablers of traceability may indirectly offer to SMEs relates to supply chain security. This applies especially to SMEs that operate in the high-tech industry, since most products sold nowadays contain at least one high-tech component. As the industry's rapid growth over the last two decades has driven the development of products of high value, supply chains and their vulnerabilities have also been noticed by criminal organisations. According to the Transported Asset Protection Association, European companies lose over EUR 8.2 billion every year through the theft of high-value products, parts, and components transported over supply chains in Europe. The top four stolen products include consumer electronics, metals, premium food and beverages, and clothing and footwear.¹⁵ Standards and certifications that enable traceability, as well as technological solutions that allow companies to adopt and adhere to these standards, can help SMEs prevent theft and associated value losses.



3.3. Value chain dynamics

Entrepreneurs that offer solutions towards standards and certification as enablers of traceability are located on the value chain in between technology developers on one side and companies adopting and adhering to standards and certification on another.

More specifically, the companies described in this report are all situated on the value chain between on the one side the technology companies that supply them building blocks of hardware and software, and on the other side the producers, transporters, and retailers that require their innovative concepts and solutions to adopt and adhere to standards to increase traceability of their goods along the value chain.

Typically, these entrepreneurs are not involved with any standardisation efforts directly. In many cases, they are directly involved with developing the information and communication technology or devices that enable their innovative solutions to deliver benefits.

However, they do not start from scratch, drawing on the technological developments of other companies that serve as their suppliers. They typically combine advances in software development, cloud computing, advanced analytics, and the increased opportunities offered by mobile and portable devices, with a novel view on product routing, tracing of packages, document storage, protection and handling, and data transmission and exchange.

The resulting solutions constitute the value that entrepreneurs in solutions towards standards as enablers for traceability add to existing technology for manufacturers, transporters, and retailers. In some cases however, new solutions can be developed without the need for new technological underpinnings.

The activity that adds this value takes place within the companies that think-up, design, develop, and market, these solutions. This takes specialised knowledge of specific challenges related to standards as enablers of traceability, and of specific risks and weaknesses, as well as in-depth analysis of specific markets and value chains. It also requires a strong understanding of the technologies underlying a traceability solution, which may include mobile app development, advanced encryption technology, big data analytics, and cloud computing concepts.

“It is not only technological excellence. How can you develop something that you can sell? You might need technology for that, but not always.” – AlpVision

Solutions towards standards and certification as enablers of traceability can have significant impact on value chains in Europe. These solutions have the potential to enhance the effective and efficient flow of goods, information, and funds across trading partners across the continent. This will require an awareness of and control over multiple sources of information, including product orders, financial flows, and logistical activities, which these solutions can improve. The same applies to responsiveness of value-chain actors towards unforeseen events, which will require control-tower approaches and solutions that go beyond track and trace solutions.¹⁶

4. Drivers and obstacles

The development and uptake of solutions towards standards and certification as enablers of traceability are driven by developments in international trade and the globalisation of markets, and their associated impact on supply-chain complexity. At the same time, their uptake hinges on the extent to which they can demonstrate sufficient return on investment, on the reliability of solution providers and the trust between them and their buyers, on divergent, overlapping, or unclear regulations, on maturity of the market and the technology, and on lobbying efforts and their impact on the selection and definition of standards. These drivers and obstacles are discussed in more detail below.

4.1. Proof of return on investment

Proof of return on investment (RoI) is an important driver for the implementation of innovative solutions that help the adoption of traceability standards. The return on investment generated by solutions towards standards as enablers of traceability should be realised through increased productivity and reduced waste at the side of the client adopting the solution. As the functionalities offered by these solutions are often not part of the client's core value proposition, the anticipated RoI typically needs to be evident upfront and realised in a short amount of time.



An effective response to meet this key success factor for a vendor, is to adopt a Software as a Service (SaaS) value proposition. When doing so, the software or solution provider offers his functionality as an online service, which means that the client does not have to purchase the software, but instead pays a periodical fee for receiving the service. The service provider often ensures installation, maintenance, and operation of the software solution. By offering SaaS, the client does not have to make an upfront investment before any return is realised on implementation of the new technology. In contrast to a mere license, for which the client pays an annual fee per user, SaaS offers the client a certain benefit, e.g. secure and effortless document storage (instead of merely a software product), from day one.

