Sustainable Product Design and Supplier Material Disclosure

Tedie West
Kerri Doyle
Siemens PLM Software
Plano, Texas

Abstract:
Sustainable product design and the task of bringing new, earth friendly products to market is a top priority for corporate leaders in the manufacturing industry. By not reaching their compliance and sustainability goals, manufacturers risk loss of market share, fines for non-compliance against regulatory directives and possible damage to their brand. Managing material disclosure information from the supply chain is one of their biggest challenges.

On average, 80% of manufactured products today are comprised of components sourced from suppliers. This means that if the manufacturer's goal is to understand how sustainable or compliant their product is, they must first pull all of the supplied parts into the product picture before doing any type of sustainability or regulatory analysis. This is no small task, especially for manufacturers dealing with 100s to 1000s of suppliers and supplier parts within a deep multi-level supply chain. The increased need to sell products in global markets, where a large portion of the product contains components sourced from around the world, coupled with the trend for higher product complexity adds another layer of challenges to manufacturers in trying to gain holistic views of their products in order to check for compliance against regulatory and industry directives. The most complex and tedious part of compliance and sustainability is getting accurate and complete data from suppliers.

Manufacturers will need to focus on supplier interaction and automation of that process using a multi-faceted and "best-practice" approach, which could include functions such as: email interaction, web portals, integration to on-line databases, engaging third party data collection agencies, general PLM framework capabilities to exchange different document types, support for industry standards and full material disclosure from suppliers.

Using an enterprise PLM framework to automate the process of gathering and managing supplier disclosure data, manufacturers will not only benefit today in addressing current sustainability challenges and gaining a competitive edge, but also tomorrow in addressing future needs and requirements to produce earth friendly, innovative and compliant products.

Introduction:
Topics around sustainability continue to top the charts these days both in the news and on the agendas of leading manufacturers. According to a study performed by McKinsey&Company, CEOs are twice as likely as they were in 2012 to say sustainability is their top priority. A recent Accenture survey (UNGC-Accenture 2013) found that 78 percent of Fortune 1000 CEOs believe sustainability is important to a company's profits and 80 percent believe that it will lead to competitive advantage in their industries.

Sustainability is a commonly used term and it's important to outline the different domains around it. Simply stated, sustainability at the highest level means meeting our needs (environmentally, economically, and socially) without compromising the needs of future generations. According to Wikipedia, "Corporate sustainability is a business approach that creates long-term consumer and employee value by creating a "green" strategy aimed toward the natural environment and taking into consideration every dimension of how a business operates in the social, cultural, and economic environment." In this article, we focus on product sustainability and Design for Environment (DfE). Product sustainability and DfE initiatives concentrate mainly on manufacturing and logistics to reduce a company's negative impact on humans and the environment.

Company leaders have valid reasons for putting sustainability high on their lists. They know that if they do not reach their sustainability goals and compliance requirements, they subject themselves to huge risks and possible damage to their brand. It's not only risk that's driving these leaders to address sustainability, it's also the benefits realized from addressing these initiatives and producing more innovative, green, products. Financial investors are rating companies based on their sustainability efforts (e.g. Dow Jones Sustainability Index) and consumers are clearly more aware of products that are considered environmentally friendly. How a product is perceived is highly important in the consumer buying process

(sometimes even more important than the price of the product). There are even websites available now (e.g. BuyGreen.com) to point consumers to earth friendly, green products for purchase. Companies who fall short of producing human and earth friendly products will have a hard time staying competitive. Innovation is also a key benefit as a result in addressing product sustainability. There are already many examples of leading companies who have turned the burden of addressing sustainability into a positive outcome. As stated in an article by Deloitte Review Using Sustainability to Drive Business Innovation and Growth, "Organizations with a broader, more strategic plan for sustainability will not only drive innovation across their enterprise—including transforming key processes—but may also influence what their customers want and how their suppliers operate."

