Feasibility study for a post-manufacturing traceability system between the People's Republic of China and the European Union

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EU-China Trade Project

Support to China's Integration into the World Trading System

FEASIBILITY STUDY FOR A POST-MANUFACTURING TRACEABILITY SYSTEM BETWEEN THE PEOPLE'S REPUBLIC OF CHINA AND THE EUROPEAN UNION

Executive Summary

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Note : this document is the first part of a package of 3 documents :
- *the executive summary*
- *the detailed report*
- *the appendices*

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Summary

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Executive summary synthesis

This feasibility study for a post-manufacturing traceability system of the quality, safety, authenticity, compliance of the products as well as the manufacturing process and product ecology and the social involvement of the supply chain highlighted three main observations over which the following **immediate needs and improvement actions** were identified.

Analysis	Needs	Suggested action plan for the European Commission
1- The market will not move on a **voluntary** basis	→ Need for a **regulation** that requires an individual tagging of all products	→ Set up a **legal framework** together with the USA
2- The **technique** to implement a traceability system is now **available** and its price is **affordable**	→ Need to **train** key actors of the supply chain of the added value of a traceability system based on harmonized legal framework	→ Fund **awareness sessions** on the requirements of the forthcoming regulation (buyers and consumers associations)
3- The ultimate **barriers** are only political or protect **corporate interests**	→ Need to negotiate a **gradual implementation** of the traceability system with Chinese authorities and international buyers (pilot projects)	→ Set up a gradual **implementation plan** to achieve one tag / product for every product

The details of each topic can be consulted in the corresponding sections of the detailed report.

I- Key motivations for a global traceability system

1. Commercial, political and human **implications** of non-quality compliance of Chinese products are already perceived worldwide and are **immense.** Not only because of loss of revenue but also because of expected litigation notably by consumer associations.

2. With globalization of trade, **production and market** environment are becoming **increasingly complex**. The occurrence of quality and safety issues related to imports is growing accordingly with a strong negative impact on the industrial added value (between 5 and 20% of the revenue generated by Chinese exports). It is commonly acknowledged that 80% of downstream problems are generated by 20% of upstream factors, in 30% of claim situations the manufacturers could not be found.

3. **Solutions** currently proposed by business lobbies worldwide are **piecemeal** and **local** while the issue is global. At best, this might lead to a limited compliance system, mainly if not exclusively led by international buyers.

4. **The appropriate approach** is to combine innovative political solutions with innovative technical solutions. Therefore, **a "global traceability system"** is a must. Global means (a) worldwide and (b) inclusive with all the key actors involved along the supply chain. **The solution is in a post-manufacturing traceability system** where benefits are clearly identified for each and every actor of the supply chain.

5. **Support from Europe is critical** to develop a truly global, transparent and accountable system of traceability. The present context also offers the opportunity for the European Union to take the initiative and **play a prominent role** in the design and implementation of such a global post-manufacturing traceability system, in close **collaboration with the USA**.

II - What a traceability system should be

What a traceability system **should be** ?	Key motivation for such features	Key success factors
Post manufacturing tracking of the quality, safety, compliance and authenticity of the products as well as social and environmental impact of the supply chain	Product and manufacturing process quality verification by the final consumer prior to purchasing	Registration of 4 key parameters : Manufacturer, Sub-suppliers, critical components, raw material, product quality controls
Per product tagging principle	After sales follow-up of the product, including ugrading, reuse and recycling purposes	Barcode or RFID technology depending on FOB product price
Internet-based access	Consumer oriented tool	Secured remote database
Built-in self learning ability	Track continuously any potential benefit/hazard of the products/suppliers registered in the database	Centralized database
A closed-loop tool between original manufacturer and final consumer	Retroactive improvement based on customer's direct voice	Internet based and customer oriented interface
A tool that complies with the requirements of an **integrated legal framework**	Simplify the manufacturing process and reduce the risk and the cost of non compliance	Concerted approach between the EU and the US public authorities
A **collaborative framework** between the designers, the manufacturers, the professional users, the retailers and the consumers	Continuous understanding of the consumers needs and expectations and ability of the manufacturers to fulfil them	Continuous identification of critical components and raw materiel (incl. REACH substances)
Independent registration of critical quality data per product	No conflict of interest (no self evaluation)	A professional 3rd party able to check the declared data
Low cost tagging per product, **free consultation**	Affordable operating cost for the manufacturers and universal access to the consumers	RFID and Barcode embedding a unique registration number, based on EPC/GS1/GTIN std.