4.2. Trust and reliability

A critical success factor in the diffusion of solutions towards standards and certification as enabler of traceability is related to a mentality of trust. Especially smaller companies need to be ensured that the information they disclose is secured and protected when complying with specific standards or when providing certificates. In essence, the client company needs to be willing to trust the supplier with confidential information and effectively part of its company security, and needs to adopt new or altered working processes.

Companies require proof of concept before they can be found willing to make the changes that the implementation of these solutions requires. For instance, Prologue's clients require evidence that a client's data is protected and that information exchange is also protected at the reception side in terms of archival. For these type of solutions, information security and data protection is the most critical success factor.

The reliability of the solution provider plays an important role in the sense of security experienced by the buying organisation. Especially when the solution provider positions its solution as a service, its involvement in the data security of the buying organisation is continuous, and its appearance cannot be fragile or vulnerable. If it does appear unreliable, the buying organisation will not be able to deliver the organisational changes necessary to implement the solution that would help adoption and adherence to specific standards. Consequently, this quality of the vendor organisation is directly linked to the usability of the solution.

4.3. Divergent, overlapping, or unclear regulations

Regulations that are divergent, overlapping, redundant, inconsistent or unclear pose an obstacle to the uptake of solutions towards standards as enablers of traceability. Such regulations can prevent successful deployment of these solutions, as they hamper the user acceptance on which

these solutions rely, and delay the integration of these solutions in day-to-day work processes. Users may get frustrated in their efforts to adopt and adhere to standards and certifications, especially when frequent changes in information and document requirements regularly induce changes and updates in digital forms, documents, and templates.

4.4. Lobbying efforts and the selection and definition of standards

Companies active in the domain of standards and certification as enablers for traceability are highly affected by the decisions of the actors that select and define standards. When these actors decide to enforce use of a specific modality for traceability, companies that are pursuing an alternative option are almost de facto out of business for the affected product category.

For instance, AlpVision is currently struggling with (expected) regulations at the European level in two fields: packaging of pharmaceutical products and packaging of tobacco products.

The current rationale that accompanies these standard-setting efforts is that pharmaceutical products can be protected against counterfeits by applying serial numbers to packaging. Following this, a standard has been designed on the European level for traceability of pharmaceuticals using serial numbers. This standard is currently in the process of being translated to the national level for implementation. For AlpVision, which developed an alternative technology for tracing pharmaceuticals through the value chain, this evidently negatively impacts business.

Reportedly, to add to their inconvenience, the company was never invited to voice its opinion on this matter. Many players active in this field confirm AlpVision's perspective that serial numbers can be copied far too easily, and thus are a poor way of certifying and tracing pharmaceuticals through the value chain. According to AlpVision, a technological security solution would be a superior method.

4.5. Lack of market and technology maturity

One of the key obstacles for this technology is the lack of market maturation. Many clients still need to be made aware, intellectually, of how to start using standards and certification as enablers of traceability. Entrepreneurs feel that there is a big evangelist task at hand, to promote the idea of traceability and get clients to sign a contract with vendors of certification and standardisation technologies.

“The market for cloud technology, has not yet fully crystallised. This ever-changing landscape can be challenging to operate in.” – Prologue



Another key aspect relates to the maturity of the technology on which solutions are based. As the technology is not yet fully mature, reliability will remain a concern, which makes it harder to evangelise the market. For instance, when a solution provider offers a platform that allows users to store sensitive information in multiple clouds, the supplier will need to follow-up on any and every instance of evolution in cloud computing. This is made additionally difficult by cloud multiplicity, the fact that different cloud services are based on different cloud-computing technologies.

Currently, there are several big European and US-originated cloud platforms that diffuse across Europe. The broker of certification and standardisation technologies needs to be aware of developments in all the different modalities. This constitutes both a technology and a human challenge.

Conversely, when a specific technology does reach a mature stage, this instantly turns into a driver for the uptake of solutions towards standards and certification as enablers of traceability.

A clear example is the PDF-file format, which has shaken the market for electronic document exchange. As a non-editable, final-form document, a signed document in PDF format can be digitally certified and carries legal value. As a result, organisations are actively pushing for solutions that facilitate electronic document exchange based on PDF.