Importance of Supply Chain Transparency

One of the biggest challenges for companies in addressing product sustainability initiatives is getting accurate and complete data from their supply chain. This challenge is people and resource intensive, which can be very expensive and error prone if the right solutions are not used to gather and manage the information. In some instances, the process to gather and manage supply chain information can take manufacturers more than a few years to complete. An article posted online by the Harvard Business Review is rightfully titled You Are Only As Green As Your Supply Chain. The article goes on to talk about the importance of tracking supply chain information and creating meaningful metrics of the data coming in from suppliers and also sharing this information with consumers. In a recent Fast Coexist article Starting Now, All Intel Microprocessors Are Conflict-Free: Here's How The Company Did It, Intel CEO Brian Krzanich talks about the importance of improving supply chain transparency to address corporate social compliance initiatives around conflict minerals. By working to identify the source of supplied materials and what smelters were used, Intel can now claim that every microprocessor that they ship will be made entirely with conflict-free minerals.

The following items are critical when defining your supply chain data collection methodology. The remainder of this paper will address each of these areas.

- Clearly define the objectives of your data collection activities
    - What regulations? What countries? Sustainability goals? Short-term/long-term
- Determine what level of detail of product, material and substance information is required to meet your objectives
- Determine where you will get this data
- Determine what data exchange standards will be used
- What software functionality will be required

Objectives:

Manufacturers should determine if they are simply trying to check a box that they are compliant with a given set of regulations. On the other hand, are they trying to meet sustainability goals? Are they interested in impact reduction? Is it important for them to be labeled as a "green company"?

- Environmental and Social Regulations – Manage and demonstrate product compliance with environmental regulations such as RoHS, REACH, or Conflict Minerals.
- Compliance with customer mandated directives – Many times a manufacturer will have customers that demand they meet certain directives.
- Life Cycle Assessment objectives – Do I need to analyze the environmental impacts associated with all the stages of my product's life cycle from-cradle-to-cradle?
- Do I have corporate sustainability objectives to help the company stay proactive to address future regulations and remain competitive?

Depending on your objectives, you will need different levels of information from your supply chain.

Level of detail:
If all a manufacturer cares about is checking a box that they are compliant, perhaps a declaration of conformity from suppliers is sufficient. However, if they have sustainability goals or impact reduction objectives they will need a lot more information. This is where full material disclosure will be important. Data collection is a process that will improve over time. Think of this an exercise that is iterative, and work towards getting the appropriate level of detail. Your processes can improve over time as you learn more about your supply chain. The key is to get started now.

There are several approaches to data acquisition and each has positives and negatives.

Declaration of conformity – utilizing this approach, manufacturers provide the supplier with a list of their regulatory or other compliance related requirements and the supplier indicates if they are or are not compliant. This mechanism is the most simple for a supplier and requires the least amount of effort making it quick to get a response. However, this approach is not ideal for several reasons. First, as regulations change, you have to ask the supplier for data again. This is time consuming and expensive. Second, how can you be certain the suppliers are answering the questions accurately if they have not the detailed analysis? In addition, meaningful analytics around these declarations within a software system is much more difficult.

Disclosure based on substance lists or categories – With this approach, a manufacturer knows what substances they wish to ban in their supply chain. They then require suppliers to disclose if their supplied products contain any of these substances. You will get more detailed information with this approach enabling better analytics and automation. In addition, as long as your substances of concern do not change you do not need to go back to your supplier for additional information. However, for smaller or less sophisticated suppliers providing this level of detail will be more difficult and time consuming.

Full material disclosure – With this approach, you ask your suppliers for all of the substances and their percentage of composition contained within the product. This approach has many advantages. As regulations change, you do not need to go back to your supplier to ask for additional information about the substances because you already know. This approach allows for the greatest flexibility in analysis and reporting. Full material disclosure pays big dividends in the end. You have data that is more complete, more accurate and the cost of acquisition does not increase as regulations change.

Getting FMD can help by:

- Making it much easier to adapt to ever changing regulations, be prepared for new regulations, without the need to go back to the suppliers for more data as things change
- Allow for what-if analysis, event horizon scanning and other analytics
    - This type of analysis allows you to look for things that will be of interest in the near future and be proactive as opposed to reactive.
- The supplier data only has to be refreshed when they provide a new part or component or make a change to an existing part.
- Reduce risk - as mentioned at the beginning of this article, companies can reduce risks by addressing sustainability objectives.

