NGUYEN LE MINH CHAU

STUDY OF DIFFERENT STRATEGIES AND APPROACHES FOLLOWED BY FOOTWEAR COMPANIES IN VIETNAM TO COMPLY WITH REACH REGULATION

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Mestrado em Inovação Química e Regulamentação

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DECLARATION OF AUTHORSHIP

I declare that I am the author of this work, which is original. The work cites other authors and works, which are adequately referred in the text and are listed in the bibliography.

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Nguyen Le Minh Chau

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ABSTRACT

The European Registration, Evaluation, Authorization and Restriction of Chemical (REACH) is the world's most ambitious initiative governing the use of chemicals not only on their own but in mixtures or articles. REACH assures the supply of safe products that do not present any hazards to end users or if there is a hazard, it must be communicated properly along with risk management plans.

Theoretically, REACH compliance is only mandatory for European companies. In fact, REACH could influence company's activities beyond its border through economic interdependence. Outsourced manufacturing is a good example as European buyers play an important role on fostering REACH application in other countries.

By taking advantages of low labor cost and favorable tariff reduction from Free Trade Agreements (FTAs) which Vietnam has signed with Europe, Vietnam becomes an attractive outsourcing destination of many European footwear buyers. Since "made in China" is no longer cheap, it could be foreseen that Europeans would soon move their manufacturing to Vietnam which is now maintaining the second position after China. However, there is a risk that Vietnam loses its opportunity due to REACH compliance issues. REACH compliance is not easy and it is much more challenging in developing countries, where gaps in technologies and stringency of standards each country applies are encountered.

The objective of this thesis has been to assess the difficulties felt by Vietnamese companies, in particular footwear companies, when faced with the requirements of REACH regulations. To address the compliance situation in Vietnam, an online survey was developed and disseminated to Vietnam footwear suppliers with the support of Vietnam Leather, Footwear and Handbag Association (LEFASO) and Decathlon (a European brand having its manufacturing in Vietnam). The survey has sets of questions that allow the researcher to assess Vietnam footwear supplier's awareness of REACH regulation, particularly, Substances of Very High Concern (SVHCs) communication obligations and Restricted Substances (RS) management. The survey also digs into difficulties Vietnam footwear suppliers are facing as well as solutions they are applying to overcome these difficulties.

None of LEFASO's company member participated in the survey. Out of suppliers of Decathlon in Vietnam, only 13 companies responded. The results of the study are largely based on these

answers. Data from the survey reveals that almost all of the suppliers are familiar with the REACH regulation and aligning REACH requirements to their operations. Major concerns identified by suppliers when trying to comply with REACH regulation are costs of testing products against chemical lists, lack of knowledge of where regulated chemicals are introduced to the supply chain and frequent addition of new chemicals in the regulated list. These issues would be resolved if information of chemical compositions of materials supplied to the industry is made available. Although suppliers are coming up with individual processes to improve information flow throughout their supply chain, there are still shortcomings which would become another problem in the future. In the light of that, an approach proposed by the researcher is also discussed in the study to tackle both current and foreseeable problems.

Keywords: REACH regulation, compliance, Vietnam, footwear

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LIST OF ABRREVIATIONS AND ACRONYMS

CAS	Chemical Abstract Service
CE	Conformité Européenne
CMR	Carcinogen, Mutagen or Toxic for Reproduction
DEHP	Diethylhexyl phthalate
DMFu	Dimethyl fumarate
ECHA	European Chemical Agency
EU	Europe Union
FDI	Foreign Directly Invested
FTA(s)	Free Trade Agreements
GADSL	Global Automotive Declarable Substance List
GDSN	Global Data Synchronisation Network
JIG	Joint Industry Guide
LEFASO	Vietnam Leather, Footwear and Handbag Association
NP	Nonylphenol
NPEO	Nonylphenol ethoxylate
PAH(s)	Polycyclic aromatic hydrocarbons
PBT	Persistent, Bio-accumulative and Toxic
PFC	Perfluorinated compounds
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
REACH	Registration, Evaluation, Authorization and Restriction of Chemical
SVHC(s)	Substances of Very High Concern
TBS	Thai Binh Shoes
USA	United States of America
vPvB	Very Persistent and very Bio-accumulative

1 INTRODUCTION

REACH is the European Regulation on Registration, Evaluation, Authorization and Restriction of chemicals and considered as the world's strictest law on controlling risks imposed by chemicals. Prior to REACH, the responsibility for chemical safety and the cost of checking fell on authorities. REACH completely changes the situation. Following the principle "no data, no market", companies manufacturing and importing chemicals must present data to prove that their chemicals are safe if they want to place them in the European market and the cost of collecting necessary data is now rested on the shoulders of companies. Therefore, it is not surprising that such paradigm shift and perceptional differences inherently existing between those who regulate and those who are regulated results in the implementation of REACH has not been without controversy.

REACH also affects other industries beyond chemical industry since chemicals are present in almost all of products[1]. Chemicals can be used as ingredients in the manufacturing of materials like plastic or additives in materials to improve their appearance or functionality, such as substances rendering water repellent surface. They are probably residues from the manufacturing processes but no longer have a role to play. Those chemicals are much more likely to leach out of products and cause serious effects on human health and environment. As an example, dimethyl fumarate (DMFu) used in some textile products has been found to seriously affect the health of consumers. In 2006 – 2007, two-seaters sofas from a Chinese manufacturer were sold in Finland with the dimethyl fumarate sachets inside to prevent the growth of mold during transport and storage. Sixty people complained that they had serious rashes after they bought the sofas. The cause was identified as dimethyl fumarate allergic reaction induction. DMFu is a biocide and known allergen at very low concentration. It evaporates when getting hot and penetrates through the sofa leather and skin that subsequently cause burns on the user's skin. The "poison sofa" scandal rang the bell on dangerous chemicals lurking in everyday products. Even some products we often think of as harmless, could be a source of exposure like the sofa. By considering chemical risks of consumer articles, REACH has specific sections addressing chemicals in articles.

1.1 Objective and scope

REACH targets harmful chemicals which users could be exposed to during product consumption, recycle and disposal. It also promotes substitution for harmful chemicals whenever technologically and economically possible.

REACH has widespread effects on international trade that has triggered concerns from non-European countries where REACH may be viewed as an unnecessary obstacle to trade. However, regardless of the unwillingness of non-European companies in complying with chemical restrictions listed in the REACH regulation, it is a compulsory requirement when they want to do business with European manufacturers.

Vietnam footwear industry is anticipated to have a remarkable growth in the next few years when European footwear giants have shifted their largest proportion of manufacturing which is now in China to Vietnam. Nevertheless, supplier's ability to comply with REACH might worry European producers to accelerate the transition. With the aim of enhancing supplier's compliance ability to catch upcoming opportunities, this study primarily focuses on:

- Assessing the current awareness of Vietnam footwear suppliers on the REACH regulation and analyzing REACH implementation at their facilities.
- Document and examine the difficulties which suppliers are facing when trying to fulfill their obligations under REACH and the approaches they are using to overcome these difficulties.
- Propose a solution (if applicable) to better resolve compliance issues in Vietnam.

1.2 REACH requirements for chemicals in articles

To determine obligations under REACH, it is necessary to be accurate in product's identification since REACH requirements for a substance on its own or in mixture and requirements for a substance in articles are different. An article is "an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition" regarding to the definition in the REACH article 3(3)[2]. In fact, the classification of a product as an article is quite complex, given the definition. For example, a candle which is thought to be an article, however, is not an article under REACH. Or, a thermometer with mercury filling is considered as an article, while a printer cartridge (plastic container filled with liquid ink) is categorized as a combination of article and mixture[3].

If an article contains a substance intended to be released in normal or reasonably foreseeable conditions of use, it is subjected to a registration in case the amount of the substance with intended release exceeds one ton per year. The intended release is interpreted as deliberate planning and it would not be achieved if substances are not released. But, it is not the main function of the product. Like a scented article, fragrance needed to be released for the article to be smelled. Even though the article is not smelled, it is still operational. Such releases due to abuse, ageing or side effects of functioning of the article are not regarded as intended releases. Normal conditions of use relate to main functions of an articles that are normally documented in the form of user's manual or instruction for use. Reasonably foreseeable conditions of use may be anticipated because of the physical state and function of the article. Releases do not occur under normal or reasonable and foreseeable conditions of use are generally not intended releases. The registration requirement for a substance intended to be released are probably exempted if the use is already covered by the registration of the substance.

Substances meeting criteria including:

- Class 1 or 2 carcinogen, mutagen or toxic for reproduction (CMR)
- Persistent, bio-accumulative and toxic (PBT) or very persistent and very bio-accumulative (vPvB) substance
- Endocrine disruptor

laid down in the article 57^2 are identified as Substances of Very High Concern (SVHCs) and placed on the Candidate List. Manufacturers or importers of articles containing a SVHC from the candidate list in a concentration above 0.1% by weight and the annual quantity of the substance is over 1 ton must notify European Chemical Agency (ECHA) about its presence. In case, the substance is already registered for the use, or the exposure to human and environment can be excluded, notification is not necessary. Besides that, manufacturers or importers are also responsible for communicating on safe uses of the article to actors down in the supply chain if there is any SVHC in the article exceeding 0.1% by weight.

A SVHC from the Candidate List may be further included in the authorization list (Annex XIV) and phased out without authorization. Companies may apply for an authorization of certain uses if they can demonstrate chemical associated health and environmental risks are adequately controlled or socio-economic benefits outweigh the risks and no alternatives exist. If the authorization is granted, the substance is still being used for its authorized purposes till a specific

date, known as the sunset date. During that time, the search of alternatives is encouraged, and the substitution should be made as soon as economic and technological feasibility.

Some chemicals which pose high risks to human and environment are prohibited in some conditions. Particularly, they are not allowed to be in certain type of products at levels higher than the requirements. The list of restricted substances and associated conditions is specified in the Annex XVII. SVHCs in the Annex XIV list are probably added into the Annex XVII list if the impacts are discovered not be able to be controlled in the future.

Below is the summary of REACH obligations which article suppliers may encounter if their products have met one or more specific conditions.

Condition	Communication requirements to professional users	Communication requirements to consumer users	Notification requirements	Authorization requirements	Registration requirements	Restrictions on use
SVHC not present in article or sub-article over 1000 ppm	None	None	None	None	None	None
SVHC present in article or sub-article over 1000 ppm	Article 33(1), the name of the substance and available information on the safe use of the article	Article 33(2), at least the name of the substance and safety information of the article if available	None	None	None	None
SVHC present in article or sub-article over 1000 ppm and the quantity of the substance produced or imported into EU above 1 ton per year			Article 7(2) must notify ECHA about the presence of SVHC in article	None	None	None
Substance intended to be released from article	None	None	None	None	Article 7(1), a registration must be done except the substance is previously registered	None
Article contains substance from the	None	None	None	Article 56, the	None	None

Authorization list in Annex XIV but has not been granted an authorization for the specific use				substance must be authorized for use before incorporating into the article		
Article contains substance listed out in Annex XVII and used in condition restricted under Annex XVII	None	None	None	None	None	Article 67(1), the article shall not be placed in the market

Table 1.1. Summary of REACH requirements for substances in articles[2]

1.3 European footwear industry

Like other industries, the future of footwear industry has been affected when REACH regulation came into enforcement. Footwear is a diverse industry which covers a wide range of materials that could be named such as textile, leather plastics and rubber, and different categories of products from men's, women's, children's footwear to specialty and fashion's footwear. In 2012, the EU footwear industry in which 21,000 enterprises were included, generated EUR 24 billion in turnover, produced 6.2 billion in added value accounting around 0.5% of total EU manufacturing, and created jobs for 240,000 people[5]. Two third of total EU footwear production are in three countries consisting of Spain, Portugal and Italy, whereas, Italy alone is in-charge of 50% of production[5] [Figure 1.1].

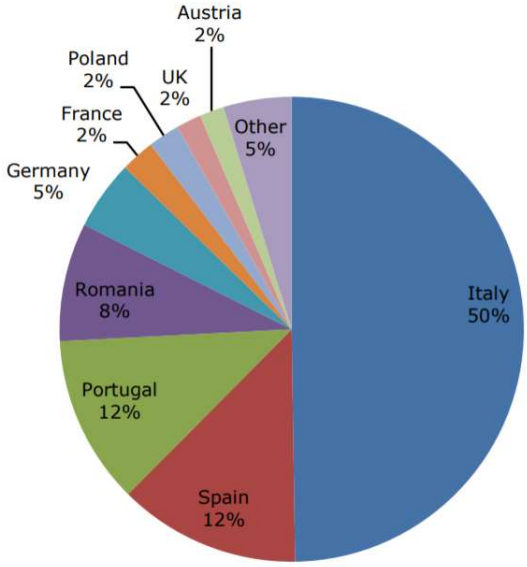


Figure 1.1. Footwear production in Europe[4]

However, production has recently dropped down as companies started moving their production to developing countries where material and labor costs are apparently low[5]. Due to cost reduction, European companies can price their products at more competitive rate than others selling similar products and increase their competitiveness. With money saving from offshore outsourcing, they can invest in activities which create higher added value such as branding and marketing.

Footwear consumption in EU now mostly relies on imports, as shown in table 2

	Consumption		Production		Import		Import from developing countries			Exports	
	Value 2014	*CAGR* 2010-14*	*Value 2014*	*CAGR* 2010-14*	*Value 2014*	*CAGR* 2010-14*	*Value 2014*	*% of total import*	*CAGR* 2010 – 14*	*Value 2014*	*CAGR* 2010-14*
Germany	4,651	7.6%	804	4.3%	7,950	9.3%	3,452	43%	7.5%	4,103	10%
Italy	3,987	0.4%	8,286	5.9%	4,882	3.2%	2,448	50%	1.0%	9,181	7.1%
France	3,763	2.4%	392	-1.8%	5,747	6.1%	1,741	30%	4.8%	2,376	12%
UK	3,352	1.9%	289	6.6%	4,548	4.3%	2,395	53%	0.1%	1,485	11%
Spain	1,830	-2.1%	2,113	5.7%	2,514	3.8%	1,323	53%	2.0%	2,796	11%
Austria	975	6.9%	285	2.5%	1,491	8.8%	216	14%	3.4%	801	8.7%
Poland	741	2.8%	367	3.9%	1,152	13%	296	26%	21%	777	21%
Portugal	681	11%	1,954	11%	634	4.3%	135	21%	10%	1,907	8.4%
Romania	666	6.3%	1,373	2.7%	659	15%	120	18%	8.2%	1,366	5.8%
Sweden	501	3.4%	-	-	726	5.3%	211	29%	0.3%	226	10%
Greece	410	-6.0%	38	-15%	441	-3.9%	156	35%	-2.8%	69	1.8%
Finland	306	0.6%	120	-2.1%	319	4.9%	90	28%	28%	133	8.6%
Denmark	288	8.8%	8.8	-26%	777	4.2%	269	35%	35%	497	0.7%

*Compounded Annual Growth Rate

Table 1.2. Statistic of footwear circulation including production, consumption, import and export activities by some European countries (in € million)[4]

Germany, France and Italy are top three footwear importers and leading countries in footwear consumption [Figure 1.2]. The main suppliers of footwear outside EU is China which amount is approximately adequate to 50% of all imports, and Vietnam which share 14% of total import volume[5]. Russia, USA and Switzerland are three main exporting markets of European footwear companies. Aside from that, exports to China, the United Arab Emirates and Turkey also receive attention by their significant growth[5].

