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Enterprise Risk Management in the Specialty Chemical Distribution Sector: A Literature Review

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Abstract

A literature review was conducted on risks in businesses, types of risks and risk management in general, and further research was conducted for three of the selected global specialty chemical distributors, namely Brenntag, IMCD and Univar. The purpose of the research is to identify the risks and types of risk confronting the specialty chemical distribution sector, how they identify their risks, manage them, and quantify their risks, if at all.

The stakeholder theory approach was adopted for the research on enterprise risk management. There was strong convergence on the risks identified from the research and the differences being only on the extent of the impact each of the risk had on the specific company. The choice of the global specialty chemical distributors, Brenntag, IMCD and Univar, for the research was justified because of their prominence in the global market space and the risks identified would be representative of the risks in the chemical distribution sector. Different companies identify their risks and the type of risks differently, but there are many similarities on the risks identified between each of them. Many of the risks identified revolves around issues in financial, operational, legal and regulatory, economics and political, markets, and safety, health and the environment.

The depth of the risks identified and analyzed by Brenntag, IMCD and Univar varies in their risk management process but they all have invested significant effort in their financial risks, especially the impact in fluctuations of interest and foreign exchange rates on their financial performances.

Keywords: chemical distribution, enterprise risk and Enterprise risk management

1. Introduction of Enterprise Risk Management and the Chemical Distribution Sector

Businesses today are exposed to many different types of risk, from both internal and external to the companies, and that no business can afford to ignore it anymore. Risks arise even from within the companies by their business processes itself, but more and more, risks are coming from external sources due to globalization and the highly interconnected economies that we are in today. In the World Economic Forum (WEF, 2020) Global Risks Report, the top five global risks that have the highest likelihood to occur are extreme weather, climate change failure, natural disasters, biodiversity loss and environment disasters, and all of which can potentially affect businesses financial performances negatively. The occurrences are external to the companies, but they nevertheless have a serious impact on the financial performances of companies. The global risks that are specific within the companies in the top ten risks are data fraud and cyberattack. Thus, having an effective risk management (RM) system would greatly mitigate the occurrence of risks and minimize the negative impact on companies.

The chemical distribution sector is just as vulnerable as any other industrial sectors and they are exposed to all the risks that are imaginable. An electronic search using key words like "*Chemical Distribution or Distributors*" together with "*Enterprise Risk*" and "*Enterprise Risk Management*" did not unearth any previous research being conducted on the topic of RM in the chemical distribution sector. This research would probably be the first to investigate enterprise risks in the chemical distribution sector and the RM being practiced by this sector. Brenntag, Univar and IMCD are three of the top global specialty chemical distributors where they jointly have more than 10% of the global specialty chemical distribution market share and they are very worthy candidates selected for the research. Their risks would be representative of the risks faced by all the other specialty chemical distributors though the impact of each risk may affect each of them differently. The other reason for choosing the three companies are because they are publicly listed companies and information can be publicly obtained.

This research will attempt to provides answers to the four research questions, i.e. What are the risks and types of risk confronting companies? What are the risks being confronted by the chemical distribution sector? How do specialty chemical distributors identify their risks and manage them? How do specialty chemical distributors quantify their risks, if at all? The answers to the four questions could possibly throw light on whether all the three specialty chemical distributors evaluate risks very similarly or differently. In addition, the answers could possibly assist the smaller companies, with much lesser resources, to formulate their RM practices on a much more well-informed basis with the availability of this research.

2. The Global Chemical Industry and the Specialty Chemical Distribution Business

In 2015, Cefic (2016) have estimated the total global chemical sales to be valued at around €3,534 billion (bn). Angermann (2015) have estimated the overall compound annual growth rate (CAGR) of the chemical industry to be at around 6.5 % between 2008 and 2013, with commodity and specialty chemical sectors CAGR to be at 6.2 % and 7.0 % respectively.

Other researchers have also forecasted the global chemical distribution market growth to be around 6.0 % till 2020 (Chen, 2016), which align with the estimation by Angermann (2015). In Cefic's report (2020) they had estimated the world chemicals sales to be at €3,347bn by 2020 and €6,200bn by 2030. This clearly shows the global chemical sales are growing at a relatively healthy rate.

Boston Consulting Group (2013, cited in Angermann, 2015) estimated the total chemical distribution market size to be worth about €165bn in 2012, with the specialty and commodity chemical sectors estimated at about €70bn and €95bn respectively. Cefic (2016) estimated the 2012 total global chemical sales to be at €2,560bn. Tay (2018) have relied on these two figures to project the estimated future total chemical distribution market size till 2030. In the estimation, the lower end CAGR of 6.0 % was used to estimate the chemical distributor's market size. In Tay's (2018) estimation, a simple pro-rated projection was used as a comparison to the CAGR rate to estimate the size of the chemical distribution market. The chemical distribution market size was then estimated to be about €260bn in 2020 and will reach €440bn by 2030. Factoring in the latest world chemical sales by Cefic (2020), a new estimation of the chemical distribution market size is as shown in Table 1. By 2020 and 2030, the chemical distribution market size is estimated to be worth about €240bn and €435bn (average annually) respectively. The chemical distribution sector is a huge industry, and it is worthy of the research.

Table 1. Global Chemical Sales and Projection of the Chemical Distribution Market Size

Year	Chemical Sales (€ billion)	References	Year	Chemical Distribution Market Size (€ billion)	References
2020	3,347	Cefic (2020)	2020	216 262	(3,347/2,560) X 165 6.0 % CAGR from 2012
2030	6,200	Cefic (2020)	2030	400 470	(6,200/2,560) x 165 6.0 % CAGR from 2012

Sources: Table was partially extracted from Tay (2018) & Updated by Author

Tay (2018) showed the 2012 and 2016 listings of the top ten chemical distributors by sales turnover. Table 2 shows the ranking of the top 10 global chemical distributors based on 2016 and 2019 sales. The top five global specialty chemical distributors i.e. Brenntag (No. 1), Univar (No. 2]), Nexeo (No. 5), IMCD (No. 7) and Azelis (No. 8), in 2016 had a combined specialty chemical distribution market share of €25.2bn (Table 2 marked with *). Tay (2018) have also estimated that the five global chemical distributors would have an estimated combined market share of about 12.0 % in 2016. For the sales ranking based on 2019 sales, the combined sales for these same top companies are at €26.29bn (Table 2 marked with *), which translates to about 10% of the total market share being held by these companies.