However, the downside of this approach is that it is very time consuming and difficult for suppliers to provide this level of detail. It is worth noting that it is possible to start by requiring full material disclosure from your most important suppliers. This will be a smaller list. For the other suppliers you could go with a Declaration of Conformity. Over time, you can work to rollout full material declaration requirements to more and more of your supply base.

Where do you get the data?

Depending on your industry, there may be many sources of material and substance information from your supply chain. For instance, the automotive industry and high-tech industries have on-line databases. Examples of data sources include suppliers, on-line database and use of third party companies. Let us have a look at each.

Direct Interaction with Suppliers – This approach involves a request/response process. You request information from your suppliers and they respond. With the proper processes in place to automate this process, manufactures will find this a very cost effective mechanism. However, this can also be the most complex and time consuming approach initially.

On-Line databases – These databases allow supplier to login and enter their material and substance information, which can then be shared with one or more of their customers. This has obvious benefits for the industry it serves. For instance, the process is an efficient way of getting this information shared throughout the industry. There is no need for a supplier to respond to multiple manufactures with the same information. However, using this method there is little control over the accuracy of the data and suppliers are many time reluctant to share this important information on the cloud.

Use of a third party – This approach required manufacturers to work with a third party that is responsible for collecting data from your suppliers. These third parties have resources that are dedicated to getting supplier information, they typically have staff in countries where your suppliers are and so they speak the same language. However, this can be an expensive approach.

Manufacturers may choose to work directly with their closest and most sophisticated suppliers, use on-line databases where they source commodity parts from suppliers and use a 3rd party to work with suppliers that are either unwilling or unable to provide the information you require.

Again, the most important thing to remember is to get started now with the goal of improving this process over time.

Manufacturers will need to focus on supplier interaction and automation of their supplier processes by using a multi-faceted and "best-practice" approach, which could include a combination of the following functions:

- Email automation to include:
  - The process of requesting supplier declarations via email
  - The process of polling and processing the email server for supplier responses
  - Automatic tracking of suppliers responses
  - Tracking supplier declaration expiration dates
  - Initiating a re-request process when a supplier declaration has expired or has failed validation
- Web portals that enable suppliers to receive material disclosure requests and submit their deliverables
- Integration to on-line databases to get accurate and complete data from suppliers
- General PLM framework capabilities to enable the exchange of different document types while

Standards:

- supporting multiple standards

  Note: Be aware that when choosing which industry standards to embrace, more is not always better. The more options you give your suppliers the more your support costs will increase.

By requesting data from your suppliers using industry standards you make the process easier for your suppliers and easier for you. The suppliers will not need to respond differently to all of their customers saving time and money. Standards also make it much easier to automate the processing of this data in your enterprise systems.

There are several important standards to consider and more are being developed all the time.

- IPC 1752
- IEC 62474
- IPC 1755
- IPC 1753
- EiCCGeSI CMRT template
- Environmental Product Declaration, EPD (ISO 14025)

Leverage software:

Using an enterprise PLM framework to automate the process of gathering and managing supplier disclosure data, manufacturers gain a more complete and accurate understanding of their product. With a more holistic view of their product BOM, manufacturers can be confident in the results they receive when running compliance checks, analysis or any other type of function during the development process. This in turn will help them achieve their regulatory compliance and sustainability goals, gain a competitive edge, and ultimately win in the market.

In addition, enterprise PLM systems offer many other functionalities that can provide benefits when managing compliance, sustainability and interacting with your supply chain.

Consider leveraging the following capabilities:

- Requirements management
    - Consider making regulatory and sustainability goals requirements in your design and release processes within your enterprise systems.
    - In addition, ensure your processes require timely and accurate data from your suppliers
- Traceability
    - Utilize workflows and other functions that enable traceability within your software systems
- Schedule management
    - Most, if not all, companies utilize scheduling software for deliverables in the design and manufacturing processes. Consider adding material disclosures from suppliers into these schedules.