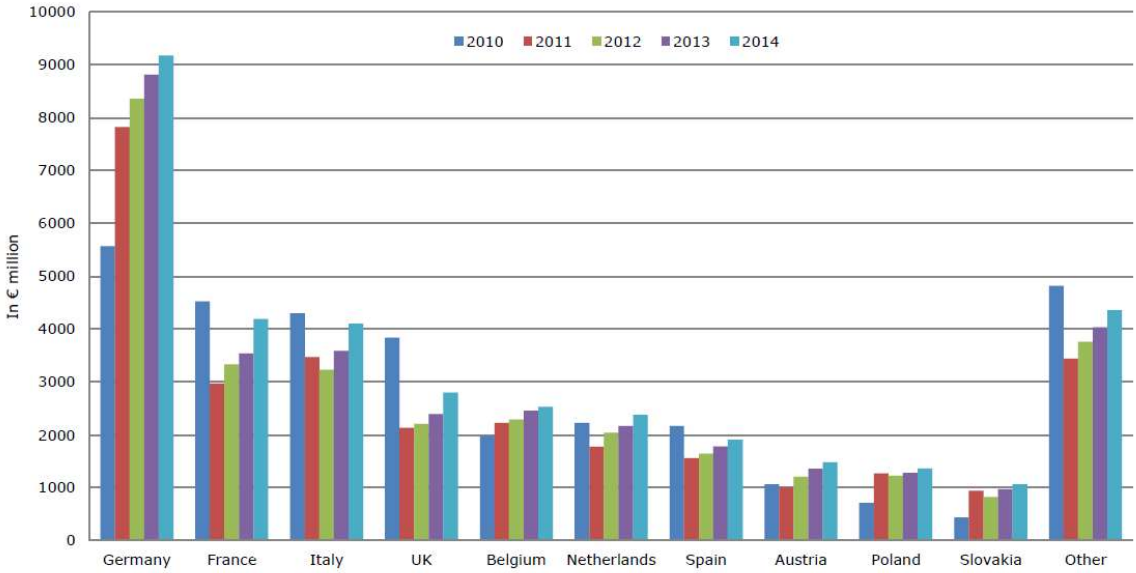
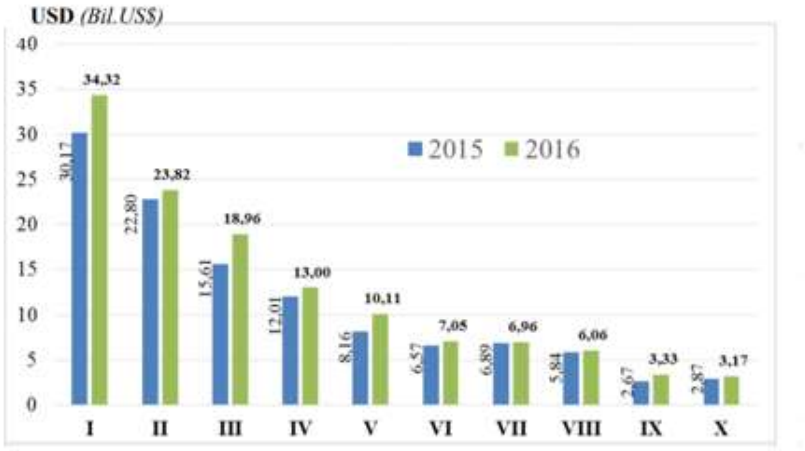


Figure 1.2. Top leading footwear importers in Europe[4]

1.4 Vietnam footwear industry

The footwear industry in Vietnam has achieved impressive growth in recent years. According to data of Vietnam Customs, footwear export generated around US 36.82 billion and reached the increase of 5,7% in 2016, less than the increase of 11.4% in 2015[7]. Footwear has become one among top ten export commodities[7] [Figure 1.3]. The estimated number of footwear produced in 2016 was roughly 1100 – 1150 million pairs, whereas 90% of the volume was for export and another 10% was for domestic consumption[6].



Whereby,

Rank	Commodity group
I	Telephones, mobile phones and parts thereof
II	Textiles and garments
III	Computers, electronic products, spare-parts and components thereof
IV	Footwears
V	Machine, equipment, tools and instrument
VI	Wood and wooden products
VII	Fishery products
VIII	Other means of transportation, parts and accessories thereof
IX	Crude oil
X	Still image, video cameras and parts thereof

Figure 1.3. Top exporting commodities in Vietnam[7]

In Vietnam, footwear companies are located all over the country, in the north, south and center. Ho Chi Minh city, Binh Duong and Dong Nai are three areas which have the largest footwear production. According to Vietnam statistic in 2015, Vietnam had approximately 1696 leather and footwear companies. The majority are domestic private companies, followed by enterprises of more than 50 labors, foreign directly invested (FDI) companies and state own corporations[6].

Vietnam is the second largest footwear exporter in the world after China, but the position may be changed as giant footwear's brands start shifting outsourcing from China to Vietnam. According to the General Director of Adidas, in 2017 Vietnam produced 44 percent of Adidas's total output while China only made 19%. The Director expected the on-going shift and by the end of 2019 Vietnam will produce half of Adidas' footwear[8]. The move occurs due to wage rising in China

that make it no longer a priority [Figure 1.4]. Besides that, European buyers also want to get benefits from favorable tariff reduction from Free Trade Agreements (FTAs) which are recently signed by the Vietnamese government and their trade partner countries. US is the largest market for Vietnam's footwear, then Europe, China, Japan and Korean as follow[7] [Figure 1.5].

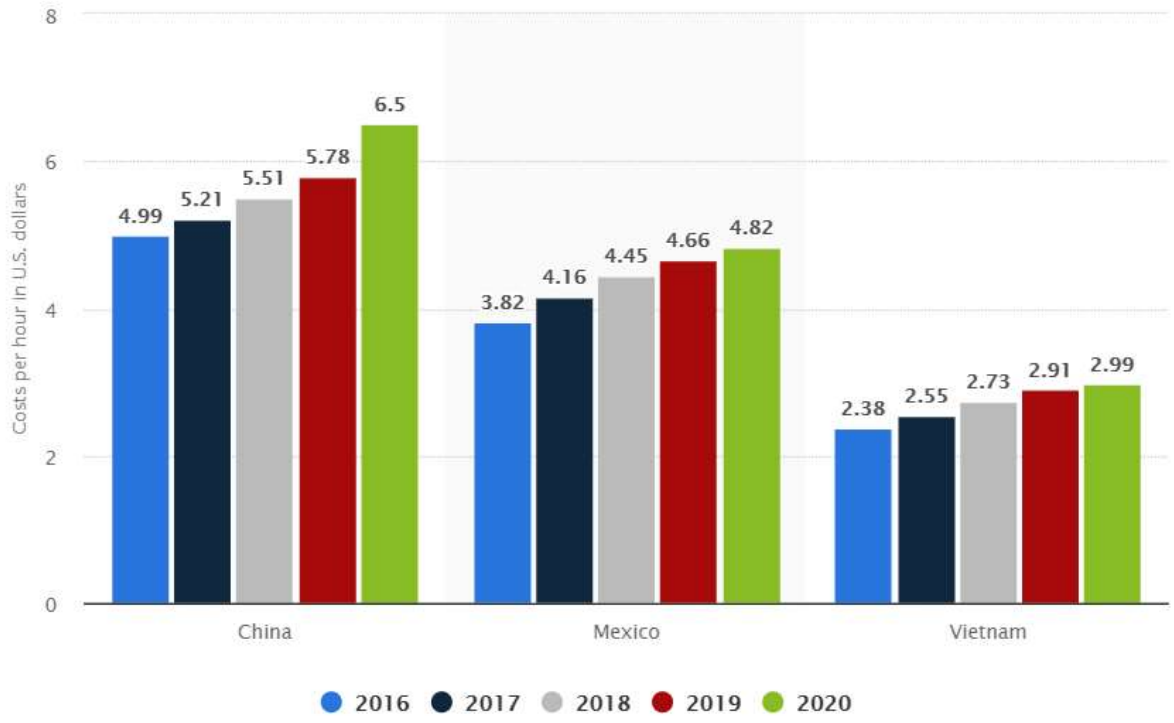


Figure 1.4. Manufacturing labor cost per hour for China, Vietnam, Mexico from 2016 to 2020[9]

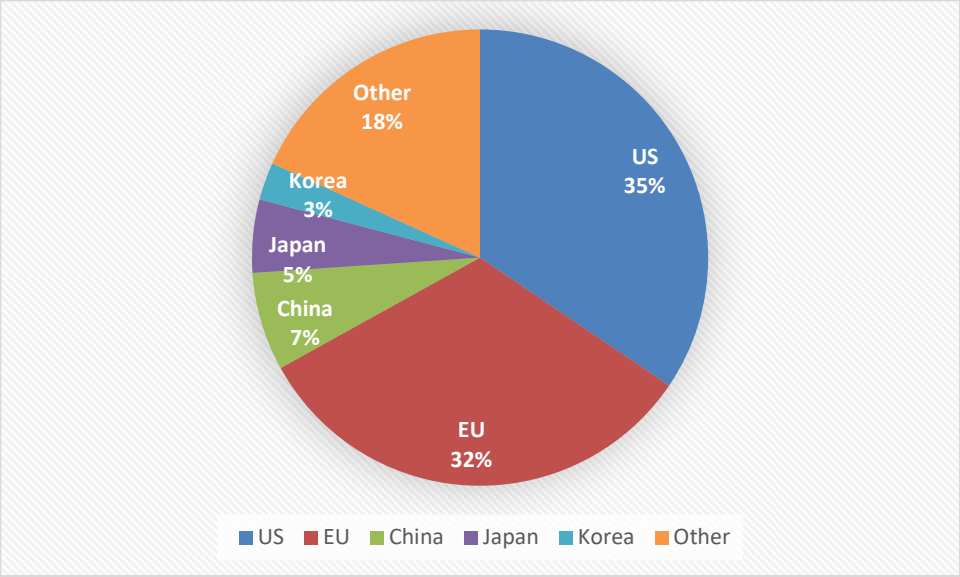


Figure 1.5. Vietnam's top exporting markets[7]

Being the world's top footwear sourcing country presents opportunities to footwear industry in Vietnam. In addition to provide massive employment, it has also brought more foreign currency to national economy and establish relationship between national footwear enterprises and international footwear enterprises.

In front of the transition, Vietnam are challenged by their European buyers about their production quality which ability to comply with chemical requirements under REACH is a considerable aspect. If these requirements are not satisfied, Vietnam certainly lose their opportunities.

1.5 Legal binding requirement for imported footwear to Europe

Footwear should comply with many requirements including requirement on product safety, restricted chemicals listed in the REACH regulation, labelling, CE marking for safety shoes and so on to be allowed on the European market[10]. Meanwhile, chemical requirements are seen as the most difficult requirement footwear producers will face when they plan to participate in the European market.

Footwear often consists of small components which are made of different materials, so it is more complicating for footwear manufacturers and importers to ensure all parts meet requirements, compared to textile industry which faces the same requirements.

Respecting REACH requirements for substances in articles discussed above, obligations of different actors in the footwear supply chain are defined below. Manufacturers and importers of substances (Tier 3 suppliers) which are used in process making of shoe materials (solvents, tanning agents, etc.) or assembly process making of shoes (adhesives) shall register these substances if 1-ton quantity limit is reached. Also, they shall ensure substances are not included in the List of Chemicals subject to Authorization (Annex XIV) and/or the Restricted Substance List (Annex XVII) in concentrations above the acceptable limit. If a substance is contained in the List of Chemicals subject to Authorization (Annex XIV), Tier 3 suppliers must fill an authorization application for the use.

Obligations for component suppliers (Tier 2 suppliers) and finished shoe suppliers (Tier 1 suppliers) are similar. Both Tier 2 and Tier 1 suppliers shall communicate the presence of SVHCs in the Candidate List to downstream customers and verify whether any substance in the List of Chemicals subject to Authorization (Annex XIV) remains in their components and/or products. If any, an authorization must be requested in case no authorization for the use has been granted. Both Tier 2 and Tier 1 suppliers shall exclude the use of substance in the Restricted Chemical List (Annex XVII) in concentration above maximum limit allowed.

To fulfill the obligations, Tier 2 suppliers should manage all chemicals used in the manufacturing of their components. Tier 2 suppliers could find information of SVHCs and RSs in SDSs provided by Tier 3 suppliers. Tier 1 suppliers, on the other hand, would request Tier 2 suppliers to do their material declaration, then conclude their product compliance based on such declaration.

1.6 Chemical substances present in footwear

Chemical contents in article are usually the results of chemical associated activities throughout the supply chain[11]. They can be inherent from any stage of component processing if the article is multi-component article. Shoes are complex products assembled from many small parts that are made of various types of materials, commonly leather, artificial leather, textile, rubber and plastic.

Normally, chemistry is involved in process making of materials not in process making of shoes. Numerous chemicals and/or groups of chemicals can be found in different parts of shoes including plasticizers, antioxidants, solvents, vulcanizations agents, surfactants, flame retardants, oxidants, biocides and so on[12] [Figure 1.6].