Nexeo has since been acquired by Univar and the sales for these four companies are accounted for here only.

Table 2. ICIS Top Ten Chemical Distributors (2016 & 2019 Sales)

Company	Ranking	2016 Sales € (billion)	Company	Ranking	2019 Sales € (billion)
Brenntag*	1	10.5	Brenntag*	1	12.8
Univar*	2	7.70	Univar (+ Nexeo)*	2	8.27
Helm	3	3.90	Tricon Energy	3	5.96
Tricon Energy	4	3.60	Helm	4	5.00
Nexeo Solutions*	5	3.40	IMCD*	5	2.81
Sinochem Plastics	6	1.77	Kolmar	6	2.74
IMCD*	7	1.72	Sinochem Plastics	7	2.42
Azelis*	8	1.60	Azelis*	8	2.41
Biesterfeld	9	1.08	Biesterfeld	9	1.29
Omya	10	1.07	Petrochemical M. E.	10	1.27

Source: This table was partially extracted from Tay (2018) & Creswell et al. (2017); Creswell et al. (2020).

Notes: *Specialty Chemical Distributors

Brenntag, IMCD and Univar have been the top three chemical distributors globally for the past couple of years and they are very well known internationally. They are acknowledged as market leaders in the chemical distribution field. In 2016, the three companies combined have a market share of about 8% of the total chemical distribution market, and, in 2019 they have grown to a market share of 10%. The three companies are active participants in growing their businesses inorganically and no doubt their market share will grow faster than any other competitors in the market. All the three being billion-dollar sales company also have the resources to invest in sustainability, corporate social responsibility (CSR) and RM programs. Brenntag, Univar and IMCD are the three largest global specialty chemical distributors and they are listed in their respective stock exchanges (Germany, USA & Netherlands). The risk reporting framework by the three companies covers both the European and USA financial markets and they would represent the requirements by the major financial regulatory bodies. The information on their Enterprise Risks and RM programs are publicly available from their published annual reports and so are readily available for research. This provides great insight into the risks they had considered and, also the programs they had implemented to address them. For all the above reasons, this would justify the choices of Brenntag, Univar and IMCD being the subject of this research.

A literature review of their annual reports would reveal the business risks they have identified, and categorized and, also how they are managing their risks. The risks that the three

companies have identified are taken to be representative of the risks encountered by all the other global chemical distributors from the industry. However, the ranking of each risk may differ from company to company, country to country, and region to region. This research will conduct a literature review of their latest annual reports and will systematically identify the risk categories they have mapped out, how they are managing their risks, and whether they use any specific tools to quantify the risk metrics like risk appetites and risk tolerances.

2.1 The Roles of the Chemical Distributors

The chemical distributors act as intermediaries between the producers/supply source and the customers. The exact roles for each distributor may vary from company to company, and Tay and Chelliah (2011) in their research provided a very detail list of roles that intermediaries play in the chemical distribution's marketplace. Figure 1 shows a simplified version of the roles that chemical distributors normally undertake, from the importation of goods from the suppliers' warehouse to deliveries to the customers' warehouse. There are, of course, a lot more administrative and financial services that the chemical distributors provide to the customers to gain their business, which is not included in the flow process (Figure 1).

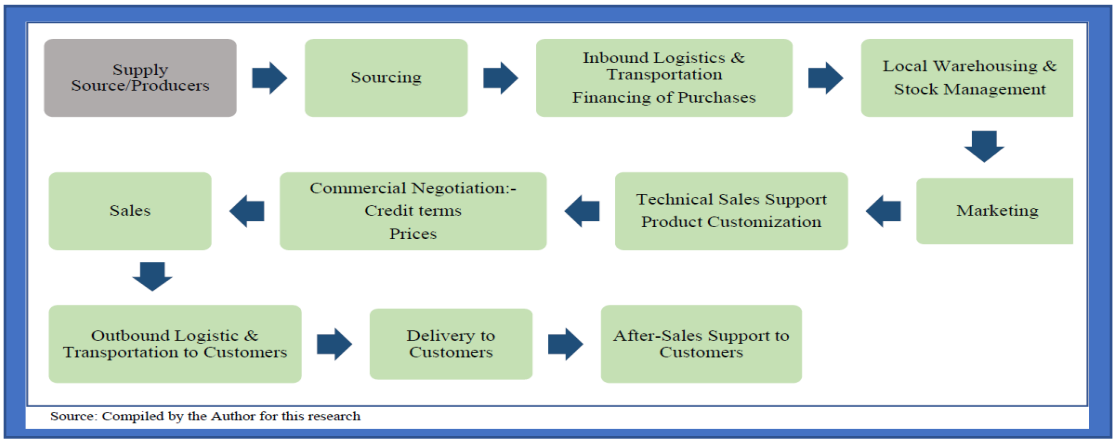

Figure 1. Supply Chain Process Flow for Chemical Distribution

In the process of fulfilling most, if not all, of the requirements of the product suppliers and customers risks will arise, and the distributors had to manage them the best way possible to minimize the uncertainties and mitigate the adverse effects they will have on the financial performances, so that their company's objectives are met.

3. Stakeholder Theory for Enterprise Risk Management

The chemical distribution business is no difference to other industries and today they had to respond or answerable to a broad range of stakeholders. The stakeholders can be in the form of shareholders, employees, banks, government agencies, insurance companies, workplace,

safety and health advocators, non-governmental environmental groups and even down to the surrounding neighbourhood. Expanding the scope for RM in global distribution companies, the stakeholders concerned would be very wide-ranging and RM is becoming more and more complex to address. The stakeholder theory would be an appropriate approach to take for RM and in developing its framework.