Quick note on working with your suppliers to help them help you:

It is very important to have a plan for working with suppliers. On one extreme you can deny them business if they do not provide the required data. However, a better approach is to work in a cooperative method to get complete quality data. Remember it is often difficult for suppliers to get the required data from their suppliers (think conflict minerals). Consider training resources and FAQ for suppliers.

Summary:

To summarize, regulatory compliance and sustainability goals are becoming increasingly important for manufacturers. Reaching these goals is a time consuming process, and more of a journey than a destination, but will be an important differentiator for your company and enable you to have a competitive advantage. A sometimes difficult and time-consuming part of this journey involves interacting with your supply chain to get accurate and complete information about the parts they supply to you that are often critical components in your products. Before beginning this process consider the many sources of data that are available to you and work towards getting full material disclosure from your suppliers. In addition, this process will be much more automated and repeatable if you utilize industry standards for data exchange and fully leverage the enterprise software available to you.

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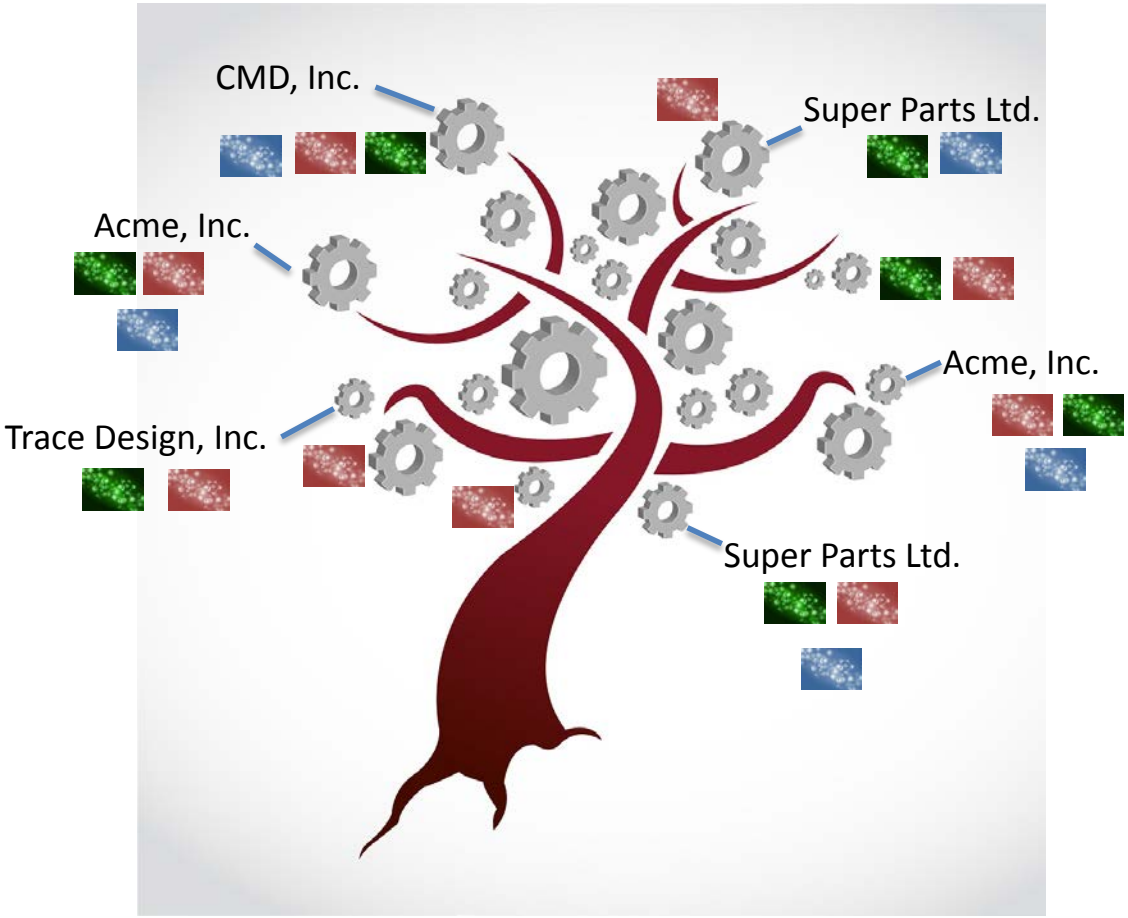
Tedie West
Siemens PLM
Product Manager