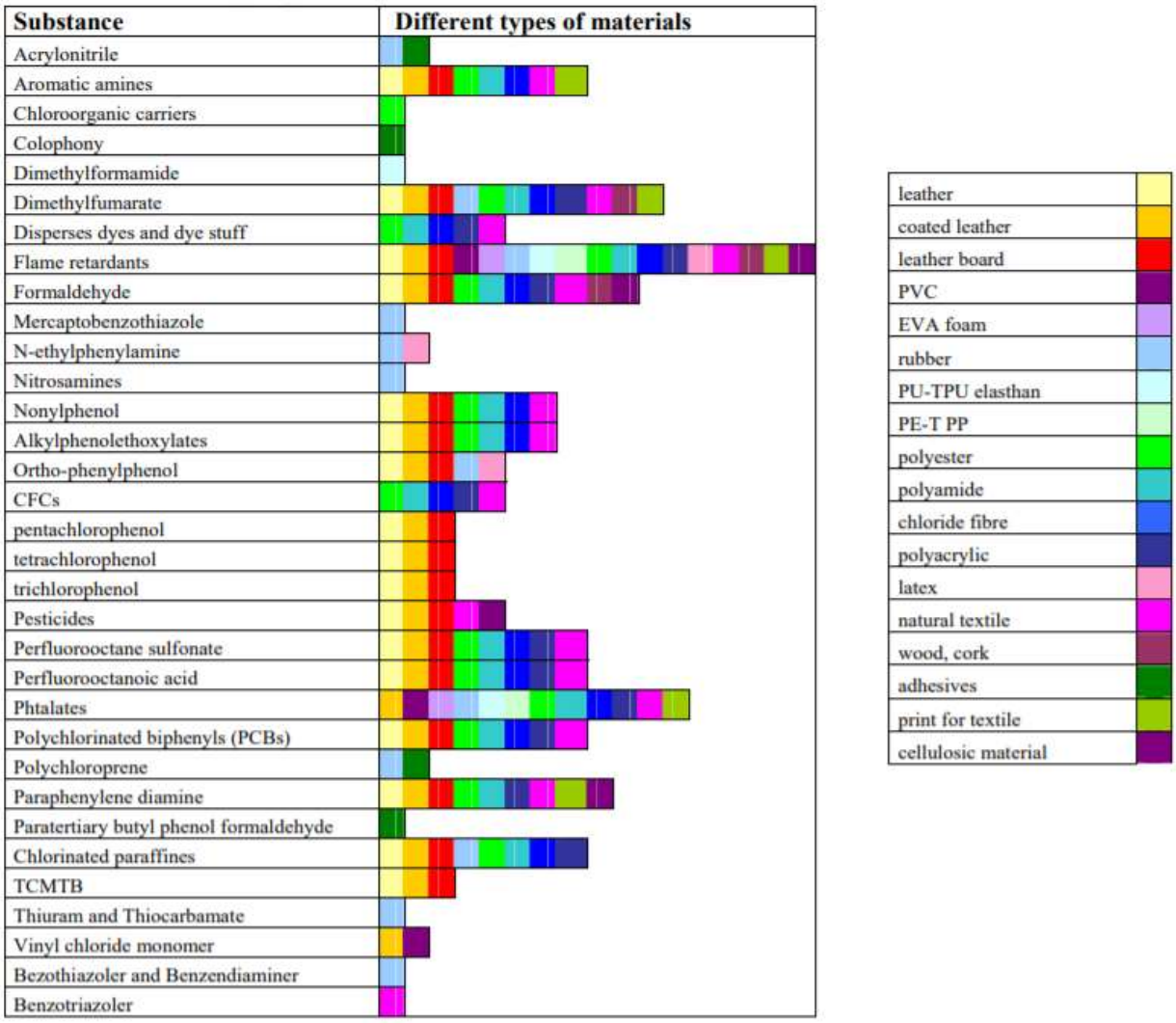


Figure 1.6. Critical substances potentially present in footwear and footwear components[12]

There were projects which were conducted by chemical regulatory authorities and NGOs to identify chemicals in footwear by taking shoes samples from the market to analyze chemical contents because chemicals in footwear has been pointed out as a group of articles being of concern and the need of information is increasing[13].

Regarding to a test report of inspection project on shoes lead by the Swedish Chemical Agency, regulated chemicals are detected from sample population were hexavalent chromium, phthalates (Diethylhexyl phthalate (DEHP)), Nonylphenol (NP) and/or Nonylphenol ethoxylate (NPEO). Other chemicals detected in shoes were Perfluorinated compounds (PFCs) according to the report by Greenpeace. Polycyclic aromatic hydrocarbons (PAHs) were also found in children shoes when these shoes were picked up and sent to test by a German magazine[13].

Hexavalent chromium (Chromium VI) is the second common and stable form of chromium. Trivalent chromium (Chromium III), the more stable form, is often found in leather at high level as 80 – 85% of all global tanning is working with chromium (III) salt[14]. Hexavalent chromium is not intentionally used in leather processing. In fact, occurence of hexavalent chromium in leather is due to oxidation of trivalent chromium under oxidizing conditions of temperature and humidity. Depending on chromium (VI) compounds, water solubilities is varied. Some chromium (VI) salts such sodium chromate and potassium chromate are highly soluble in water[15]. Other compounds such as lead chromate and barium chromate, otherwise, are water insoluble[15]. Chromium VI can be used in other applications including pigments for textile dyes, paints, inks and plastics. It is also used as corrosion inhibitors, wood preservatives, metal finishing and plating agents[14]. Chromium VI is mobile in the environment[14]. People are often exposed to chromium VI mainly through inhalation route[16]. Chromium VI can irritate the nose, throat and lungs[16]. Prolonged exposure can damage mucous membranes of the nasal passage and induce ulcers[16]. Chromium VI is also known as a human carcinogen[16]. Skin contact can elicit dermatitis even at very small concentrations[17].

DEHP is predominantly used in plastic industry to increase plastic softness and flexibility for easily shaping and molding. DEHP is low water soluble and high bioconcentrated which is demonstrated by the Octanol – water partition coefficient, log Kow, of 7[18]. DEHP can be found in diversified categories of consumer goods from cosmetics, toys to food packaging, shoes and clothes. Since DEHP is not strongly bound in plastic matrix, it can be easily released to the environment. DEHP is not considered as human carcinogen although this conclusion has still provoked many controversies due to inconsistent research results[18]. It also shows low incidence of mutagenicity and reproduction effects in the experiments. However, DEHP is regarded as an endocrine disruptor. Particularly, it reduces the amount of testosterone to female level in male

fetuses during critical stage of reproductive tract differentiation[19]. Perinatal DEHP exposure inhibits fetal testicular testosterone production demasculinizing the males[19].

NP is a subset of alkylphenols and precursor of NPEO which is a known industrial surfactant in a variety of products. Due to their applications, both NP and NPEO are eventually ended up down the drain then widespread to the environment. Thus, environmental effects of both NP and NPEO are concerning. Although NPEO is less toxic and persistent than its precursor NP, it is still highly toxic to aquatic creatures. Given that, NPEO in the environment will be degraded into NP[20].

PFCs are a group of man-made chemicals including the most prevalent Perfluorooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA) which are widely used in consumer products like shoes, clothes, furniture, etc. to grant them water, grease and dust repellent surface. In fact, how people are exposed to PFCs has not been fully identified. Contaminated of PFCs leached out directly from food packaging into foods is a potential source besides occupational exposure occurring to workers directly handling textile and furniture pretreatment processes. PFCs has been linked to several health effects, namely, liver toxicity, increased neonatal and adult mortality, decreased body weight, developmental delays, behavioral changes, abnormal mammary gland development, immune system effects, lower testosterone and cholesterol levels, changes in estrogen levels, and decreased thyroid hormones which are essential for normal growth and development[21].

PAHs originate from incomplete combustion of organic materials such coal, oil, wood, etc[22]. Emission from anthropogenic activities are predominant, however, natural sources, for example, natural losses or seepage of petroleum or coal deposits, and volcanic activities can be attributes to PAHs level in the environment[22]. PAHs are highly lipophilic. It has low aqueous solubility but high solubility in organic solvents. Since PAHs manifest various functions such as light sensitivity, heat resistance, conductivity; emit ability, corrosion resistance, they are mostly used as intermediaries in pharmaceuticals, agricultural products, photographic products, thermosetting plastics, lubricating materials, and other chemical industries[22]. PAHs can transfer to different environmental compartments, so they are got into human body via multiple routes including ingestion, inhalation and dermal contact. PAHs can cause adverse health effects on human such as the immune system suppression, DNA alteration and birth defects[22]. They are also considered as human carcinogens[23].

2 METHODOLOGY

In this chapter, two aspects of the research methodology, research design and data analysis, are described. In the research design stage, method, sample population and measurement procedure are defined. Next, raw data are collected then converted to format that is easy to interpret and address objectives. The research was conducted in Vietnam from December 2018 to June 2019.

2.1 Research design

The research has employed an online survey to collect information from defined sample population by its cost efficiency, time saving, scalability, accessibility and convenience. The survey incorporates both close-ended and open-ended questions, to get qualitative and quantitative data. The survey is divided into three sections, not mentioned the sub-section in the beginning asking about information of respondents (name, working company, title and contact information of respondent). In the first and second sections, there are questions which should be under one of below categories.

- Category 1: company's general information (type of ownership, product, market)
- Category 2: company's understanding of the REACH regulations, particularly SVHCs communication obligations (the first section) and restrictions on chemical uses in products (the second section)
- Category 3: compliance program which are currently operated at the respondent's company
- Category 4: challenges, problems and issues are experienced by the company in the process of complying with the REACH regulation (including strategies they are using to cope with them).

The third section requests companies to rate the importance of different elements in determining success of a compliance program.

The questions were created with reference to the content of the REACH regulation and guidance materials from ECHA[3], chemical sector regulatory authorities[24,25] and business organizations[26] and associations on establishing a well governed of chemical management program that enable companies to meet with REACH requirements for substances in articles.

The survey is available in two languages, English and Vietnamese, so that companies can better understand the questions.

Since data collected in the survey is not considered as "personal and/or sensitive" information that may trigger ethnic issues, so it is out of the scope of EU' 2016 General Data Protection Regulation and no data protection method needed to be done to fully comply with the regulation.
There are different actors including participating into the footwear supply chain [Figure 2.1]. However, the target population of the research were only article suppliers which should be Tier 2 suppliers and Tier 1 suppliers. REACH requirement for chemicals circulating in Europe is out of this research's scope.

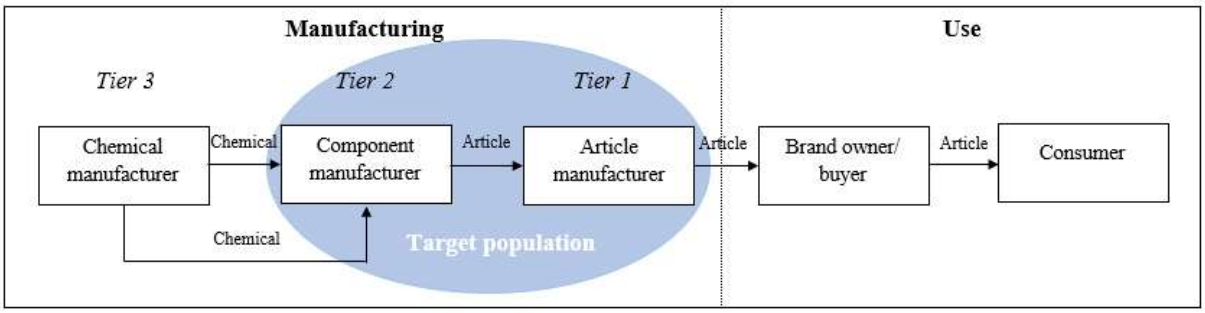


Figure 2.1. Simplified footwear supply chain

Initially, the survey aimed to involve the business association, Vietnam Leather, Footwear and Handbag Association (LEFASO), in launching the survey. The approach is chosen considering possibility to increase survey response rates.
The link of survey and the letter explaining of the project and expectation of support from LEFASO in disseminating the survey to their member companies were sent to LEFASO's email address which was found in their official website. Follow-up calls were made to ensure the request was considered and processed.
No feedback was received three months after confirmation of being in the project from LEFASO. Concerning that, the researcher decided to involve European buyers because European buyers were interested in compliance projects. Their attention would attract supplier's participations. The researcher contacted several brands which are sourcing their products in Vietnam but only Decathlon was open to conversations.
Decathlon is a known sportwear and sport equipment retailer from France. They develop and sell sporting goods under their own brands. Decathlon has their manufacturing based in many

countries and Vietnam is one among. Production for Decathlon accounts a considerable proportion of total footwear production in Vietnam in 2017. It is clearly indicated by the fact that Thai Binh Shoes (TBS) company, one of top outsourced factories in Vietnam, has dedicated nearly full of their capacity to catch Decathlon's demand in Vietnam footwear outsourcing[31].

Similarly, the link of survey and explanation letter were sent to Decathlon's headquarter in France for considering the request of assistance for the research. Before that, the researcher had several talks with in charge people at Decathlon's subsidiary in Vietnam. Understanding the nature of subsidiary's operation which is to execute the parent company's plans, the researcher determined to escalate the request to the headquarter.

The process which is outlined in the below diagram:

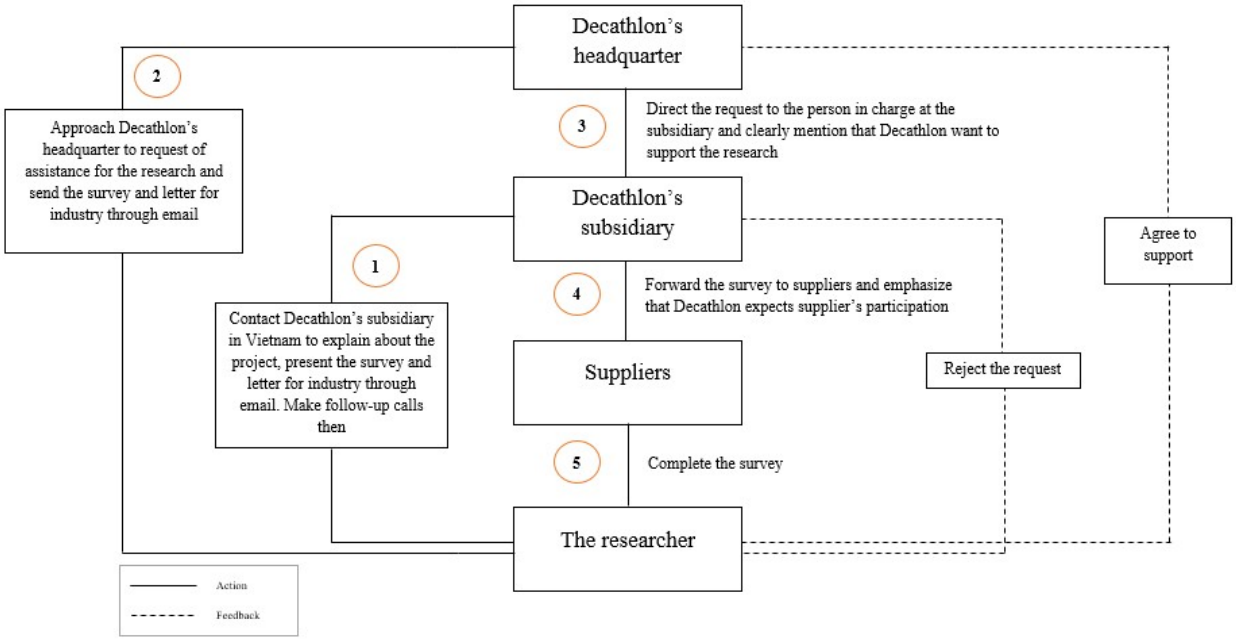


Figure 2.2. Escalation process to acquire support from Decathlon company in spreading the survey

2.2 Data analysis

The survey utilizes both close-ended questions (yes/no and multiple-choice answer) and open-ended questions (short descriptive answer associated to the topic in question). The setting on the

survey making website allows the researcher to directly use quantitative data from close-ended questions which is automatically converted into types of charts and graphs.