Clarkson (1995) have identified primary stakeholders, whereas Henriques and Sadorsky (1999) called them organizational stakeholders, where the support from these stakeholders are essential for the business to operate, grow or/and even to survive. Husillos & Alvarez-Gil (2008) posited that in the stakeholder theory firm's behaviour is greatly influenced by the actions of the different stakeholders' groups in the various operational aspects of the enterprise. This concurs with the much earlier study by Ullman (1985) where stakeholder power was described as the key driver of organizational behaviour. With the growing concerns on areas in sustainability and CSR, this have led to increasing pressure on operational managers not only to make profits for the shareholders but also must be seen to be doing good for the society at large. The chemical distribution business too faced similar external pressure from stakeholders, and this have demanded that companies invest resources to build effective risk RM program to minimize any adverse effects should the company be negatively impacted by risk occurrences.

4. Literature Review of Risks and Enterprise Risk Management

The following few sections below will detail out the risks from different perspectives, definition of risks, the different types of risks encountered, and the risk drivers from the literature review. Risk Management (RM) and Enterprise Risk Management (ERM) will be reviewed and will also include ERM framework from authoritative sources.

4.1 Risks: Definitions and Types of Risks

ISO Guide 73:2009 Risk Management - vocabulary has defined risks as the "*effect on uncertainty on objectives*" (ISO, 2009, cited in IRM, 2010, p. 4). Everything a company does will give rise to a certain amount of risks and they needed to be managed appropriately so that the risks do not deteriorate the financial performances of the company even further. Operation-based risks, market risks, financial and investment risks, regulatory and legal risks are just some of the names being used to refer to risks (Peterson, 2006). Woodard (2005) have also identified political and social risks which arises in the country where the companies have operations. Reputational loss (Ruquet, 2007) by companies is a very important aspect of risk that needs to be managed carefully otherwise the companies can potentially be exposed to significant negative impact to their business.

Schlegel and Trent (2012) are of the opinion that there are no standard topology available for the word "risk". Risks can be associated with hazard risk (act of nature like hurricanes, floods, fires and accidents) and financial risk (related to customers and suppliers). There are operational risks which relates to the supply chain i.e. poor quality suppliers, late deliveries, safety issues, high costs, excessive inventory resulting from poor forecast. Strategic risk also

arises from decision taken by management for mergers and acquisition (M&A) activities, and includes risks from competitive market environment, liquidity and availability of sufficient capital.

Rekhi (2020) reported in the Singapore Straits Times on a survey being conducted by the World Economic Forum (WEF, 2020) on 350 senior risk professionals where they ranked the top risks to the world over the next year and a half. The main risks can be grouped into a couple of categories like economic risks (global recessions in both developed and under-developed economies, surge in bankruptcies and industry consolidation, failures of industries), supply chain disruptions (restrictions and disruption of border movements of goods, fiscal risks (major economies weakening fiscal position) and information technology risks (cyberattack and data fraud).

Supply chain forms the mainstay of the chemical distribution business and with suppliers shifting to low-cost producing countries, it has brought in new areas of risks into the supply chain system which was not an issue previously. Biedermen (2006) have identified risks of wars, labour issues, epidemics, natural disasters, government sanctions, export licence restrictions and unstable political conditions. The outsourcing of services and manufacturing have also greatly broadened the traditional risk categories and resulting in new ones like political, trade and credit risk being created. The importance of the supply chain sector was already being highlighted in the 2005 FM Global survey (Sarbanes-Oxley, N.D.) of over 600 financial executives where they opinionated that supply chain risks posed the greatest threat to their financial performances. The survey revealed that the supply chain poses the biggest threat to their business at that time.

Risk changes with time and often the risks that occurs are temporary in nature (Barrieu & Karoui, 2004). Short term operational supply chain risks could arise from the outsourcing activities which could results in strategic risks over a longer term (Quinn, 1999). Traditionally, risks are often looked at and addressed in isolation within the locality where it manifested (Campbell, 2015). The multitudes of internal and external risks factors can greatly impact the company's set objectives and thus creating uncertainty as to whether the set objectives can be met.

4.2 Risk Drivers

The Institute of Risk Management (IRM) (2010) have compiled a list of risk drivers and they have also segregated them into internally and externally driven, as shown in Table 3. The four categories of risks described are Financial, Infrastructural, Market and Reputational.

Of course, there are many other ways to classify and categorize risks, but by and large, they cover most of the same risk drivers that most companies encounter. When managing risks, there are different mitigating techniques, tactics, and strategies suitable for consideration for each of the risk category. However, companies need to identify, analyze, evaluate, and treat risks based on their respective categories, classification, probability of occurence, and relative impact as there are trade-offs between the different strategies. Woodard (2005) have suggested there are several options to manage risks, and management have to decide whether

to accept, prevent, mitigate, transfer, share or avoid the risks or a combination of these options to the level of acceptable outcomes.

Table 3. Risk Drivers by the Institue of Risk Management

	Risk Categories	Externally Driven	Internally Driven
1	Financial Risks	Accounting Standards	Internal Controls
		Interest Rates	Frauds
		Foreign Exchange	Historical Liabilities
		Funds & Credits	Investments
			Capex Decisions
			Liquidity & Cash Flows
2	Infrastructure Risks	Communication	Recruitment
		Transport Links	People Skills
		Supply Chain	Health & Safety
		Terrorism	Premises
		Natural Disasters	IT Systems
		Pandemic	
3	Marketplace Risks	Economic Environment	M&A Activity
		Technology Developments	R&D Activities
		Competition	Intellectual Property
		Customer Demand	Contracts
		Regulatory Requirements	
4	Reputational Risks	Product Recall	Brand Extensions
		CSR	Board Composition
		Public Perception	Control Environment
		Regulator Environment	
		Competitor Behaviour	

Source: IRM (2009, p. 14)

4.3 Enterprise Risk Management

Many researchers attempted to define what is Enterprise Risk Management (ERM), but often all they are doing are just describing what ERM is about in a very broad context (Bromiley et al., 2015) from many different perspectives. ERM had been described as a collective management strategy and that risks should be addressed company-wide and not in isolation. In addition, it also describe, rather intuitively, that it has to include all the risks holistically (Lindenberg & Hoyt, 2003) to derive the most value for the organization (D'Arcy & Brogan, 2001; Meulbroek, 2002). ERM were also called RM, Aggregate RM, Strategic RM and Holistic RM by Prewett and Terry (2018) and they are all probably having the same meaning.