Kerri Doyle
Siemens PLM
Product Marketing Manager

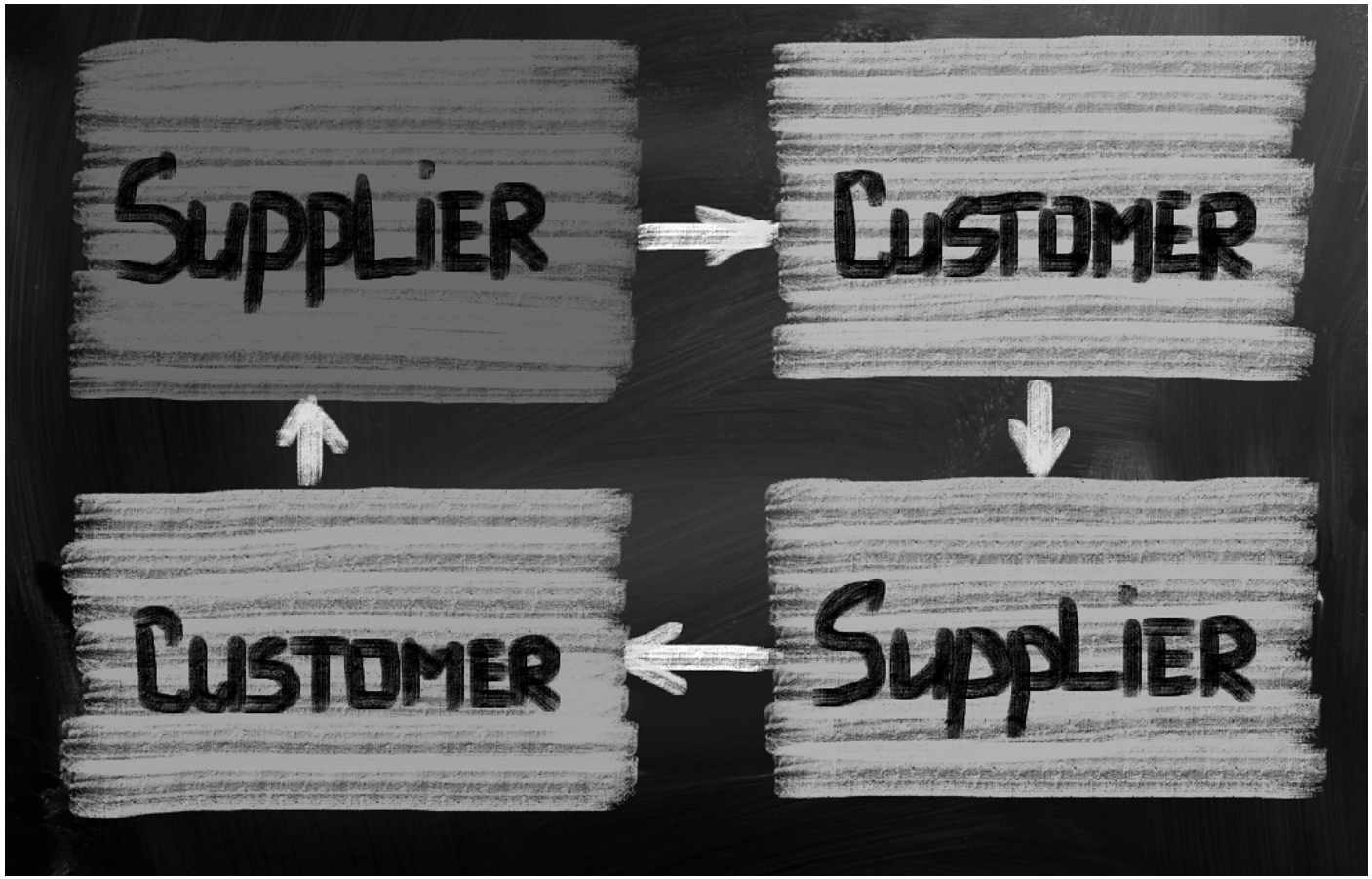
Sustainable products a top priority for most corporate leaders