III - What a traceability system must NOT be

What a traceability system should not be ?	Key counter-argument	Key success factors
Multi database	Independence of proprietary database and accessibility of the data + not easy way to track the causes of non-quality problems	A clear specification of the access hierarchy depending on user's profiles
Marketing differentiator	All companies should be subject to tagging	A global legal framework requiring individual and universal product tagging
Sourcing tool	International buyers will not disclose their supply chain	A clear classification of the information with dedicated secured access rights depending on user's profiles
A tool aimed at segregating the products	Applicability of the traceability fundamentals should be generalized to every product	A globalized legal industrial framework
An open-loop system	Quality problems come partly from the current open-loop status of the supply chain	An internet-based read-write centralized and secured data-base

IV- Needs and expectations of the actors of the supply chain

The following table highlights the following key conclusions:

1- Most of the **technical and commercial features are agreed** by the four key players for all kinds of products (see en green in the following table) except food products which supply chain is very specific.

2- There are **two blocking issues (in red color within the table) and one motivating issue** to foster the implementation of a traceability system:

- Both manufacturers and international buyers **disagree on the registration of suppliers and sub-suppliers within the database** unless they are not visible so as to protect their sourcing network from their competitors.
- Manufacturers, though they acknowledge the technical features of the system, will not take part in such a system without **explicit requirement from their buyers**.
- Consumers associations consider that such a system must be implemented, even if not possible otherwise at **the expense of a supply chain disruption**: consumers' health is more important than trade and business.

Based on those 3 key issues, **voluntary approaches seem**, so to speak, **counterproductive**. The market might be distorted by disloyal competitors who may use the information on the sourcing networks of the registered companies to their own profit. Therefore, only a concerted approach articulated at the public authority level would allow a fair implementation of a traceability system without distorting freedom of trade and exchanges. Besides, a complete voluntary approach would take much more time to develop and might not even be successful due to disloyal competition.

3- There are secondary issues (orange color in the table) which need to be further discussed between the parties:

- C**entralized and independence features of the database**. Such aspect is mandatory as 1) the credibility of information registered in the database would not be independent if the database were operated by one of the supply chain actors and 2) due to the necessity to cross-check information by comparing declarations from the manufacturers concerning their suppliers and the critical components of their products.

-The **tracing of both the product** and the **manufacturing process features** regarding the social and environmental commitments of the various actors along the supply chain. This question loops back to the, already mentioned, supply chain transparency issue. We are now facing a new dilemma as some companies appear increasingly sensitive to the findings resulting from factory audits performed by NGOs showing the link between undeclared sub-suppliers and huge retailing companies, usually unaware of this dimension (referred to as the so-called "sourcing black hole").

Table 1: Stakeholder and traceability system features
(green: agreed, orange: debated and red: disagreed).