The underlying philosophy of ERM is that all risks has to be considered holistically rather

than addressing them piece-meal. Arena et al. (2010) have noted that external stakeholders like rating agencies, legal authorities, professional bodies and international standard organizations are urging the adoptions of ERM. Companies in the United States are subjected to external pressure to adopt ERM. The United States Security Exchange Commission (US SEC) mandated to US listed companies they had to reveal how they manage risk in their reporting (Barrieu & Karoui, 2004). Rating agencies like the Standard and Poor (S&P) are now including RM when evaluating company's ratings. The Sarbanes-Oxley Act directly calls for American companies to address the risks in their financial reports. Sarbanes-Oxley Section 302 specifically mandated disclosures controls and procedures in companies financial reporting where business risks and company's developments would be disclosed. Barton et al. (2009) reported that companies under Section 404 had to report how effective their internal control are over financial reporting. Publicly traded companies under their US SEC section 1A of the 10-K's filing have to disclose their risk factors.

S&P is a financial credit rating agency, and they are factoring in companies ERM's policy for their credit rating. S&P (2008) do not specifically endorse any specific ERM model or standard. S&P relies more on the effectiveness of whatever RM processes in use more as proxy to effective RM meaning that they value substance over form in their evaluation for the credit rating. From S&P perspectives, a company's ERM policy should address all risks, define the limits of risk that the firm can or cannot accept, and avoiding risks that are outside of the company's tolerance limit. They further ventured to elaborate that ERM is not about eliminating all risks and providing guarantee that losses will be avoided. They are not meant to be a fixed set of rules to be adhered to and not limited to just regulatory compliance issues, and they are not the same for everyone.

In addition to traditional risks like product liability and employees health and safety, ERM should also incorporate strategic risks like product life cycle and risks from competitions into their considerations. Meulbroek (2002, p. 64) stated that the goal of RM is "…. *not to minimize the total risk ..... but to maximize shareholder value*" at optimal level of risk. He further asserted that an effective ERM would smooth-out the fluctuations of cash flows, and earnings, and reduces the financial stress it causes to the company (Meulbroek, 2002).

The Risk & Insurance Management Society (RIMS, N.D.) defines ERM as "*the methods and processes used by organization to manage risk and seize opportunities related to the achievement of their objectives*". The framework for RM must relates to the company's objectives and have to encompass assessment of the likelihood of risks occurring and assess the impact, a response plan and monitoring system to track progress. When implementing ERM strategies, the tools and methods selected have to commensurate with the specific size and type of the company under cosideration (Milligan, 2009) and this is the most serious challenge when implementing ERM strategies. Companies need to fully assess and understand the total risk built within their day-to-day operational procedures, be cognizant of the risks that possibly arise, and prioritize the strategies on how to address them. Companies too need to identify the weak spots in their control procedures (IRM, 2010). Companies with well structured RM derive many benefits from it, namely improve operational efficiency, more efficient use of capital, deliver results, and improved compeitiveness of the company

(IRM, 2010). It can also results in more accurate financial reporting and also improve the reputation of the company. Bearing in mind that a risk occurrence may give rise to other risks too and so the company have to decide the level of risks to be taken in relation to the size of their company, the nature of their business and also their business complexities. It would not make any sense to the company to continue to live with certain risk arising from a specific activity if the potential risk far exceeded the benefits that it would bring into the company (IRM, 2010).

A quick electronic search on the topic on "*Risk Management*" yielded plentiful of guidelines, practices, frameworks and processes. It would be too confusing and, also be rather repetitive to delve into too many of them as many published articles are just presenting similar concepts, perspectives, approaches and ideas except from different perspectives only. Here, the Author will focus only on two of the established and reputable authorities on RM, namely, Committee of Sponsoring Organizations of the Treadway Commission (COSO) Enterprise Risk Management Framework and the ISO 31000 Risk Management – Principles and Guidelines.

4.4 Committee of Sponsoring Organizations of the Treadway Commission: Enterprise Risk Management

COSO was formed by the financial, accounting and auditing professionals, and they published their guidance on ERM: Integrated framework in 2004 (COSO, 2004) and followed by another revision in 2017 (COSO, 2017) where they incorporate strategy and performance into the framework. COSO (2004, p.2) has defined the integrated ERM framework as "… *a process effected by an entity's board of directors, management ….. across the enterprise ….. to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurances regarding the achievement of entity's objectives*". COSO is a framework for undertaking ERM and it is not meant as a guide to eliminate risks in a company. The COSO framework have gained considerable influence and authority in the field of ERM for companies listed in the USA as it has a linkage to the Sarbanes-Oxley requirements.

"*Strategic*", "*Operations*", "*Reporting*", and "*Compliance*" are the four categories of objectives identified in the COSO (2004, p. 3) framework. Each of the four categories of objectives consist of eight components and they are "*Internal Environment*", "*Objective Setting*", "*Event Identification*", "*Risk Assessment*", "*Risk Response*", "*Control Activities*", "*Information and Communication*" and "*Monitoring*" COSO (2004, pp. 3-4). There are a lot of elements within each category of objective and component and it takes some effort to navigate through all of them. The Author will not cover any of the components here as they are readily referred from public sources. The updated COSO 2017 version (2017, p. 16) had five components i.e. "*Governance & Culture*", "*Strategy & Objective Setting*", "*Performance, Review & Revision*", and "*Information, Communication & Reporting*" in addressing risks and there are in total twenty principles to elaborate on the five components. Here too, the Author will not attempt to repeat all the information that are readily available from electronic search resources.