4.6. International trade and the globalisation of markets

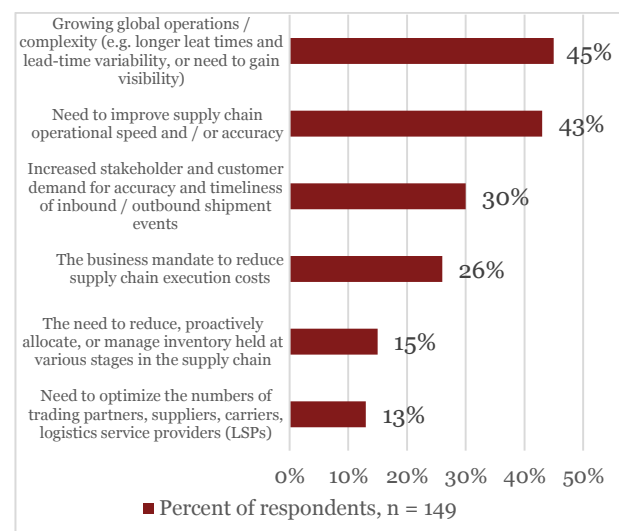
As different markets integrate and globalise, and as international trade maintains a growth trajectory, the need to monitor and protect high-value goods and materials throughout the supply chain increases.¹⁷

Growing complexity of these supply chains generate longer and more varied lead times, increased numbers of involved organisations and logistics channels, increased incidence of unpredictable events, and rising costs associated with managing the supply chain.¹⁸

These developments drive the demand and uptake for solutions towards standards and certification that enable traceability.

Figure 2 shows the key drivers for improving visibility of what occurs within supply chains. These key drivers includes pressures stemming from the complexity of global operations (45%), the need to improve speed and accuracy (43%), and the challenges posed by the increased complexity and multi-party nature of global supply chains.

Figure 2: Key drivers for improving visibility of what occurs within supply chains



Source: Aberdeen Group

5. Policy recommendations

The analysis of drivers and obstacles above provokes two clear policy recommendations that have the potential to contribute to a business environment more conducive to the development and uptake of solutions towards standards and certification as enablers of traceability. One relates to addressing divergent, overlapping, or unclear regulations, and the other to generating more transparency of lobbying efforts and the definition of standards.

5.1. Introduction of more clarity in the regulations

The uptake and successful deployment of solutions towards standards as enablers of traceability is hampered by rules and regulations that are divergent, overlapping, redundant, inconsistent or unclear. Especially when such regulations require frequent change in standardised documents and formats, the enthusiasm among users required to adopt and adhere to standards and certification requirements can get curtailed.



To prevent this, governments and public bodies that are responsible for the design and implementation of information and documentation requirements related to standards and certification could attempt even more to deliver clear, straightforward requirements that do not change too often, and that maximise on the possibilities that information and communication technology offers, for instance when retrieving basic organisational descriptives from previous information submissions instead of requiring them with every communication.

5.2. Improve transparency and equitability of lobbying efforts

Entrepreneurs in solutions towards standards as enablers of traceability point at the impact that government regulations have on their market potential. They understand that they will lose current market share as well as potential future revenue if standards are defined that do not fit with their solutions.

Consequently, they are worried by the idea that their relatively small size and limited resources will limit the extent to which they can articulate their case, especially when compared to larger organisations that have a vested interest in the status quo, and that can dedicate more resources to lobbying efforts.

ALTER-EU estimates that currently approximately 30,000 professional lobbyists try to gain access and influence to the European Union's institutions and legislators to further the interest of their backers. Considering the size of Commission and Parliament staff, which number approximately 33,000 and 6,000 respectively,^{19 20} this means that about three lobbyists engage policy issues for every four commission and parliament staff members.

This underscores the importance of interaction between policymakers, legislators, and representatives of specific interest groups that may offer important perspectives from different segments of markets and societies. However, this also points to the importance of stakeholders to be represented in Brussels, or at least to be able to follow the discussions that precede legislative decision making and the design of public policy.