Traceability system evaluation criteria		Chinese Manufacturers	International Buyers	Consumers associations	Regulation authorities
Traceability system features	Applicable to food/drugs products	Proprietary traceability systems already available. Food/drugs traceability has different requirements from inert products			
	Applicable to non-food products				
	Based on standardized numbering system (GTIN/EPC, GS1)			Need further investigation	
	Using TIN/EPC numbering on a production batch basis				
	Based on tagging of individual products (not the packaging)				
	With registration of raw material & critical components	Problem is in that some manufacturers do not even know that some raw materials can be hazardous			
	With registration of manufacturers, subcontractors and suppliers and sub suppliers	Strategic suppliers to be kept confidential			
	With registration of product conformity certificates, manufacturing audits, product inspection & test reports			CE marking : not enough !	
	Self learning platform				
Database features	3rd party Centralized		Risk of proliferation of proprietary database	Independent from industries	AQSIQ national database issue
	Full access by fingerprint recognition in write mode for manufacturers				
	Limited access by login/password in read mode for professional users				
	Restricted google type access for consumers and retailers				
	Location in independent country		Need further investigation		
	Data verification				
Product information	Quality				
	Safety				
	Compliance to the regulations of the retail market				
	Authenticity of trademark of protected products				
	Environmental responsibility covering manufacturing and product ecology	Transparency issue			
	Social responsibility during the manufacturing				
Price	RFID (max. 0.5 USD/unit)	For FOB value > 15 USD		RFID : spy of private life	
	Barcode (max. 0.05 USD/unit)	For FOB value < 15 USD		Barcode: not sure enough	
Key success factors	The new traceability system must not disrupt the supply chain			Health more important than economy	
	The new traceability system should be simple and cost effective and flexible			Not too simple but effective	
	The new traceability system should be fostered by forthcoming regulations				Global and standardized approach required
	The new traceability system should be fostered by buyers/retailers		Depending on size and maturity		
	The new traceability system should be fostered by consumers			Members may test the syst.	
	The approach should be only voluntary	Mandatory	Depending on size and maturity	Mandatory	Reduced public intervention

V- Technical solution for an effective global traceability system

- **Post-manufacturing traceability system should comply with the following requirements:**

1- **Each and every product should be individually tagged** (NOT ONLY the packaging, the pallet or the container) in order to ensure traceability all along the life cycle of the product,

2- **The tag should bear a number in line with GS1 EPC standard** (24 digits) which is the most advanced numbering system containing the appropriate number of digits,

3- Product information should be stored in **one single central data base owned by an independent third party**. The contacts established so far with the main Chinese associations and European importers show that the industry is reluctant to confide sensitive information to a database owned by an actor of the supply chain (including public authorities such as AQSIQ or any other on the European side). An international system that satisfies European consumers, retailers and manufacturers who produce in China, will need to be hosted by an independent institution as it is the case for the REACH programme.

4- **Cooperation should prevail between this third party and AQSIQ** notably in terms of data verification entered by manufacturers, factory audits, product testing and certification, random inspections, etc.

5- Access to the data base should be via **Internet 24/7/365** with a very easy interface (**Google type access**) for all categories of users, including importers, retailers, final consumers and public authorities,

6- In order to **ensure data confidentiality and security**, the database should be organized into three different levels of information access i) manufacturers in read and write modes with access by finger print recognition ii) professional users in read mode only with access to detailed information by login and password iii) retailers and consumers in read mode only with access to limited information by direct access,

7- The whole traceability system should comply with the **best international standards** and practice in this field, such as GS1, EPC, Bridge, AQSIQ.

- **Two technologies have been positively tested.**

- Extended **Bar Code, QR Code and Datamatrix** directly printed on the product for low-end products which FOB value does not exceed 15USD. In terms of cost for the traceability service the level of acceptance by the industry is in the range of 0,05 USD per product .

- **Counterfeit proof passive RFID** (complying with ISO/IEC 15693 and 18000 international standards) embedded in the product for medium and high-end products which FOB value is more than 15 USD. The level of acceptance for this service is in the range of 0,35 USD per product including the RFID (see appendix 3).

Table 2:
Expected evolution of RFID technology in traceability applications from 2007 to 2012.

	2007	2012	2017	2022
Total number of tags purchased annually (in Millions)	144	3.220	22.400	86.700
Total number of locations with RFID readers	2.750	30.710	144.000	453.000
Total number of RFID readers deployed	7.630	176.280	1.161.800	6.268.500

Table 3:
Expected evolution of RFID technology from 2007 to 2012 for retail consumer goods.