About open-ended questions, the setting on the survey making website only allows the research to capture qualitative results. To achieve quantitative results of such questions, the calculation would be conducted manually. First, answers were copied to separated Microsoft Excel's spreadsheets in correspondent to each question. The answers were then sorted in alphabetical order and grouped into relevant categories. Some techniques could be used in case of huge amount of received answers. For example, a text analyzer is a good start to identify the broad categories by screening data for the most commonly used words in the text answers. After finishing the list of categories and grouping answers to relevant category, percentage is calculated, and the quantitative result now could be used to explain the trend of the population.

3 RESULT

The results of the research discussed in this chapter were obtained through the responses from the survey provided to LEFASO's company members and Decathlon's suppliers in Vietnam. On the date that we officially closed the survey, we received totally 13 answers, all from Decathlon's suppliers. None of LEFASO's company member joined in the survey. The results were divided into five categories, namely, sub-section – respondent's information, regulated chemicals in products, process in place, challenges through implementing compliance process and effective compliance program.

3.1 Sub-section – respondent's information

This section allowed the researcher to sort the answers which might be used, or which might be not from total received answers. It was necessary to ensure the results were represented for the selected population. The sorting was done regarding the answers of two questions about product's description and product article self-declaration. Six over thirteen respondents defined all their products as articles under REACH. Three defined some of their products as articles. One considered none of their products were articles. Other three couldn't define whether their products as article or not. The respondent's descriptions of their products could be grouped into three categories which were textile components, sole materials/ sole and full shoes [Figure 3.1].

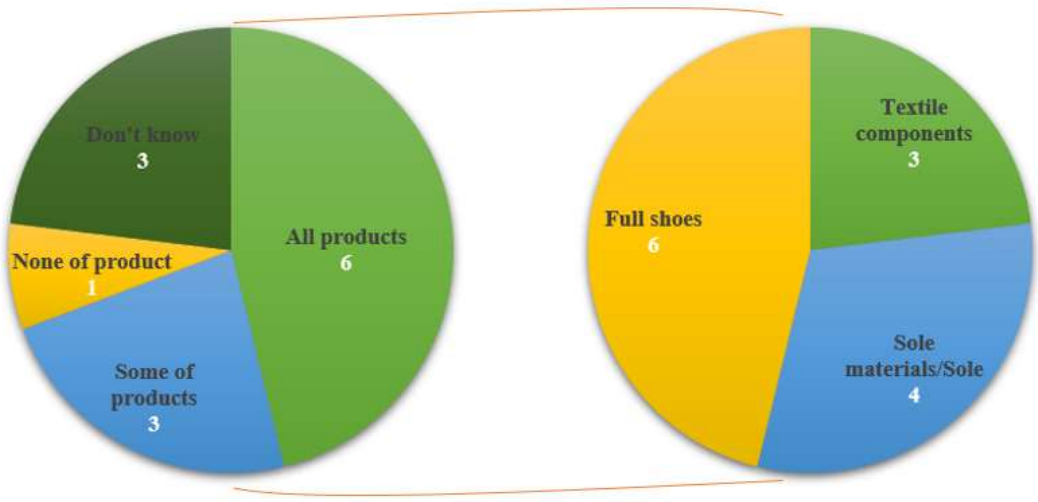


Figure 3.1. Respondent's production of articles

The categories were all articles under REACH, so all thirteen received answers could be used in further examination.

In addition, the researcher was briefed on respondent's company profiles that was useful to understand whether any link of company's aspects and the and compliance advancement. All of respondents are privately owned entities and manufacturing for several markets. As shown in the below figure, Europe is the main market of ten out of thirteen respondents. Six respondents are manufacturing for domestic and USA market. Other markets, Japan and India, were specified by a respondent.

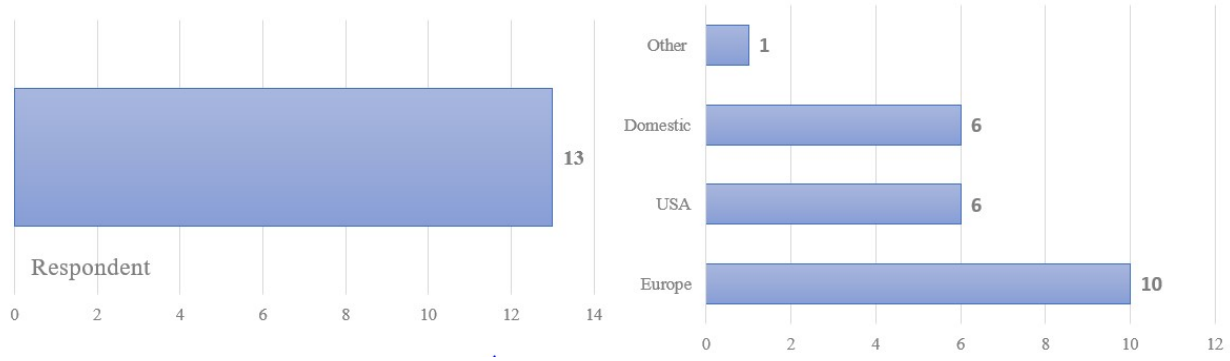


Figure 3.2. Respondent's target business market

3.2 Regulated chemicals in products

3.2.1 SVHCs communication obligations

Asking about information of SVHCs from the Candidate List, eight out of thirteen respondents confirmed no SVHC was contained in their products above the limit 0.1% by weight that would trigger communication obligations. The rest of them had no idea if their products were in compliance with REACH requirements on SVHCs from the Candidate List. Similarly, when it came to information of SVHCs from the Authorization List (Annex XIV), nine respondents disclosed that their products do not contain any SVHC from the Authorization List that would require an authorization to continue using the SVHC. Others did not know if SVHCs from the Authorization may present in their products or not [Figure 3.3].

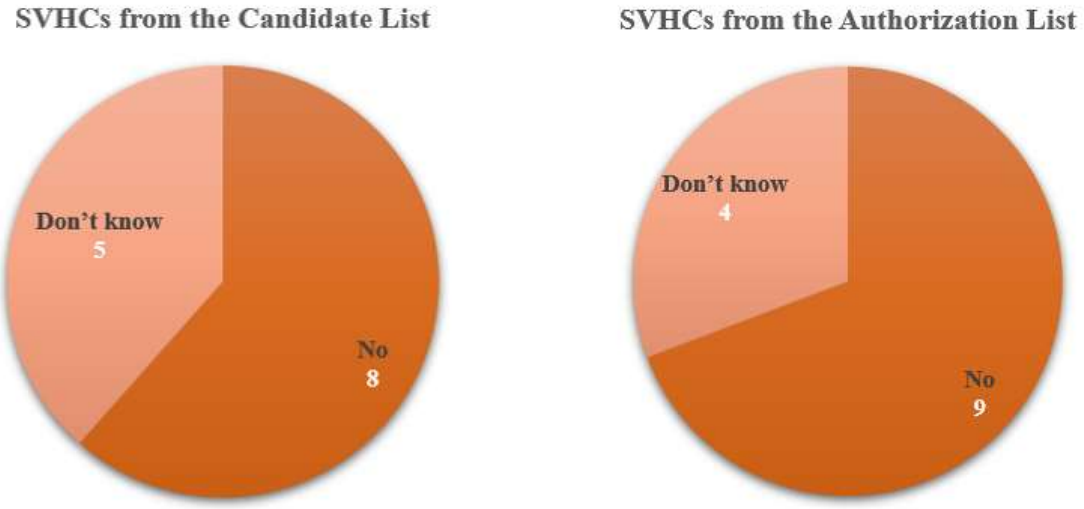


Figure 3.3. Respondent's understanding of SVHCs from the Candidate List and the Authorization List in their manufacturing products

There were different measurements to get the information of SVHCs from the Candidate List or the Authorization List. The measurement, which were mostly applied by ten out of total thirteen of respondents to screen SVHCs in products was communicating and verifying the information with upstream vendors. Other used measurements were chemical analyses and sector knowledge by seven respondents and six respondents respectively [Figure 3.4].

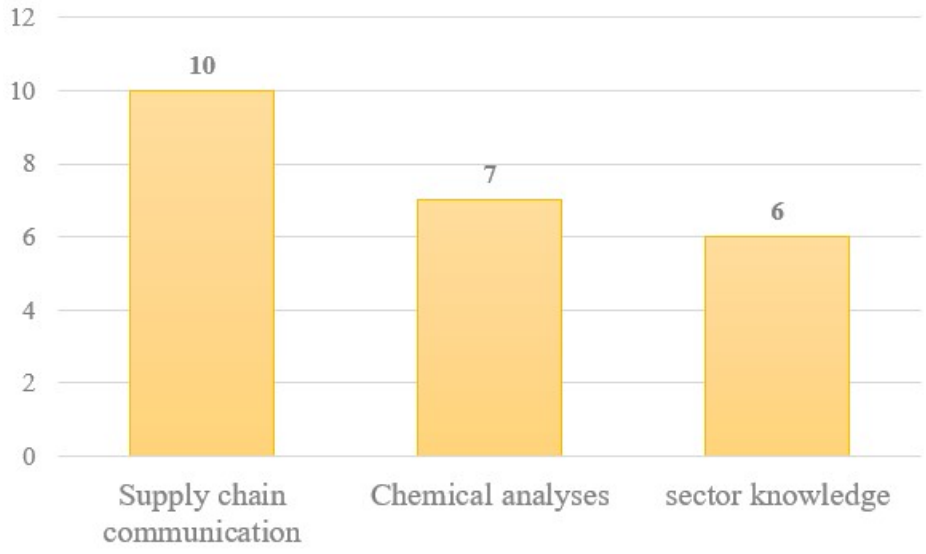


Figure 3.4. Respondent's means of SVHCs information collection

In respect of information from ten respondents, SVHCs in products were resulted from feedstocks wherein SVHCs were remained as residuals. Only two respondents admitted they used SVHCs in their products on purpose [Figure 3.5].

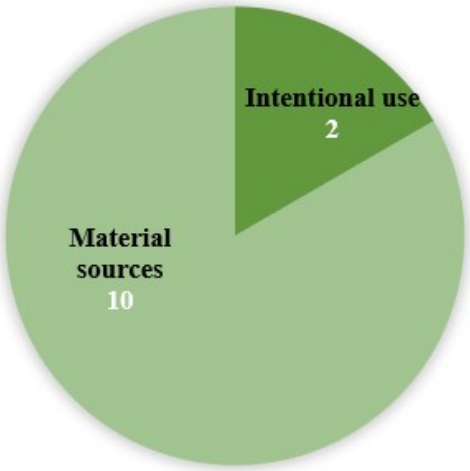


Figure 3.5. Respondent's defined causes of SVHCs present in products

The source of information on the REACH regulation is an essential factor for companies to learn about REACH obligations imposed on them, then establish management plans for effective compliance to the regulation. Most of respondents obtained such information from their

customer brands, internet and ECHA's website. As pointed out in the introduction, REACH application in developing countries were subsequent to outsourced activities and with European buyers, thus, it was not surprising that majority of respondents learnt about REACH regulation from their customers. They also received information from business's associations and organizations such as AFIRM, AAFA, etc. and external consultants. Professional training, seminar and course on this topic were other useful sources to enrich knowledge on the REACH matters [Figure 3.6].

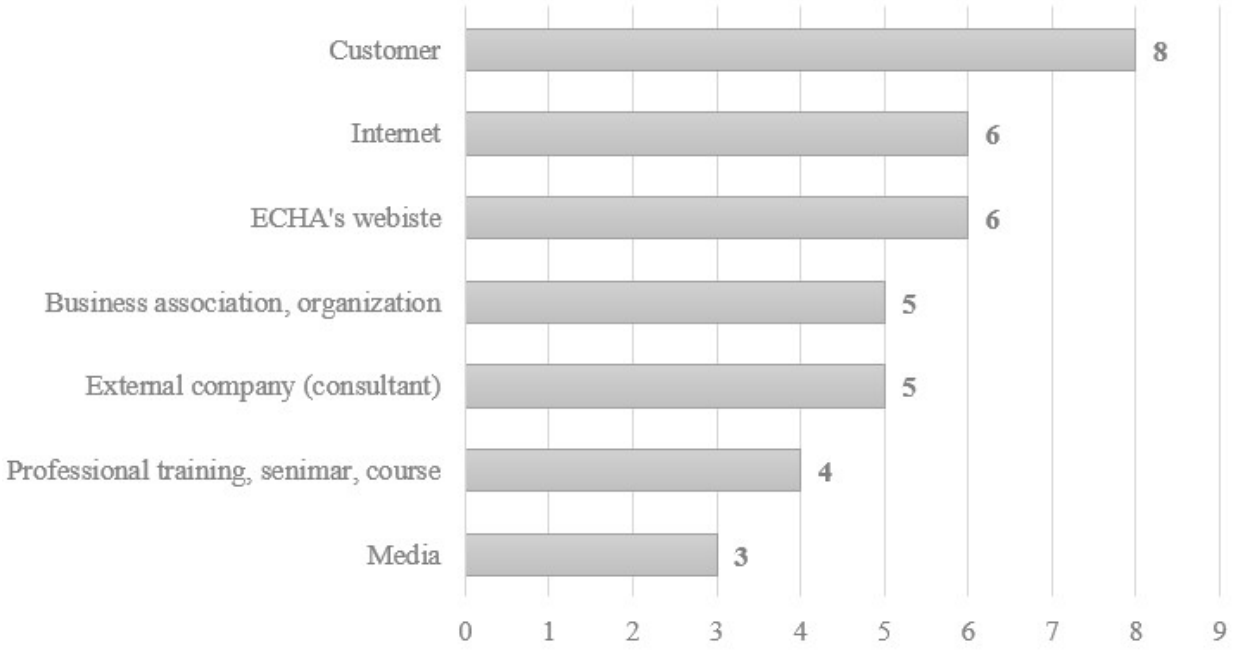


Figure 3.6. Respondent's sources of information on the REACH regulation

3.2.2 Restricted substances management:

The result revealed that majority of respondents were aware of REACH restrictions on chemicals used in articles under circumstance, compromising nine of total respondents, and the proof of compliance with these restrictions would be required by their customers [Figure 3.7].