4.5 ISO 31000: 2009 Risk Management – Principles and Guidelines

ISO 31000 (ISO, 2009) is titled "*Risk Management – Practice and Guidelines*". The underlying principle of this standard is that the very existence of all companies is to achieve their goals and objectives. The ISO 31000 standard (ISO, 2009) lays down the basic principles that makes for effective RM and propose the way to manage risks. The RM principles linked the framework with the practice of RM and align it with the company's strategic goals (Gjerdrum et al., 2009). It aligns RM to corporate activities and the framework encompasses integration of RM, reporting and accountability. It must be clarified here that ISO 31000 merely describes a framework for implementing RM, and it is not really a framework for supporting the RM process (Gjerdrum et al., 2009). ISO 31000 also do not show how to design a framework that support RM but just laid down some key attributes of effective RM. It seeks to improve corporate governance, financial reporting and stakeholder trust. Implementing an effective RM will not only advocates the need to identify and assess the risks throughout the company but will also assist and improve on identifying opportunities, threats, and emerging risks that the company may face (Gjerdrum et al., 2009). It helps towards complying with the relevant legal and regulatory framework and gives the company a strong foundation for decision making on a sounder basis.

The RM processes in ISO 31000 (2009, cited in Gjerdrum et al., 2009, p. 4) has 5 steps; i.e. 1) "i*dentify risks*"; 2) "*analyze risk treatment options*"; 3) "*select the best response*"; 4) "*implement risk mitigation*"; and 5) "*controls and monitor results*". The 5-steps proposed are iterative process and not meant to be just a one-off exercise. The risks are evaluated on a regular basis and revised as and when necessary. Managers must look at risk objectively so that risk measurement can be conducted on an objective basis (March & Shapira, 1987). Most managers have bias tendencies, and they will perceive risk the way they believe it and it can be very different from the objective measure of risk (Miller, 1993). Managers may also perceive the same risk differently in the same circumstances at a different period.

The risk identification step is to identify the risk and uncertainty which the company are exposed to. As part of the identification step on all the risks, a holistic risk assessment must be conducted which encompass all the risk evaluation steps. The process of analyzing the risks includes understanding all the risks and, also everything about the risks and the effects of each of the risk on the company. The risks evaluation process involves reviewing the analysis of the risks, the risk appetite of the company and the tolerances of the company towards the risks where risk mitigation steps are taken. The risk treatment step involves the selection and implementation of the appropriate steps taken to mitigate the risk and this could take the form of either avoiding the risk or move the risk elsewhere in the process. It must be emphasized that the RM process is a cyclical process to determine the best available option to minimize the risk and the company needs to determine the residual risk they are willing to accept. Monitoring and review forms a very part important part of the RM process to ensure that the steps taken to mitigate the risks are properly considered and addressed using the most cost effective measures.

In implementing the RM process, the company must very importantly also determine its risk

appetite and risk tolerances. ISO 31000 (2009, cited in Gjerdrum et al., 2009, p. 7) has defined risk appetite as the "….. *amount and type of risk that an entity is willing to accept ….. in pursuit of its … strategic objectives, and value goals*". The risk appetite of a company strongly influence their strategic risk decisions as it may impose a constraint on the operational decision. However, ISO 31000 is silent on the issue of risk appetite (Gjerdrum et al., 2009). Different companies have different risk appetites and risk tolearances and company management has to convey this standard very clearly to the managers involved in the RM process. This sets the boundary for which the risk managers have to operate as best as they can and even then there is no guarantee when the risk actually occurs. The company's management must set realistic risk appetites and risk tolerances for the company as unrealistic benchmarking will set unrealistic goals which may then forces the company to be too risk averse and not allowing the company to achieve their objectives.

Reporting externally is becoming more a norm rather than an exception these days due to regulatory compliances, and also in a very large part, driven by the company's CSR or sustainability reporting. It could be argued that the risk reporting by companies, provides assurances to stakeholders, both internal and external, that the risks faced by the company in trying to achieve their objectives are being adequately managed. Having a clear policy on RM thus sends a strong signal to the stakeholders that the management recognizes the risks, have systemically assessed them, and risk mitigation measures are available to address them if and when it arises. For public listed companies around the world, it is customary for them to report on their RM policy in their annual financial reporting now. So, annual reports of public listed companies are a rich source of information on how extensive the company have devoted on their RM policy.

5. Risks Management in the Chemical Distribution Sector

Literature review was conducted on the top three global specialty chemical distributors, namely Brenntag, IMCD and Univar through their annual financial reports which are readily available since they are publicly listed and they have to file their annual report to their respective listed authorities. All the three companies operates globally and are operating in similar market segments. It would be logical, and also intuitive, to assume that the scope of the risks identified by all these three companies would be very similar to each other. The only differences would be how detail each company looks at their risks, the depth of their assessment and the extent of their risk appetites and tolerances.

5.1 Risks Management in the Chemical Distribution Sector: Brenntag

Brenntag's declared their aim of risk management (RM) is to "….. *avoid potential risks and to identify, monitor and mitigate emerging risks at an early stage.*" (Brenntag, 2019, p. 75). The various legal operating units within the Brenntag's regional holding companies are responsible for the RM. This include identifying risks, estimating their effects, and risk reduction measures put in place by the operating units. They conduct risk inventory exercises regularly and documented it every six months for their global RM. The reporting are

bottom-up approach and the significant risks at smaller subsidiaries are escalated upwards to their respective regional holding company. The reporting of risk occurrences does not have to be on a periodic basis and ad hoc reporting for significant risk on any risk occurrence will have to be done immediately to the group headquarters as and when it occurs. In their risk inventory exercise, estimations on existing risks were gathered and the risk categories are grouped thematically. In Brenntag's (2019) annual report, ten risk categories and thirty-five risks associated with all the risk categories were documented. Figure 2 shows Brenntag's ten risks categories. The thirty-five risks associated with the ten risks is not listed here and they can be referred from their annual report (Brenntag, 2019)

Figure 2. Brenntag's Ten Risks Categories

Source: Information extracted from Brenntag (2019, p. 77)

5.1.1 Brenntag Corporate Overall Risks and Risks Assessment

Brenntag defined gross risk as "*the maximum damage if no counteraction is taken*" (Brenntag, 2019, p. 75) and the gross risk of each of the risk were assessed. Brenntag have also further defined the residual risk (net risk) as the "*gross risk less the effect of measures taken to reduce the risk*" (Brenntag, 2019, p. 75). Table 4 shows the Brenntag's overall risks with the corresponding "*Possible Extent of Damage*" and the "*Probability of Occurrence*". Brenntag has defined the possible extent of damage as "*the negative impact on the results of operations and financial position and our cash flow*" (Brenntag, 2019, p. 75). The net risks are classified as "*high*", "*medium*" or "*low*". Table 4 is only showing the partial description of how Brenntag assess their company's overall risk.