To this end, the European Commission and the European Parliament have set up the European Transparency Register in 2011, with the support of the Council of the European Union. The goal of this register is to allow European citizens and stakeholders access to information on who is attempting to influence the European decision-making process, and in what manner.²¹ In essence, the transparency register constitutes a database that contains information on 6,600 public affairs consultancies, trade associations, in-house lobbyists, NGOs and other organisations such as think tanks and academic institutions, that register and provide their

information on a voluntary basis. While doing so, these organisations also agree to respect a code of conduct.²²

Despite a review in 2013, which led to additional measures and a further tightening of the rules of the game, organisations that critically follow EU transparency issues think that lobbying processes could be made even more transparent to curtail and prevent undue influence. They argue that the voluntary nature of the European Transparency Register should be substituted for mandatory registration of all lobbying parties, a position they share with the European Parliament.²³

Additionally, transparency groups have developed specific recommendations to improve transparency and equitability of lobbying efforts. These recommendations include:^{24 25 26}

- Making registration an obligation for all actors involved in EU lobbying (including law firms and think tanks) and to improve the reliability of the information disclosed;
- Striving or increased transparency regarding the size of lobbying consultancies' clients in ranges of EUR 10,000 or above;
- Implementing safeguards against under-reporting, including regular checks on registrations and meaningful enforcement of the rules to prevent under-reporting;
- Providing clearer guidance on disclosure requirements to increase transparency on funding sources of all registrants;
- Considering publication of the names of lobbyists that have crossed the line;
- Banning all Commission and Parliament staff from holding meetings with non-registered organisations that have an apparent lobbying goal;
- Banning non-registered organisations from sitting on Commission or Parliament advisory groups;
- Preventing Commission members and Commission or Parliament staff from attending or hosting events organised by non-registered organisations that have an apparent lobbying goal;
- Requiring registrants to file quarterly reports on their lobbying activities;
- Preventing lobbying organisations from hiring former commissioners or other high-level Commission officials for a specific period of time after they leave office, e.g. three years.



6. Appendix

6.1. Interviews

Company	Interviewee	Position
AlpVision	Fred Jordan	Co-founder and CEO
Prologue	Najah Naffah	General director
BrandBank	Rob Tarrant	CEO
Is4it	Herald Rott	CTO

6.2. Websites

AlpVision	www.alpvision.com
Prologue	www.prologue.fr
BrandBank	www.brandbank.com
Is4it	www.is4it.de

6.3. References

¹ European Commission, 2011, Press release: Commission for better standards to boost European competitiveness and promote consumers' interest

² European Commission, 2014, The annual Union work programme for European standardisation for 2015

³ Ibid.

⁴ Ibid.

⁵ Ibid.

⁶ European Commission, 2011, Press release: Commission for better standards to boost European competitiveness and promote consumers' interest

⁷ Ibid.

⁸ Enterprise Europe Network, 2014, <http://www.brusselsnetwork.be/eu-news-m/859-sme-helpesk-on-standards-another-service-to-boost-competitiveness.html>

⁹ European Commission, 2014, Fact and figures about the EU's Small and Medium Enterprise (SME), available at <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/>, accessed January 2015

¹⁰ European Commission, 2014, Annual Report on European SMEs 2013-2014

¹¹ Enterprise Europe Network, 2014, <http://www.brusselsnetwork.be/eu-news-m/859-sme-helpesk-on-standards-another-service-to-boost-competitiveness.html>

¹² Aberdeen Group, 2013, Supply Chain Visibility

¹³ Ibid.

¹⁴ Ibid.

¹⁵ www.tapaemea.com 2014, in Chris Yau & Ivan Yiu Wah Ha, 2010, Understanding the supply chain security certification standards - Supply chain security whitepaper

¹⁶ Aberdeen Group, 2013, Supply Chain Visibility

¹⁷ Chris Yau & Ivan Yiu Wah Ha, 2010, Understanding the supply chain security certification standards - Supply chain security whitepaper

¹⁸ Aberdeen Group, 2013, Supply Chain Visibility



¹⁹ European Commission, 2013, staff figures, available at http://ec.europa.eu/civil_service/about/figures/index_en.htm, accessed January 2015

²⁰ European Parliament, 2014, recruitment, available at <http://www.europarl.europa.eu/aboutparliament/en/0079d60a3f/Recruitment.html>, accessed January 2015

²¹ European Parliament Research Service, 2014, EP-Commission Joint Transparency Register, available at <http://epthinktank.eu/2014/06/30/transparency-register/>, accessed January 2015

²² Ibid.

²³ Ibid.

²⁴ ALTER-EU, 2015, Greater lobbying transparency, available at <http://www.alter-eu.org/taxonomy/term/23>, accessed January 2015

²⁵ ALTER-EU, 2014, Alter-EU briefing on mandatory lobby register

²⁶ EUObserver, 2014, A long way to go for effective EU lobby regulation, available at <https://euobserver.com/stakeholders/123182>, accessed January 2015