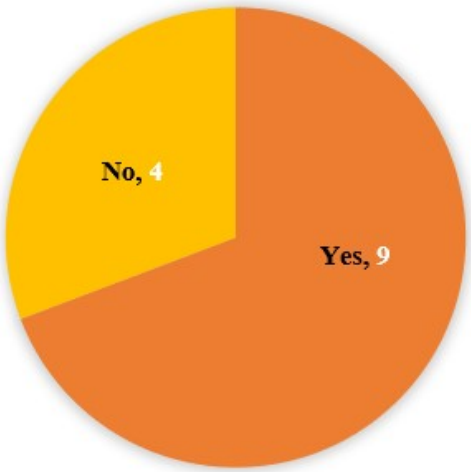


Figure 3.7. Respondent's knowledge on REACH restrictions on chemicals

Complying with REACH requirements for substances in articles depends on how information is collected, evaluated and consolidated. It would be the best approach, if an overview of substances contained in articles and concentrations could be shared throughout the supply chain, in term of compliance and anticipation of impacts of regulatory trends in the future. However, it is not always achievable because such information may be considered as confidential information by some companies. As an alternative, upstream suppliers can focus on clarifying restricted chemicals in products instead of all chemical constituents through declaration process which is a step in the procurement. If none of restricted chemicals is used neither in supplier's manufacturing processes nor their material vendors', the supplier could exclude the presence of restricted chemicals in their products. Almost all of respondents, eleven out of thirteen, are using this approach in response to obligations of restricted chemical management [Figure 3.8].

Product testing at the facilities or third-party laboratories were also relied by eight respondents to directly acquire information of a restricted chemicals in product. Testing may be helpful in certain situation, but it is not often feasible because not all chemicals can be tested. Additionally, it is time and money consuming. Most importantly, the results are probably different depending on method selection [Figure 3.8].

Other possible approaches to get critical information of chemicals in products were to conduct on-site audit at supplier's facilities, refer to publications of toxic footprints in footwear process and plan to have third party certifications. These approaches could be used individually or in combination with others to enhance process efficiency [Figure 3.8].

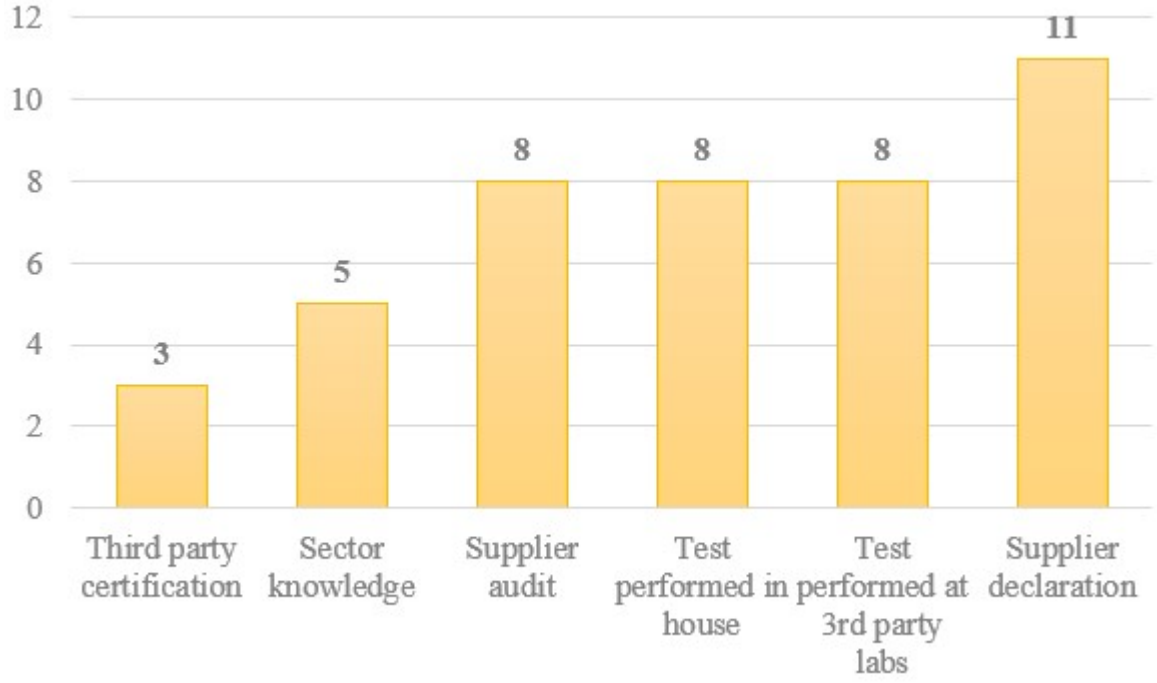


Figure 3.8. Respondent's means of restricted chemicals information collection

When respondents were asked about where restricted substances in their product came from, more than half of respondent supposed that restricted substances were inherent from material sources not from their processes. The results were not much different as they answered the similar question regarding to the main causes of SVHCs in products [Figure 3.9].

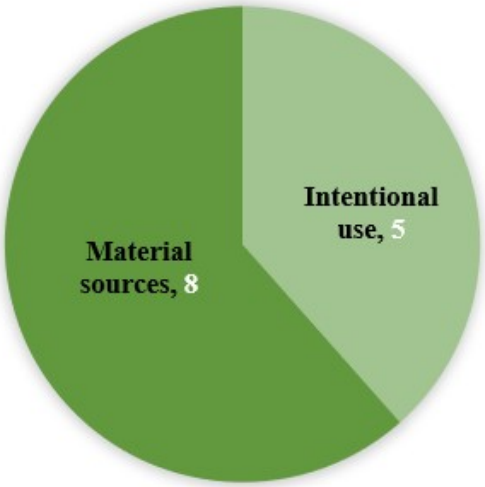


Figure 3.9. Respondent's defined causes of restricted chemicals found in products

3.3 Process in place

One of the best practices for companies to ensure their compliance is having key personnel directly in charge of addressing SVHCs/ RSs relating issues or chemical regulatory matters. All of respondents had three to four employees responsible for these issues in their companies.

Complying with REACH requirements for substances in article could be achieved if chemicals used in manufacturing processes and input materials are well controlled. Nine over thirteen respondents already have their inventories in place to manage chemicals in their manufacturing. Seven respondents developed a database to record and track compliance information of materials supplied by their vendors.

Out of the total respondents, nine suppliers requested their vendors to respect REACH requirements of SVHCs and restricted chemicals in products, while three suppliers did not have any requirement specifically covering SVHCs and restricted chemicals management for their vendors. Another one did not answer on this query [Figure 3.10].

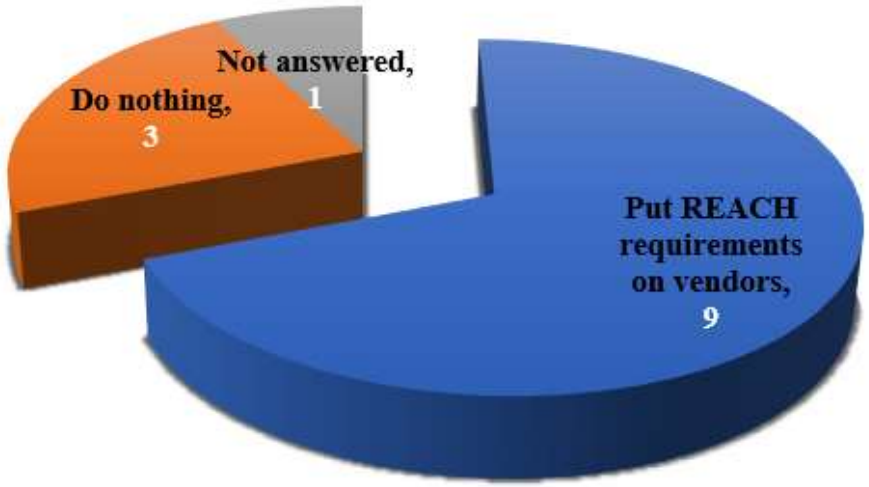


Figure 3.10. Respondent's actions to involve vendors in compliance process

Proper actions would be taken by some respondents to prevent the regulated chemicals from material sources. Particularly, six respondents would cancel, and six respondents would limit buying from these suppliers with frequent non-compliance history. Comparably, seven respondents would cancel, and four respondents would limit ordering from suppliers who failed to comply with restrictions on chemicals listed under REACH [Figure 3.11].

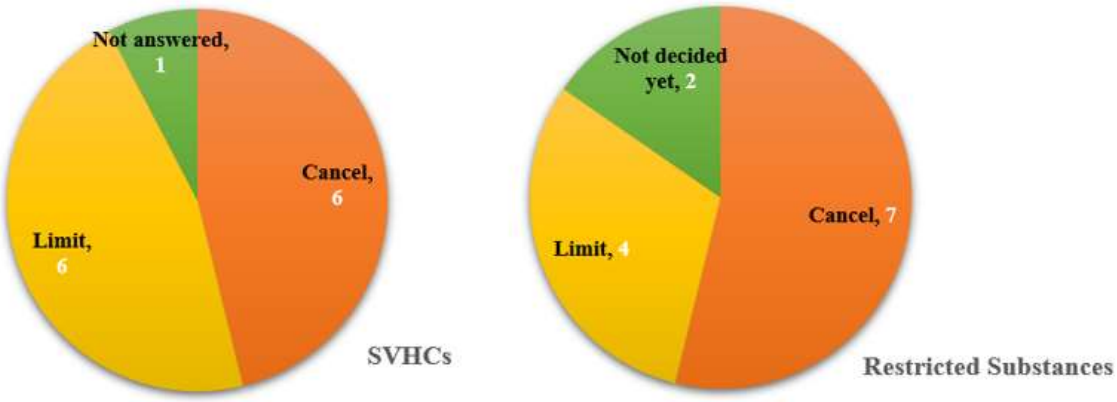


Figure 3.11. Respondent's actions toward vendor's non-compliant activities

The REACH regulation will eventually support promoting substitution of hazardous chemicals and manufacturing processing to safer chemicals and green technologies. Seven suppliers of total thirteen suppliers have alternative for regulated chemicals might be in their products.

3.4 Challenges through implementing compliance processes

Nine of thirteen respondents reported the challenge mostly experienced by them was shortage of knowledges in chemicals and where they were introduced into the supply chain for the purpose of complying with REACH SVHCs communication obligations. However, when it comes to restricted chemicals management, only three respondents spoke up knowledge deficit was their challenge [Figure 3.12]. Looking at the SVHCs list published in ECHA's website, there is basic information of substances such as name, CAS number, date of inclusion, reason for inclusion[27]. Few information on, for example, common applications is available. It is more difficult for suppliers to decide where to start. On the contrary, conditions of restrictions are well stated, so it is easier to localize the risks[28]. That could explain the supplier's answers.

Costs associated with product testing to collect data of SVHCs and restricted chemicals in products were viewed as critical issues by a large proportion of respondents [Figure 3.12]. Money spending to screen SVHCs and test against restricted chemicals were addressed by eight and ten respondents respectively.

The chemical lists, the SVHCs Candidate List and Restricted Substances List, are not static and updated periodically. It grows business risks considered by five respondents [Figure 3.12]. For suppliers that do not have adequate data of chemical contents in their products, they need to start new investigations with upstream actors throughout complex supply chains about new added substances. Under normal conditions, a reliable investigation can be completed within 2 – 6 months as reference to the automotive industrial scenario[29]. It is generally easiest for companies that operate their manufacturing processes from chemical and raw materials purchased. In contrast, companies that assemble products from parts or components provided by suppliers or those who outsource their entire manufacturing face more difficult tasks due to the number of tiers in their supply chains and the complexity of the parts and components they purchase[30]. Another way to come up with the addition of new regulated chemicals is sending products to test against these chemicals and incur the cost, but it is not a long-term approach.

As an effect of globalization, trades across countries becomes easier when tax barriers have been removed. A company produce not only for a market but different markets. Each market has

applied different standards to tackle chemical and environmental issues. Thus, companies have developed their own lists of substances to cover all their market's requirements. Sometimes, they may introduce more restricted chemicals or set lower limit than legislations depending to company's quality management policies, in response to anticipated regulatory trends depending. Usually, a supplier may receive different specifications from customers and those are even conflicting [Figure 3.12]. It will be a challenge for suppliers because maintaining several production lines could be resource intensive and deficiency but applying the highest standard to entire operations would affect the profitability. Five out of total respondents reported that on the query [Figure 3.12].

An issue brought up by eight respondents was their current abilities may not be technologically and economically feasible to meet REACH requirements. Others could be counted were difficulties in defining article and calculation concentration of SVHCs to determine if obligations were triggered (4), supplier's unwillingness to share information of SVHCs (2), inconfidecne in addressing all SVHCs in products regardless understanding on sector (2), delay in response to requests of SVHCs information (1), unreliable test reports (1) [Figure 3.12].

Improving information flow was believed to be the solution for above challenges and issues by all respondents.