The risks identified are assessed with regards to the possible "*Extent of Damage*" and their "*Probability of Occurrence*" on a five-level scale (Brenntag, 2019, p. 77). The scale for the "*Extent of Damage*" ranges from "*Critical*" to "*Insignificant*" and the scale for "*Probability of Occurrence*" ranges from "*Highly Improbable*" to "*Highly Probable*".

Table 4. Brenntag's Corporate Overall Risks for 2020 (partial only)

Risk Category	Possible Extent of damage	Probability of Occurrence	Overall Risk
Market Risks	High	Possible	Medium
Operational Risks	Medium	Improbable	
Personnel Risks	Low	Possible	
Acquisition Risks		Possible	Medium
Legal Risks	Medium		Medium

Source: Extracted from Brenntag (2019, p. 77).

Note: For illustration purposes only for the matrix and the missing information are deliberately left out.

Table 5 shows only the partial description of each of the five scales used in the risk assessment matrix. Brenntag have defined the "*Possible Extent of Damage*" (2019, p. 75) in both qualitative and quantitative terms. Brenntag's sales turnover is €12.8bn for 2019 (Brenntag, 2019) the possible extent of damage, at "*critical*" level, can be in excess of €800m that the risk occurrence can cause the company to incur.

Table 5. Brenntag's Risk Assessment Matrix (partial only)

Possible Extent of Damage		Highly Improbable				Highly Probable
Qualitative	In € m	(<10%)	Improbable (11-20%)	Possible (21-50%)	Probable (51-90%)	(> 90%)
Critical	>800	Medium	Medium		High	High
High	>400-800	Low			High	
Medium	>200-400		Low	Medium		High
Low	>65-200			Low	Medium	
Insignificant	<65	Low			Low	Low

Source: Extracted from Brenntag (2019, p. 75).

Note: For illustration purposes only on the matrix and the missing information are deliberately left out.

5.2 Risks Management in the Chemical Distribution Sector: IMCD

IMCD believes that the "…….. *broad diversity of its business …….. can lessen the impact of local and regional economic changes*" (IMCD, 2019, p. 80). In today's challenging globalized business environment, companies faced high uncertainties and they are continuously being challenged by external forces. IMCD is no different than other companies and they are affected by supply and demand fluctuations, and with weak economic conditions

and they will certainly have adverse material effect on the company.

5.2.1 IMCD Risk Management Framework

The overall responsibility for IMCD's RM and control systems falls under the Management Board which reports to the Supervisory Board (IMCD, 2019). However, the responsibility for the compliance, and associated local RM comes under the regional holding and operating companies. The RM are to identify the risks, analyze each of the risks, evaluate the risk controls, and to set up the monitoring systems. They are to identify the key risks based on the likelihood of the risk occurring and the adverse impact it will have on the company. They are also to prevent or minimize the occurrences of key risks. IMCD's RM framework (IMCD, 2019, p. 81) consist of three RM elements i.e. 1) "*Control Environment*"; 2) "*Risk Assessment and Control Procedures*"; and 3) "*Information, Communication and Monitoring*". IMCD also cautioned that regardless of the systems being put in place there is no absolute certainty that the company will not be adversely affected by the risks in running the business. IMCD have identified four risk categories i.e. "*Strategic*", "*Operational*", "*Compliance*" and "*Finance*" in their annual report (IMCD, 2019, p. 80) and they are as shown in Figure 3. They have also identified thirteen risks associated with the four categories of risks and they can be referred to in their annual report (IMCD, 2019).

Figure 3. IMCD's Four Risk Categories

Source: extracted from IMCD (2019, p. 80)

IMCD have defined their risk appetite for each of the four risk categories identified. In their strategic risk category, the company is willing to take a "*moderate*" risk approach in pursuit of new businesses and including acquisitions. However, there is no explanatory note to explain what "*moderate*" risk appetite means. In the "*Operational*" risk category, IMCD stated that they will try to minimize the risks of unforeseen operational failures and for "*Compliance*" they will maintain a "*risk-averse strategy*" (IMCD, 2019, p. 82). IMCD's position would be to maintain a cautious financing structure and stringent cash management policy to manage their "*Financial*" risk category. IMCD have also mapped out a matrix

showing all the risk categories, the description of the specific risk and they have included the "*Likelihood*" of it happening and also the "*Impact*" it will have on the company (Table 6).

Table 6. IMCD's Risk Likelihood and Impact on Each Risk Category (partial only)

	Risk	Risk Description	Likelihood	Impact
1	STRATEGIC	Decline in customer demand	Moderate	
		Acquisition and integration risk		Moderate
2	OPERATIONAL	Cybercrime and continuity of ICT	Moderate	Moderate
3	COMPLIANCE	Anti-corruption and bribery	Low	High
4	FINANCIAL	Liquidity risk	Low	Moderate
		Interest rate	Moderate	Low

Source: Extracted and summarized from IMCD (2019, pp. 82)

Note: For illustration purposes only on the matrix and some of the information are deliberately left out.

5.3 Risks Management in the Chemical Distribution Sector: Univar

Univar have identified in total twenty-eight risk items in their SEC Form 10-K filing (Univar, 2019a, pp. 9-18). They were not categorized or ranked in any specific order. The full list can be viewed in Univar's (2019a) annual report. Many of the individual risks identified by Univar are not unique in any sense of the word and many of them are also similarly being identified by both Brenntag and IMCD. There is no information provided to show the risk appetite, likelihood of occurrence or impact to their business if it happened, and so nothing much can be inferred from how intense their consideration was on each of these risks.