	2007	2012	2017	2022
RFID Tags (in Millions)				
On food items	0	520	5.200	31.700
On non-food items	26	960	5.000	12.400
On cases	34	760	3.300	11.500
On pallets	2	40	200	500
Total RFID tags	62	2.270	13.700	56.100
Locations with RFID readers	650	11.590	59.900	206.600
Total number of RFID readers	1.740	70.570	502.700	3.440.500

Source: Bridge-European passive RFID market sizing 2007-2012.

Those RFID evolution tables cover essentially the **logistic** traceability of shipping cases, pallets which is voluntary. In other words, the industrial infrastructure is moving to a RFID-based solution that can be easily extended beyond the pre-manufacturing needs (covering today's logistics) to a full and mandatory post-manufacturing traceability system (targeting quality/safety/compliance/authenticity).

VI- Conclusion

1- The changing structure of supply chains and regulatory environment presents **important challenges** in terms of safety for companies engaged in export and sell at home. Traceability technology however provides a **unique opportunity** to substantially change the conditions for safety of traded products while making every key player of the supply chain more responsible and less exposed to any industrial downturn.

2- The **technology** necessary to effectively trace the quality, safety, authenticity and compliance of the products as well as the social and ecological impact of the manufacturing processes is now **available, reliable and inexpensive** and makes available a knowledge sharing platform of any critical controls points in the manufacturing processes.

3- **Chinese professionals** agree on both the technical and commercial features of the traceability system under **4 conditions:** a) that it is initiated by regulators and international buyers, b) the traceability system operation should not increase the cost of manufacturing, c) the system should rely on a centralized database operated by an independent 3rd party and d) the legal framework is unified between Europe and the USA.

4- It is the role and responsibility of public authorities to create a **global legal framework ensuring an harmonized/standardized post-manufacturing system, concerted between EU and US policy makers**. Otherwise, the risk is to have as many traceability systems in place as there are importers and states, with no possibility for the retailers and the consumers to obtain in an easy way the product information they are entitled to. Such a fragmentation of traceability information would be highly detrimental to consumers' rights.

5- As far as China is concerned, the main difficulty lies in the fact that **AQSIQ** is currently developing a post-manufacturing system which is not standardized and not accepted, neither by Chinese manufacturers nor by foreign buyers. To overcome this key problem, we recommend to:

a) involve AQSIQ **in the design** of the proposed global and harmonized post-manufacturing traceability system rather than implementing a national data-base,

b) suggest to AQSIQ to **play a fundamental role** once the system is established by checking the authenticity of the data entered by Chinese manufacturers in the global data-base, organizing factory audits when and where necessary, taking care of product testing and certification, etc. This role will be discussed during a dedicated working session in September 2008 with the consultant mandated by AQSIQ.

VII- Next steps

We suggest conducting 2 major actions in the short term (3-6 months) to prepare the ground of a global traceability system well understood and respected by all stakeholders of the supply chain:

1- **Organise awareness sessions** on traceability for international buyers and manufacturers. This is a must insofar as the level of maturity is very diverse at the moment among the main actors of the supply chain.

2- **Implement several pilot projects** with leading international buyers and Chinese manufacturers to demonstrate the benefits of a global post-manufacturing system. All institutions and companies interviewed in this study[1] (with the exception of Nestlé Group) are willing to participate in such pilot projetcs. Our team as developed a prototype which could be used for this purpose. It is available at www.optimum.ch/tracingdemo

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Post-manufacturing traceability in a nutshell

1- A post-manufacturing traceability system relies on a **centralized and secured database** accessible on-line by the all key players

2- **Products are individually tagged** by a RFID or a bar code depending on the price of the product and the required anti-counterfeiting level.

3- Manufacturers register the basic **quality, safety, authenticity and compliance** as well as the **environmental and social compliance** data required to retail the product on the targeted market.

4- **Consumers can access product information 24/7/365** and report any anomaly through a "Google" type window by entering the EPC/TIN number (read from the RFID or the barcode) on the traceability system website.

5- Another main value of such a centralized data-base is that it is **a self-learning system** ("*zi wo xuexi de xitong*" as our Chinese partners put it), not a punitive one, automatically helping buyers and manufacturers in their continual improvement challenge.

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[1] [CONT01] List of contacts