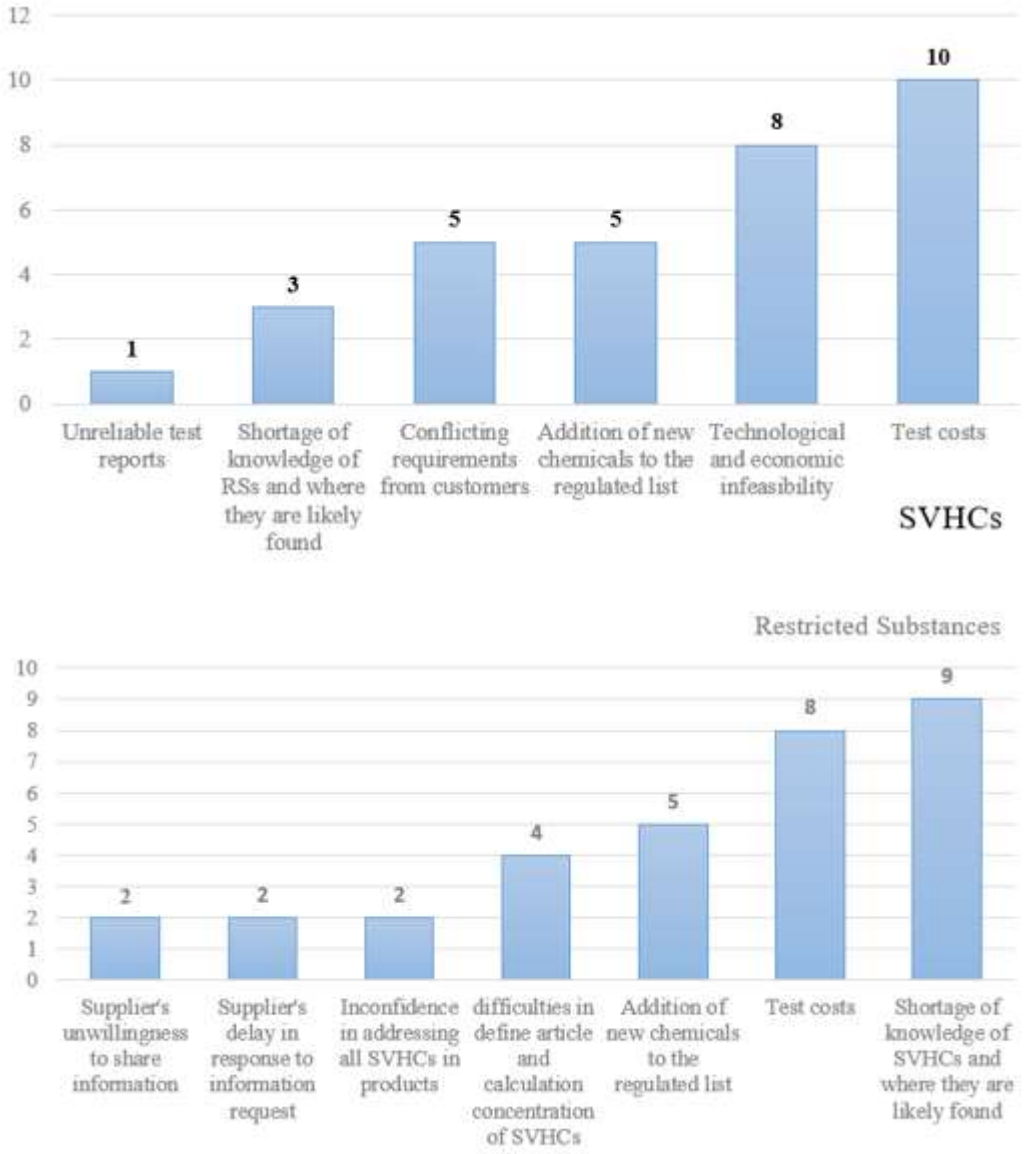


Figure 3.12. Respondent's challenges and issues in implementation of REACH compliance

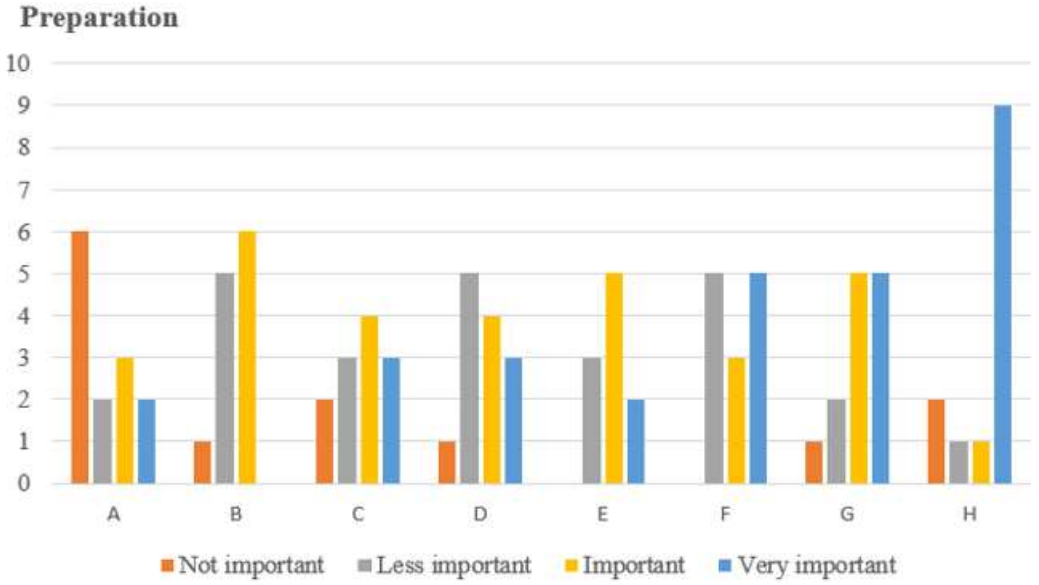
3.5 Effective compliance programs

3.5.1 Preparation

Of critical importance to the success of any compliance program, six of thirteen respondents defined that reading of materials such regulatory documents and guidelines from authorities to ensure necessary knowledge of issues and needs and making a study of chemicals which would be dealt with. As the most important as specified by ten out of thirteen respondents was

monitoring and anticipating regulatory trends to minimize impacts on businesses by taking quick actions when new regulations or changes were released [Figure 3.13].

In term of knowledge significance in complying with REACH, five respondents implied that refer to information sources from individual brands, business associations and organizations was important. It was followed by self-research on Internet and ECHA's website (4) and constantly attending to seminars and courses on REACH topics (4). Seeking advices from external consultant was undertaken as the last resort. The priority as showed in the figure 3.14 was consistent to the results of information resource preference in the figure 3.6.



A	**Liaise closely with ECHA and regulatory bodies**	**E**	**Refer to resources supplied by individual brands, AAFA, AFIRM, ZDHC, etc.**
B	**Seek for advices from external consultants**	**F**	**Read of materials**
C	**Self-research on the internet, ECHA's website, topic specific websites**	**G**	**Make an effort to understand chemistries in use and where Substances of Very High Concern (SVHCs) and/or Restricted Substances are introduced to the supply chain**
D	**Constantly attend to seminars and training courses related with REACH chemical regulation and other regulations**	**H**	**Regularly update changes in regulations and/or releases of new regulations**

Figure 3.13. Respondent's perspective on the importance of preparation schemes in an effective compliance plan

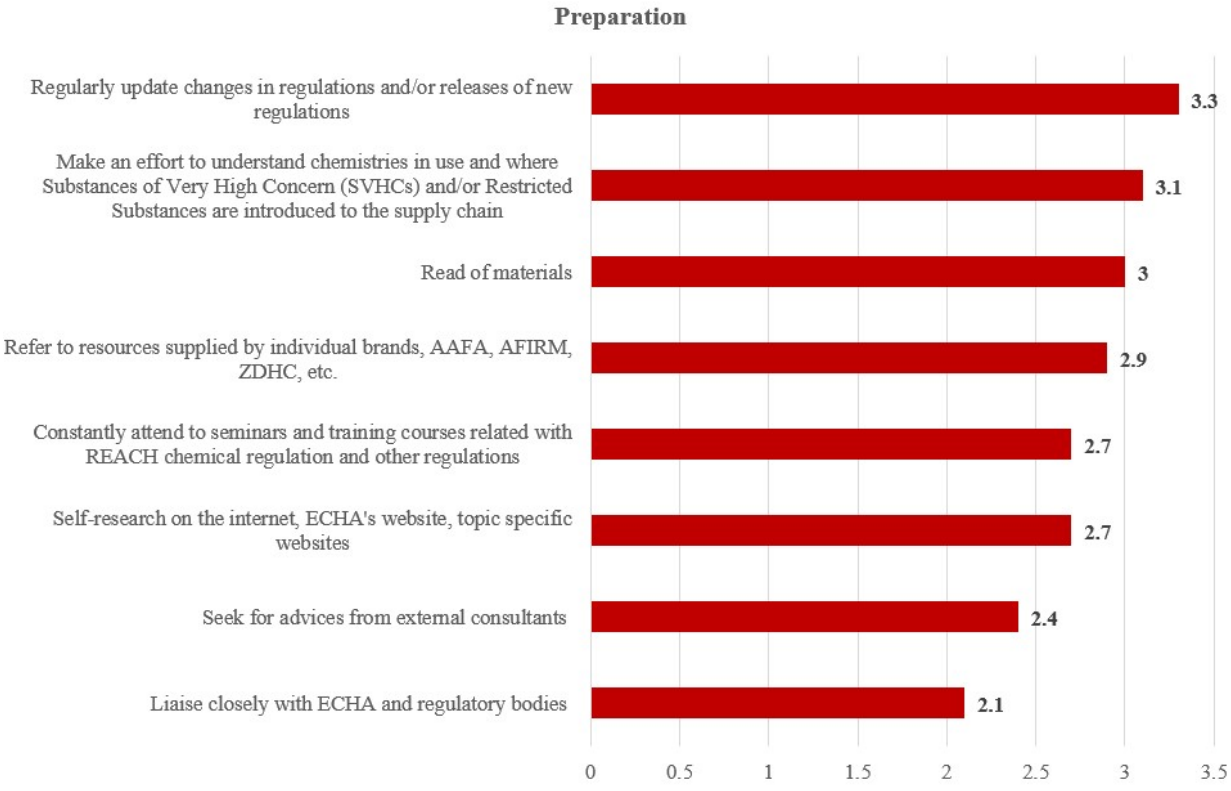


Figure 3.14. Means of different preparation schemes in an effective compliance program

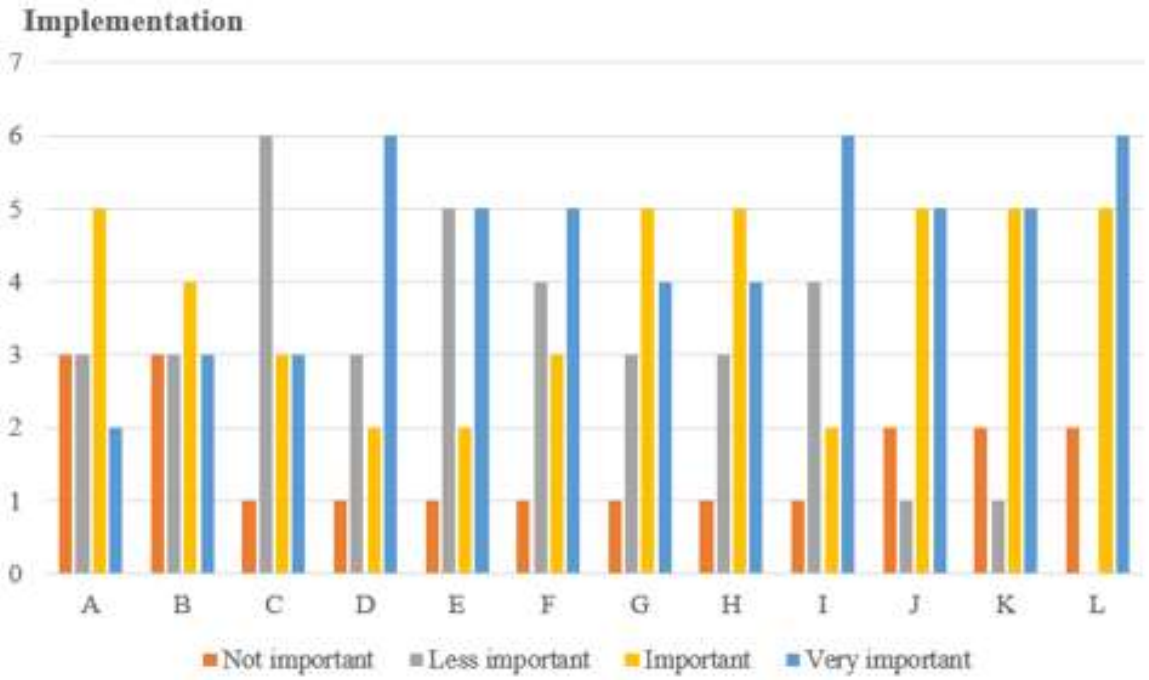
3.5.2 Implementation

When it comes to important elements of an effective compliance program, the top answers were around vendor liaison and management. It was harmonized to the respondent's answer of critical factor for overcoming current difficulties in compliance that was improvement of information exchange in the supply chain. Risks from vendors can vary greatly, so it was most important by six respondents to classify suppliers by chemical risks with respect to their material categories and compliance history. Following up supplier compliance on regular basic and making decisions based on supplier records of compliance were also highly considered by five respondents [Figure 3.15].

Also, it is important to designate group of employees responsible for achieving and maintaining REACH compliance, beside performing risk assessments of the supply chain and operation to pinpoint areas of exposure to risks, building data system to record and keep track compliance reported submitted by suppliers and aligning company policies to stringent standards and best

practices, requesting vendor to comply with REACH requirement and explain to them the importance of their engagement in sound manage of regulated chemicals and developing testing programs to assure strong governance of incoming materials and product outcomes [Figure 3.16].

Substitution for safer and greener chemicals as well as investment on innovative technologies to reduce chemical risks were recognized as an important element of an effective compliance program by the respondents in the survey but not that important comparing to others. [Figure 3.16].