Univar elaborated on the financial risks in their financial risk management objectives and policies for the US SEC Form 10-K filing (Univar, 2019a). Under financial risk, Univar have identified "*interest rate*" and "*foreign currency*" as their principal risk instruments (Univar, 2019b, pp. 33-34). Univar used suitable financial tools to manage the gyrations of foreign exchange and interest rates and are prohibited from trading in financial instruments, and only use it to manage their financial hedging positions. Univar also do not use other financial tools to hedge against translation risk or for pure speculation purposes.

5.3.1 Univar Interest Rate Risk

Univar's long-term debt obligations exposes them to market risk for any interest rate changes. They try to maintain a mixture of both fixed and floating rate debts, and on an annual basis they make their decision on their hedging variability of interest expenses and interest payments. Table 7 shows the sensitivity of interest rates increase on Univar's earnings before tax (with other variables held constant) for both a 100-basis point, and 200-basis point, upward movement. As shown in Table 7, a 100-basis point increase in interest rate will cost Univar an additional US$5.20 million as interest expenses which will ultimately impact the

company's earnings negatively. Doubling the increase in interest rate will double the financial impact to earnings.

Table 7. Sensitivity of Interest Rate Changes on Company's Earnings before Tax

Interest Rate Change	Year Ended December 31, 2019 (in US$ million)
100 basis point increase in variable interest rate	5.2
200 basis point increase in variable interest rate	10.4

Source: From Univar (2019b, p. 34)

5.3.2 Univar Foreign Currency Risk

Univar operates predominantly in the USA and Europe market and they had to deal with multiple currencies. Their company's financial performances could be negatively impacted due to foreign exchange rate fluctuations if it went against them. Currency risks affect balance sheet items like cash, receivable, payables and outstanding loans. Table 8 shows the sensitivity of Univar's 2019 earnings (before taxes) to a 10% increase in the value of the US$, Euro and British pound sterling (with all other variables held constant). As shown in Table 8, the strengthening of the US$ positively impact the company's financial performances whereas a strengthening of the Euro and British pound will impact them negatively.

Table 8. Univar's Sensitivity of Foreign Currency Exchange Rate Change to Earnings before Tax

Foreign Currency Exchange Rate Changes	Year ended December 31, 2019 (US$ million)
10% strengthening of US dollar	2.30
10% strengthening of Euro	(0.40)
10% strengthening of British pound	(0.30)

Source: Univar (2019b, p. 34)

6. Discussions

From literature review on risks and RM, it would seem that all the risks unearth can be grouped under the subject headings of "*Market*", "*Operational*", "*Economic and Political*", "*Financial*", "*Health, Safety and Environment*", and "*Legal and Regulatory*" and this is as shown in Figure 4 below. The Author have chosen these six risk subjects as they are the most frequently mentioned categories from the literature reviewed. As regards to the research questions on the types of risks confronting companies in general, and the risks being

confronted by the specialty chemical distribution sector, there are basically none or very little differences between them. Figure 4 also shows the risks associated with each of the group of risks. The list is not exhaustive, but it shows the main ones being unearthed in the literature review. Take for example, for specialty chemical distributors who actively seek growth inorganically, they will be subjected to risks from the acquisition of companies initially and later they will be exposed to risks from the integration. The three specialty chemical distributors selected for the research here have all embarked on the acquisition trails for the past few years and certainly the risks from acquisitions and integrations would be very real for them. The specialty chemical distributors who conducts their business within a certain country or in a single region, will be exposed to less risks from the Economic, Political, Legal and Regulatory risks' groups. The complexities of the business increased multiple folds when they conduct business across many different legal jurisdictions, and company's management must have a robust ERM system to address and manage the possible risks arising from it.