A	Have an understanding on chemical analysis to interpret testing result	G	Build a data management system to track supplier compliance
B	Plan a budget for costs involving chemical regulatory compliance activities	H	Perform a risk assessment of your supply chain and operations to pinpoint areas of exposure to risks and take a closer look at these areas
C	Research on alternatives or new technologies to reduce or eliminate chemical risks	I	Create a company's regulatory associated group in charged in compliance and implementation of REACH regulation and other chemical regulations
D	Send requirements to suppliers, explain why their engagement is important and collect information that they read, understand and can meet requirements	J	Follow up supplier compliance on a regular basic
E	Develop a testing program to assure strong governance of incoming materials as well as finished products	K	Make buying decision based on supplier records of compliance
F	Align internal policies, standards with the most stringent regulations and best practices	L	Classify suppliers by chemical risks with respect to their material categories and compliance history

Figure 3.15. Respondent's perspective on the importance of implementation schemes in an effective compliance program

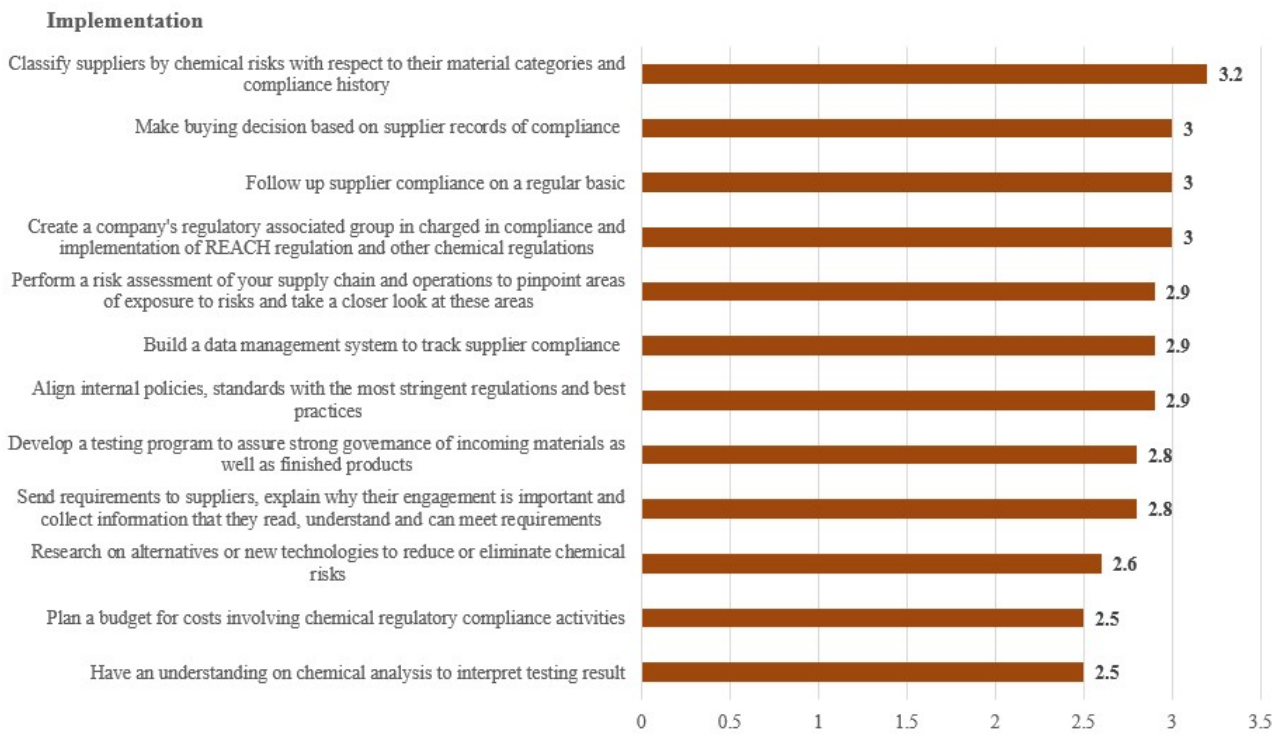


Figure 3.16. Means of different implementation schemes in an effective compliance program

4 CONCLUSION AND RECOMMENDATIONS

This chapter presents conclusions drawn from the study and recommendations to solve the current challenges and issues which are faced by Vietnam footwear suppliers and problems foreseen by the researcher when analyzing general compliance situation in Vietnam. The study was intended to assess challenges and issues, and document mechanisms and practices of Vietnam footwear industry in response to REACH compliance demands from European business partners.

4.1 Conclusion

Based on the results of the survey, the majority of respondents is aware of REACH obligations which imposed on them, particularly, communication of SVHCs information in the supply chain and management of chemicals restricted to be included in products under circumstances. Almost all of respondents participated in the survey are manufacturing products or components which are eventually used in other products supplied to European market. European buyers play a very important role on fostering REACH application in non-European suppliers which is indicated by the fact that a large proportion of respondents acknowledge their customer's support in terms of compliance implementation. This fact confirms that economic interdependence can promote global REACH.

Complying with REACH requirements for substances in articles depends on information availability which could be achieved through the participation of all supply chain actors. Information of regulated chemicals is exchanged between Vietnam suppliers and their vendors via a so-called declaration process. Specifically, in this process, a supplier requests their upstream vendors to fill in a declaration form which is alike a questionnaire investigating regulated chemicals present in supplied materials. Some example questions likely seen in the form are: does your material contain any chemical regulated by a country? If yes, which chemical contained in which part and its concentration. Vendors, after finishing investigation, will complete the form and upload in a database which is designed and administered by the supplier. A list of substances is often attached with the declaration form for vendor's reference. These substances lists are varied depending on supplier's target markets and quality management policies. Another way is to obtain information from test report. Both measurements are used by most of respondents.

However, costs associated to testing against regulated lists brought a high concern to respondents. Also, vendor's unwillingness or delay in information response cause troubles for suppliers in achieving compliance goals and understand chemical footprints in their supply chain. Continuous inclusion of new chemicals in the regulated list yields another issue recognized by the respondents considering time spent to an information investigation along the supply chain under normal conditions. Although Vietnam manufacturer's abilities has been improved[31], some respondents shared that there were requirements which they were still unable to meet.

All respondents agreed compliance would be achieved, if the information issue is resolved. Information sufficiency facilitates suppliers to get an insight on where regulated chemicals are introduced in the supply chain then focus on high-risk sources. It also helps them to narrow the list of test substances when they need to double confirm compliance status by the test report, thereby test costs will be reduced. Furthermore, information availability allows suppliers to ensure compliance with future regulations.

4.2 Recommendation

Today, more and more suppliers in Vietnam have developed their own declaration process to enhance information flow regarding to material and substance compositions of footwear components. Although primary parts are similar, the declaration templates and information tracking systems are varied from suppliers to suppliers. The conflicts in these processes are sometime experienced by the respondents of the survey. It also is resource and time intensive for supplier when they need to manage their own process and response to their customer's processes concurrently. In the future, it will become another issue for suppliers. As recognized by the researchers, one single, transparent and harmonized process which all suppliers in the sector can be used and share their information on chemical regulatory compliance up and down the supply chain is recommended to not only meet the needs of information but prevent the foreseeable problem.

There are industries have employed such approach. Below are examples of single platforms which are promoted by automotive, electronic, construction and consumer goods industries in chemical compositions information exchange within the sector.

Automotive industry – International Material Data System[32,33]	It is an online database which is established by the consortium of auto manufacturers such as Audi, BMW, Ford, etc. This database is globally used to communicate information about chemicals in parts supplied by the supply chain to auto manufactures. It also incorporates Global Automotive Declarable Substance List (GADSL) listed out chemicals used in the automotive manufacturing targeted by national and international regulations as well as chemicals interest to know by automotive manufacturers[34]. The GADSL master file and an instruction of how to it is available for public assessment.
Electronic industry – Joint Industry Guide for Material Composition Declaration for Electronics Products (JIG)[32]	It is the work of group of industry representatives which aims to create a framework for data disclosure. It includes a standardized list of chemicals must be disclosed by suppliers concerning current chemical regulations applicable to electronic products and anticipated new inclusion. Detail instruction how to fill in the declaration form is also provided. In contrast of IMDS, it does not require suppliers to use any specific database or data tool.
Construction industry – BASTA project[32, 35]	It is an online database supported by leading Swedish companies in the sector and owned by the Swedish Environmental Research Institute, and the Swedish Construction Federation. The database is used to document self-declaration by construction material

	suppliers. The compliance information will be the validated by 3rd party audits. Like IMDS, BASTA project also includes requirements on chemical contents for which the REACH regulation is the foundation.
Retailers – Global Data Synchronisation Network (GDSN) [32]	The initiative has been agreed by Wal-Mart, suppliers, trade association and data company. Unlike above projects which information is publicly shared to all system participants, suppliers provide information on chemical which will be keyed in a database administered by a 3rd party to avoid leakage of confidential information. Buyers can access selected information by 3rd party once permission is granted by the suppliers. Released information may be the screening result based on a company specification or a certain regulatory requirement. The system is also used to track information relevant to future regulatory update

Table 4.1. Summary of declaration processes employed by several industries

Each discussed system here has some distinct features which Vietnam footwear industry could consider incorporating to their future declaration system to minimize individual requirements and ensure cost-effective management of declaration practice along the complex supply chain.

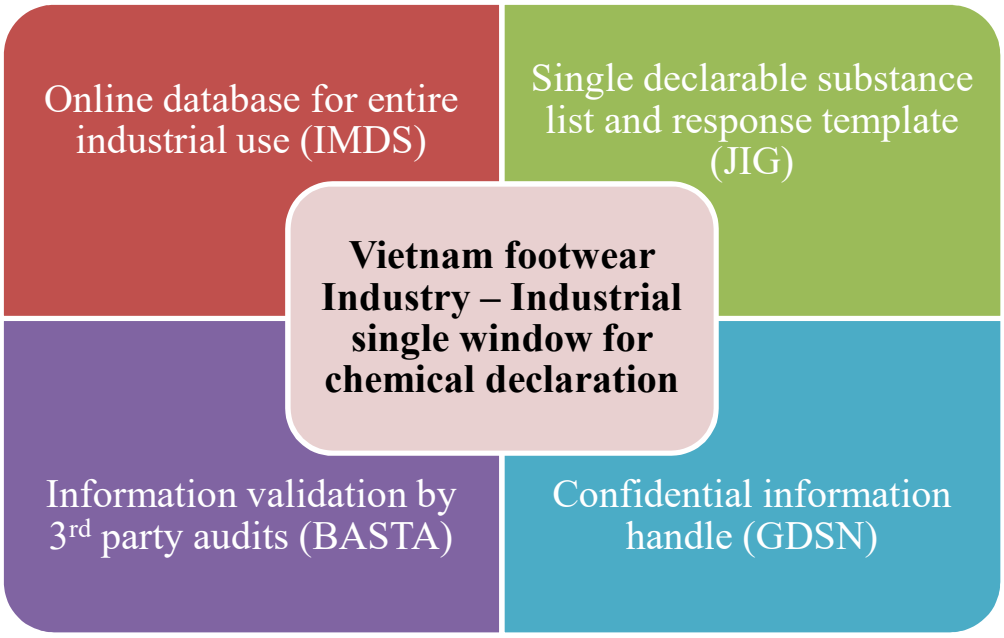


Figure 4.1. Outlined features of proposed Vietnam footwear industrial single window for chemical declaration

In the researcher's opinion, to apply this process in Vietnam, first, a group of Vietnam leading footwear manufacturers or business associations like LEFASO could take the leading role of initiating the project of the harmonized declaration process and system to document information regarding to material compliance used in Vietnam footwear industry. The main roles of the project initiators are:

- Work with the data company to develop the system with features and functions that allows all suppliers in the sector to register and share their product information.
- Appoint the data company as an only authorized organization to keep and extract the data upon the requests and permissions of involved parties.
- Approve a 3rd party auditor to validate information provided by suppliers, then feedback to the data company to complete registering.
- Work with relevant organizations to publish a declarable and/or restricted chemicals list that will be used as the reference standard in the Vietnam footwear sector and be responsible for updating the list upon regulatory changes and industrial interests.
- Encourage suppliers in the sector to participate in the new introduced process and make it widely known and accepted.

– Organize training to explain to suppliers benefits of the new declaration process and how to implement the new process in their operation.

When the system is rolled out, a supplier wishing to sell their materials to Vietnam footwear industry must register their materials in the system by providing information on chemical compositions, especially presences of declarable and/or restricted chemicals in the materials. Once the supplier submits their information, it will be processed by the appointed data company. If the information is validated by the 3rd party company, the materials is successfully registered and recorded in the database. Otherwise, it will be informed to the supplier for updating. By doing so, all information of materials which use in the Vietnam footwear sector is managed.

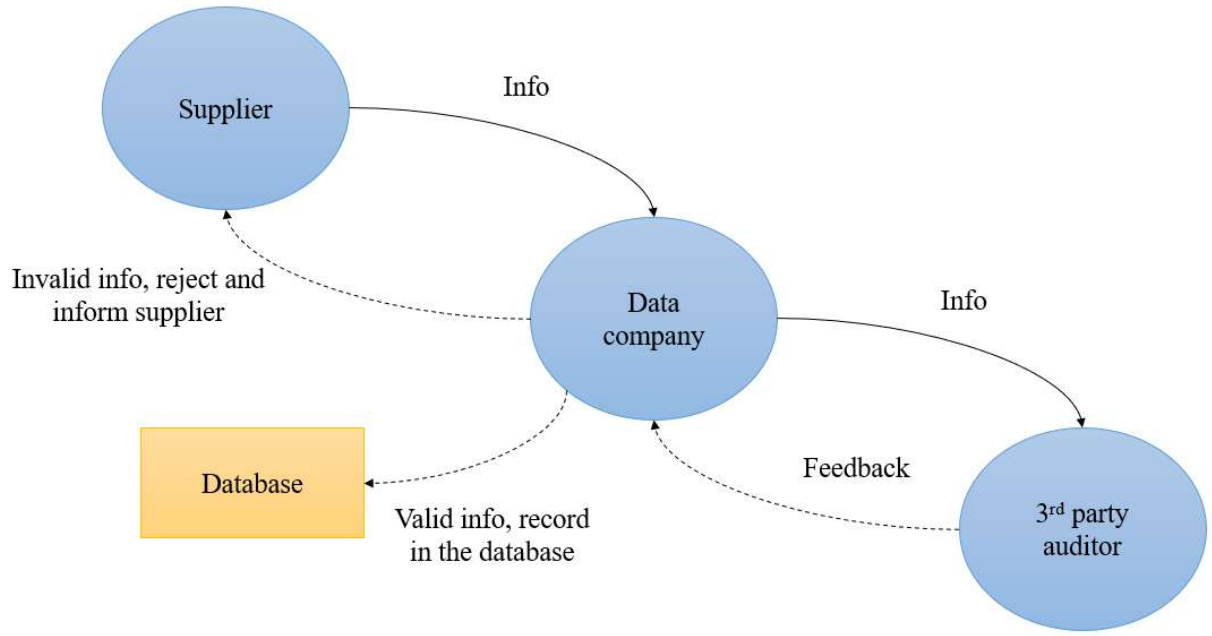


Figure 4.2. Registering process of new materials in the system

All information is managed by an independent data company for information security purpose. If a buyer is looking for a potential supplier, they can access to system and request the data company for information of a material of interest from the supplier. The data company, upon the buyer's request, will check with the supplier for a permission of data sharing and response the buyer. Only selected data which, for example, is whether the material is complied with a regulation or specification asked by the buyer, is shared. Then, the buyer can make their decision if they want to do a business with this supplier concerning the compliance matter.