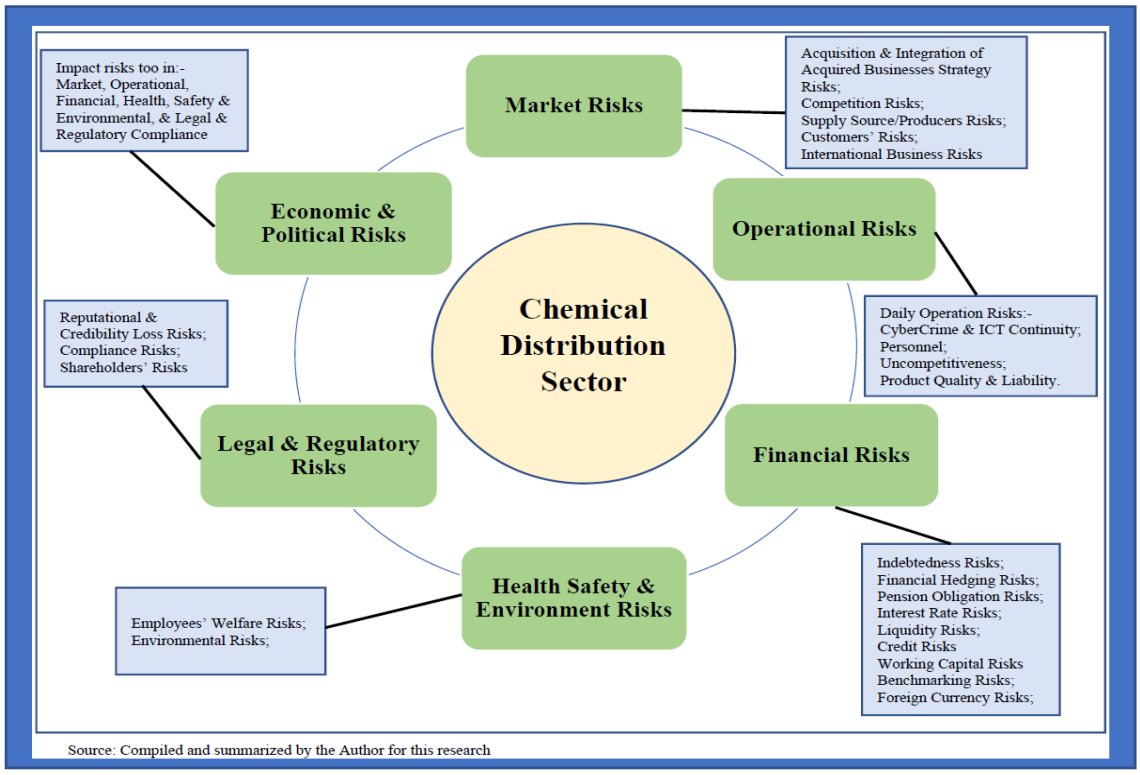

Figure 4. Summary of Risks in the Chemical Distribution Sector

The issue of risks arising from cybercrimes and Information and Communication Technology (ICT) would appear to be very serious threat to companies because of the dominant reliance on ICT in the daily operations. Another area to be carefully addressed and managed is the environmental risks. With sustainability reporting gaining popularity, or even being mandated in some jurisdictions, companies had to report what they are doing in mitigating such risks. In the same breath as sustainability reporting, CSR is today becoming a norm in the company's

annual financial reporting. From literature review, the subject of environmental risks is always being strung together with the subjects of health and safety, not only for the employees but also for the stakeholders in general. Here too, the Environment, Health and Safety are also being listed together and presented as a group.

Supply chain risk certainly caught the limelight under the CO-VID 19 pandemic when major disruptions of the supply chain occurred. With many of the markets under lockdown or under restricted access, producers were not able to get their raw materials. Consequently, the producers were not able to fulfill their obligations and so start the disruption to the whole supply chain. From this pandemic lesson, producers are now evaluating how to diversify their supply sources to minimize this from happening again.

The risk of reputational loss is also on the rise with stakeholders being alerted almost instantly through social media if there are any negative publicity about the company, its products or its policies. With the world so interconnected through open social media which are so easily accessible, it is becoming a challenge to keep any on-goings within the companies under wrap, especially if they are negative in nature. It is important to deal with reputational loss risks openly and transparently to minimize further fallout when addressing and managing the risks causing the issues in the first place.

From literature review on the annual reports on Brenntag, IMCD and Univar, all of them have systematically identified the risks for their business model and they are all articulated in some length in their annual reports. Brenntag and IMCD have made it very clear that their top management are finally responsible for RM and they have classified the risks identified into a few categories. Though Univar did not categorize their risks into any category, but the risks identified are very similar to what Brenntag and IMCD have reported. The risks associated with each of the categories of risk is also being elaborated in their annual reports. Most of the risks identified by the three companies do align with each other and they all view risks similarly as evidenced from their annual reports.

Brenntag have elaborated on their possible extent of damage if risk occurred and even quantified it in monetary term. In their risk assessment matrix, it showed the possible extent of damage the risk can inflict on the company with a monetary value. For critical case, the possible extent of damage it could cause to the company can be in excess of US$800 million. Of the three companies researched, Brenntag was the only one who had reported this in quantitative terms.

IMCD have a similar risk matrix on the likelihood of occurrence of the risk and the impact of each risk category on the company but it was classified in qualitative terms only as being low, moderate and high only. Univar just listed down the risks identified without attempting to categorize them in any form or ranking. As can be seen from their annual report, it covered a broad spectrum of risks and it aligns itself well with what Brenntag and IMCD have mapped out too. There was no attempt to quantify the risks, either from the possible damage it could cause or the probability of them occurring.

All the three companies researched here have elaborated further on their financial risk inside

the notes section of their annual financial report and have performed sensitivity test on the movements of the foreign exchange rates against their main reporting currency. Univar have performed sensitivity tests to estimate the costs incurred by the company due to interest and the foreign exchange rate changes. Quantitative measurement of gains or losses caused by the increase or decrease of exchange and interest rate changes were provided. Brenntag have made mention of the risk from their "*defined benefit pension plans*" (Brenntag, 2019, p. 145) under the notes section inside their financial report. A sensitivity analysis on the "*present value of the defined benefit obligations*" (Brenntag, 2019, p. 150) where the resulting effects on the company due to the changes of the discount rate were conducted. Similarly, Brenntag have elaborated on their risks from financial instruments such as currency, interest rate, credit and liquidity there. Sensitivity test were conducted for the effects on the company's financing costs if the Euro were to either increase or decrease by 10% against the major currencies. IMCD have similarly listed down their financial RM in the notes section of their consolidated financial report (IMCD, 2019, pp. 124-128). The financial risks identified in this section were credit, liquidity, market and operational. IMCD have performed a similar sensitivity test on the effects on the financial results of the company with a Euro movement of 10% increase or decrease against the major currencies involved.

7. Conclusion

A literature review was conducted on business risks and RM in general and, also on Brenntag, IMCD and Univar, the three global specialty chemical distributors, who were selected for the research. There was strong convergence on the risks identified from the research between the companies and the difference being only on how much impact each of the risk had on the specific company. Risks are temporal in nature and the risks can crop up at any time with the strong influence of risk coming from external sources which may be unexpected by the company. However, with a strong RM policy and framework within a company, all the risks can be addressed and managed within the risk tolerances of the company.

As to the research questions, i.e. 1) What are the risks and types of risk confronting companies? 2) What are the risks being confronted by the chemical distribution sector? 3) How do specialty chemical distributors identify their risks and manage them? and 4) How do specialty chemical distributors quantify their risks? They have all being answered adequately from the research material unearthed. The choice of the global specialty chemical distributors, Brenntag, IMCD and Univar, for the research was justified and the risks identified would be representative of the risks to the chemical distribution sector.

The Author is cognizant that the chemical distributors researched here may actually be performing much more analytical data on their risk profiling and risk assessment matrix than are reported but are only showing a portion of these information in their public reports. So, readers must not assume that just because the risks are not reported in the public documents that the company have missed it out or deemed it unimportant and did not consider them. It could be that they are just too sensitive to be published and the details are part of their proprietary information, and so they are not published at all for public consumption.

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