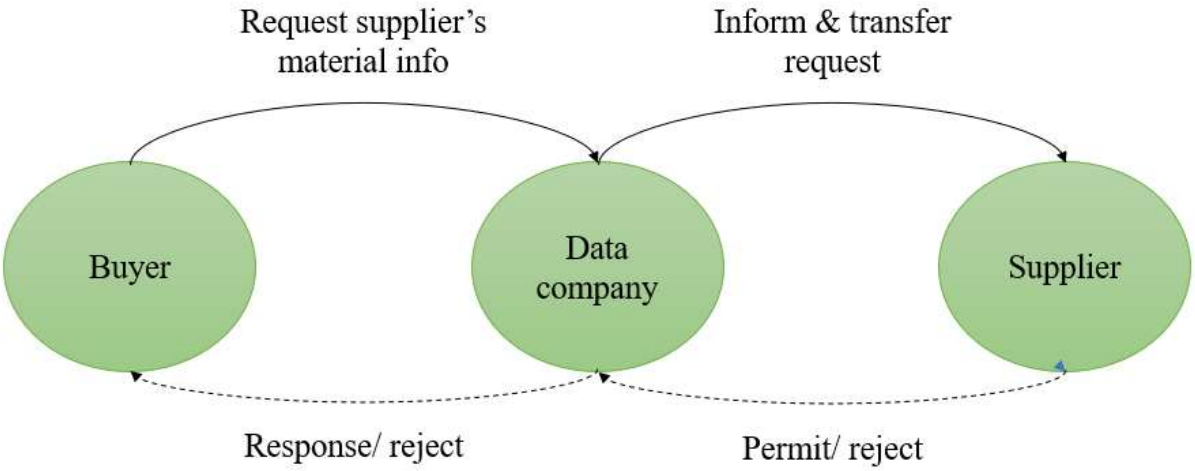


Figure 4.3. Data processing upon the buyer's request

5 ANNEX

5.1 Introduction letter

February 18, 2019

Dear Sir/Madam,
Kính gửi Ông/ Bà,

The implementation of chemical safety regulations has been a challenge in all countries of the world and has resulted in various strategies and approaches adopted by different sectors and countries.
Việc thực hiện quy định an toàn về hóa chất là một thách thức lớn đối với tất cả các quốc gia trên thế giới, mà mỗi quốc gia, mỗi lĩnh vực khác nhau cần có những chiến lược, phương thức tiếp cận riêng.

The "Erasmus Mundus Master in Chemical Innovation and Regulation" (EMMC-ChIR) is an international joint project between the University of Algarve (Portugal), University of Barcelona (Spain), University of Bologna (Italy) and Heriot-Watt University (UK), aiming to research all fields with applications to chemical safety regulations.
Chương trình thạc sĩ Erasmus Mundus in Chemical Innovation and Regulation (EMMC-ChIR) là một dự án liên trường gồm đại học Algarve (Bồ Đào Nha), đại học Barcelona (Tây Ban Nha), đại học Bologna (Ý) và đại học Heriot Watt (Anh), với mục đích nghiên cứu ứng dụng luật an toàn về hóa chất trong tất cả các lĩnh vực.

Ms Chau Nguyen is presently working on a research project within the EMMC-ChIR, under my supervision. The Research Project aims to identify the issues, concerns and problems encountered as well as document best practices of companies in Vietnam in complying with the REACH, as well as other international chemical regulations. The research project will also attempt to assess how industries are able to address these challenges by means of effective and efficient mechanisms to cope with the demanding requirement and how the research study can be used as decision support tool for industries in maintaining industry standards, establish appropriate mechanisms in dealing with the evolving chemical regulatory guidelines as well as strengthening competitiveness in the chemical industry market worldwide.
Chị Châu Nguyễn hiện đang thực hiện một dự án nghiên cứu nằm trong khuôn khổ chương trình EMMC-ChIR dưới sự hướng dẫn của tôi. Dự án này nhằm mục đích ghi nhận thực trạng, các mối quan ngại, các vấn đế cũng như giải pháp mà các công ty Việt Nam đang áp dụng khi tuân thủ luật REACH và các quy định quốc tế khác về an toàn hóa chất. Dự án còn đi sâu phân tích cách mà các doanh nghiệp nhìn nhận vấn đề cũng như làm thế nào để khắc phục nó một các đầy đủ và hiệu quả nhằm đáp ứng yêu cầu được đặt ra; đồng thời cách để dự án này có thể được sử dụng như là một công cụ đưa ra quyết định nhằm duy trì các tiêu chuẩn trong công nghiệp, xây dựng phương thức ứng phó với quy định ngày một khắt khe về luật hóa chất và nâng cao sức cạnh tranh của nền công nghiệp hóa chất toàn cầu.

In relation to this, we ask for your kind assistance and support by truthfully providing your insights and information, namely by filling the online survey prepared for this project.
Chính vì thế, chúng tôi rất mong nhận được sự hỗ trợ, giúp đỡ của Ông/Bà bằng cách chia sẻ quan điểm, thông tin chính xác thông qua việc điền vào phiếu khảo sát online của dự án này.

Your feedback and response will be an important aspect in the successful completion of the research work. All information provided by you will be solely used for the research project. Your company will be provided by the EMMC ChIR an electronic copy of the final report of the research project.
Những ý kiến đóng góp và chia sẻ của Ông/Bà là một trong những yếu tố rất quan trọng đóng vai trò quyết định sự thành công của dự án này. Tất cả mọi thông đều nhằm mục đinh nghiên cứu. Công ty của Ông/Bà sẽ được nhận một bản sao báo cáo kết quả cuối cùng của dự án từ EMMC ChIR.

If you have questions or need clarifications, please feel free to contact me by email (icavaco@ualg.pt).
Nếu Ông/Bà có bất kỳ câu hỏi hay cần sự giải đáp nào từ tôi, vui long liên hệ qua email (icavaco@ualg.pt)
Thank you for your cooperation.
Rất cảm ơn sự công tác của Ông/Bà

Sincerely yours,
Trân trọng,

Isabel Cavaco
Associate Professor,
University of Algarve, Portugal

5.2 The survey questionnaire

SUB-SECTION: COMPANY INFORMATION	
1. Please enter your contact	
Company's name:	Position:
Company's address:	Email address:
2. Please select the type of your business ownership	
A) Privately owned	B) Governmentally owned
3. Please briefly describe your products	
4. Please define your target market	
A) Domestic	B) USA
C) Europe	D) Others (please specify)
5. Are your products defined as articles under REACH? **An article under REACH** is defined as *"an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition"* (Article 3(3))	
A) Yes, all of them	B) Yes, some of them
C) None of them	D) I don't know
SECTION 1: REACH - SUBSTANCES OF VERY HIGH CONCERN (SVHCs)	
6. Is there any part(s) of your product(s) containing one or more Substances of Very High Concern (SVHCs) from the Candidate List above 0.1% per weight?	
A) Yes	B) No
C) I don't know	
7. Is there any part(s) of your product(s) containing one or more Substances of Very High Concern (SVHCs) from the Authorization List (REACH Annex XIV) above 0.1% per weight?	
A) Yes	B) No
C) I don't know	

8. If your answer in both **question no. 6 and no. 7** are **"No"**, please skip this question and go to the **question no. 9** **Do you have alternatives for these Substances of Very High Concern (SVHCs)?**		
A) Yes	B) No	
9. How do you get information on Substances of Very High Concern (SVHCs) in your products? *(You can select more than one answer)*		
A) Supply chain communication	B) Chemical analyses	
C) Sector knowledge	D) Other (please specify)	
10. Substances of Very Concern (SVHCs) in your products is the main consequence of your intentional uses, material sources or which other reasons? *(You can select more than one answer)*		
A) Intentional use	B) Material sources (impurities in feedstock/ contamination	
C) Other (please specify)		
11. Please indicate which source of information on Substances of Very High Concern (SVHCs) and SVHC related obligations that your company found to be useful *(You can select more than one answer)*		
A) ECHA's website	B) External company (consultant)	C) Customer
D) Business Association or Organization, e.g. AFIRM, AAFA, etc.	E) Professional training, seminar and course	F) Internet
G) Media	H) Other (please specify)	
12. How many people are there in your company in-charged of addressing Substance of Very High Concern (SVHC) related issues in particular or chemical regulatory matters in general?		
A) 0	B) 1	C) 2
D) 3	E) More than 5	
13. If your answer in the **question no. 12** is **"zero"**, please specify the reason		

14. Do you think it is essential to have extensive knowledge in chemistry to handle Substance of Very High Concern (SVHC) related issues in particular or chemical regulatory matters in general?		
A) Yes	B) No	
15. Please give your opinion for your answer in reference to the **question no. 14**		
16. Will you cancel or limit purchasing from a supplier due to consideration regarding to Substances of Very High Concern (SVHCs)		
A) Cancel	B) Limit	C) It is not a factor to determine if I should continue doing business with my suppliers
D) Not decided yet	E) I don't know	
17. Approximate number of seminar, training and course related in chemical regulatory compliance attended by your company in 2018		
A) 0	B) 1	C) 2
D) 3	E) 4	F) 5
G) 6 – 10	H) More than 10	
18. If your answer in the **question no. 17** is **"zero"**, please select your reason *(You can select more than one answer)*		
A) Lack of time	B) Lack of information from organizers	C) Late information from organizers
D) Topic is too general	E) Topic is too specific	F) Costs associated with attendance
G) It is covered by external company (consultant) or upstream enterprise	H) It is vendor's responsibility	I) Other (please specify)
19. Do you receive any support from your customer in term of information, advice,		

training, etc. to fulfill your communication obligations on Substances of Very High Concern (SVHCs)?		
A) Yes	B) No	
20. Do you instruct your suppliers on Substance of Very High Concern (SVHC) related information sources and how they should do to get understanding on SVHCs in their products?		
A) Yes	B) No	
21. Please select challenges, issues and problems encountered when collecting information on Substances of Very High Concern (SVHCs) in your products *(You can select more than one answer)*		
A) Difficult to define if a product is an article under REACH and/or calculate the amount of SVHC to determine if it triggers obligations	**B)** Lack of understanding on SVHCs and where they are likely to be found in your production	**C)** Suppliers are unwilling to share information on SVHCs which they consider as sensitive and/or confidential information
D) Suppliers don't know where to get the information upon your request	**E)** Suppliers are unable to provide the information because they are also waiting for the answer from their vendors	**F)** Information provided by suppliers is not reliable
G) Costs for tests	**H)** It is not sure to cover all SVHCs in products regardless how much I understand my production	**I)** Continuous inclusion of new SVHCs in the Candidate List

J) Other (please specify)		
22. In reference to the **question no. 21**, please explain how your company can cope or address those issues or problems		
23. Do you have your own chemical inventory to keep all database of chemicals used?		
A) Yes	B) No	
SECTION 3: REACH – RESTRICTED SUBSTANCES LIST (ANNEX XVII)		
24. Do you know anything about REACH - Restricted Substances List (Annex XVII)?		
A) Yes	B) No	
25. Do you receive any request from your customers about evidences on REACH Restrict Substances compliance?		
A) Yes	B) No, I receive a List of Restricted Substances from my customer and a compliance request regarding to this list, but I don't know if it is covered REACH Restricted Substances List or not	
C) No, I don't receive any request from my customer to comply either with REACH Restricted Substances List compliance or customer's own Restricted Substances List	D) Other (please specify)	
26. Do you have any similar request for your suppliers on complying with Restricted Substances either from REACH Restricted Substances List or your own/ your customer's Restricted Substances List?		
A) Yes	B) No	
27. Restricted Substances failures experienced by your company is normally due to which reason? (You can select more than one answer)		
A) Restricted Substances inherent in raw materials	B) Intentional use of Restricted Substances to achieve some desired properties	

C) Other (please specify)	

28. In reference to the **question no. 27**, if Restricted Substances in your products are the result of **your intentional uses**, **do you already have alternatives and/or new technologies to reduce or eliminate these substances?**

A) Yes	B) No
C) Other (please specify)	

29. Will you cancel or limit buying from suppliers who have frequently non-compliant history?

A) Cancel	B) Limit	C) It is not a factor to determine if I should continue doing business with my suppliers
D) Not decided yet	E) Other (please specify)	

30. Please select methods your company is using to prove the exclusion of Restricted Substances either from REACH Restricted Substances List (Annex XVII) or your customer's own Restricted Substances List in your products

(You can select more than one answer)

A) Supplier declaration	B) Supplier audit	C) Sector knowledge
D) Tests performed in-house	E) Tests performed at 3rd party labs	F) Third party certification
G) Other (please specify)		

31. Please select challenges, issues and problems encountered when you are working on compliance with Restricted Substances either from REACH Restricted Substances List (Annex XVII) or your customer's own Restricted Substances List

(You can select more than one answer)

A) Some requirements are not achievable due to technological and economical	B) Lack of understanding on Restricted Substances and	C) Continuous inclusion of new Restricted Substances and introduction stringent requirements

infeasibility	where they are likely introduced to the production and/or supply chain	
D) Short preparation time from the releasing date of new requirements to the effective date	E) Costs for tests	F) Unreliable test reports
G) Receive multiple request to comply with RSL from brand customers and those are usually different and even conflicting	H) Other (please specify)	
32. In reference to the **question no. 32**, please explain how your company can cope or address those issues or problems		
33. Do you have your own data management system to evaluate your supplier compliance and use it as references to make buying decisions?		
A) Yes	B) No	

SECTION 3. RATING – COMPLIANCE MANAGEMENT PROGRAM				
Steps	**Not important**	**Less Important**	**Important**	**Very important**
Read of materials (REACH regulation, guidelines, articles, etc.)				
Internet access and research on ECHA's website and other specific websites (chemicalsafetypro, chemicalwatch, etc.)				

Regularly update changes in regulations and/or releases of new regulations				
Constantly attend to seminars and training courses related with REACH chemical regulation and other regulations				
Liaise closely with ECHA and regulatory bodies				
Seek for advices from external consultants				
Refer to resources supplied by individual brands, AAFA, AFIRM, ZDHC, etc.				
Make an effort to understand chemistries in use and where Substances of Very High Concern (SVHCs) and/or Restricted Substances are introduced to the supply chain				
Create a company's regulatory associated group in charged in compliance and implementation of REACH regulation and other chemical regulations				
Align internal policies, standards with the most stringent regulations and best practices				
Send requirements to suppliers, explain why their engagement is important and collect information that they read, understand and can meet requirements				
Classify suppliers by chemical risks with respect to their material categories and compliance history				
Follow up supplier compliance on a regular basic				
Build a data management system to track				

supplier compliance				
Make buying decision based on supplier records of compliance				
Perform a risk assessment of your supply chain and operations to pinpoint areas of exposure to risks and take a closer look at these areas				
Develop a testing program to assure strong governance of incoming materials as well as finished products				
Have an understanding on chemical analysis to interpret testing result				
Research on alternatives or new technologies to reduce or eliminate chemical risks				
Plan a budget for costs involving chemical regulatory compliance activities				

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