Managing material and substance disclosures (MSD) from global supply chains is a BIG challenge

Understand your product makeup



Goal: Get accurate and complete data from the supply chain

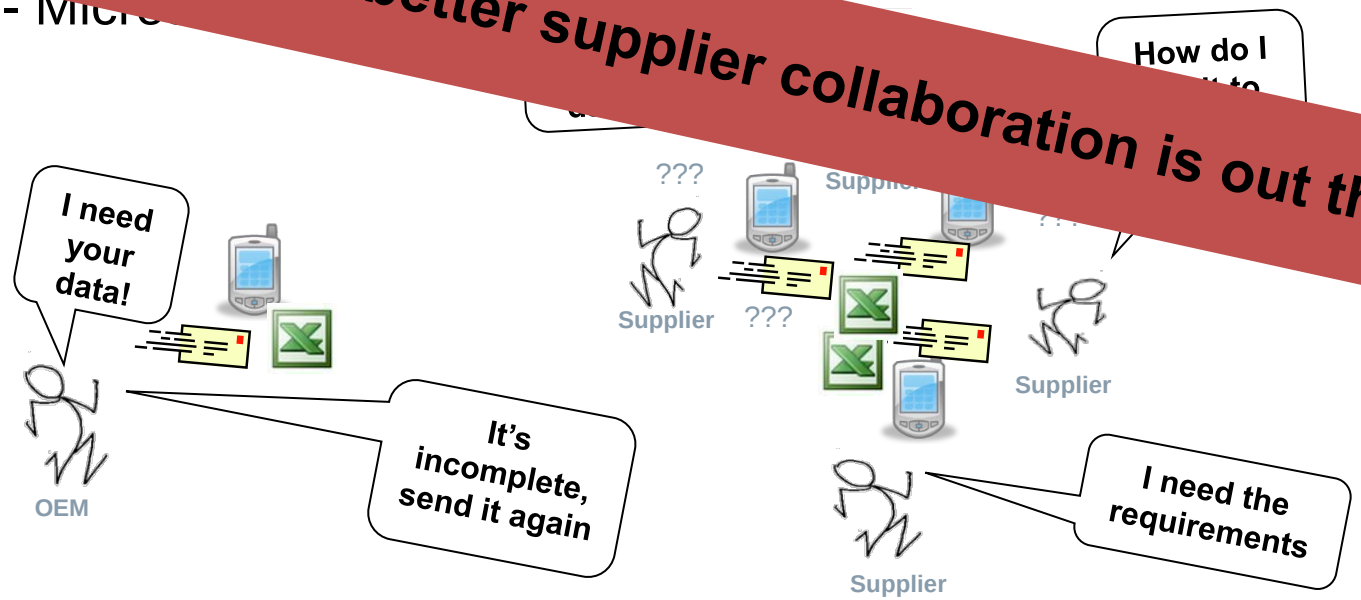


Gartner survey of 500 companies regarding how they collaborate externally today with their supply chain

#1 - Email

#3 - Micr

The need for better supplier collaboration is out there!



Reference: Gartner

Manual processes create operational inefficiencies

- Errors, rework and missed delivery dates
- Time wasted on incorrect or out of date information
- Standards not enforced
- Lack of visibility across supply chain

Best Practice Approaches

- Clearly define the objectives of your data collection activities
- Determine what level of detail of product, material and substance information is required to meet your objectives
- Determine where you will get this data
- Determine what data exchange standards will be used
- What software functionality will be required

Clearly define the objectives of your data collection activities

- What regulations?
- What countries?
- Sustainability goals?
- Short-term/long term?

Determine what level of detail of product, material and substance information is required to meet your objectives

- Declaration of Conformity
- Partial Disclosure based on query/response or substance categories
- Full Material Disclosure

Determine where you will get this data

- Direct interaction with suppliers
- On-line databases
- Use of a third party

Determine what data exchange standards will be used

- IPC 1752
- IEC 62474
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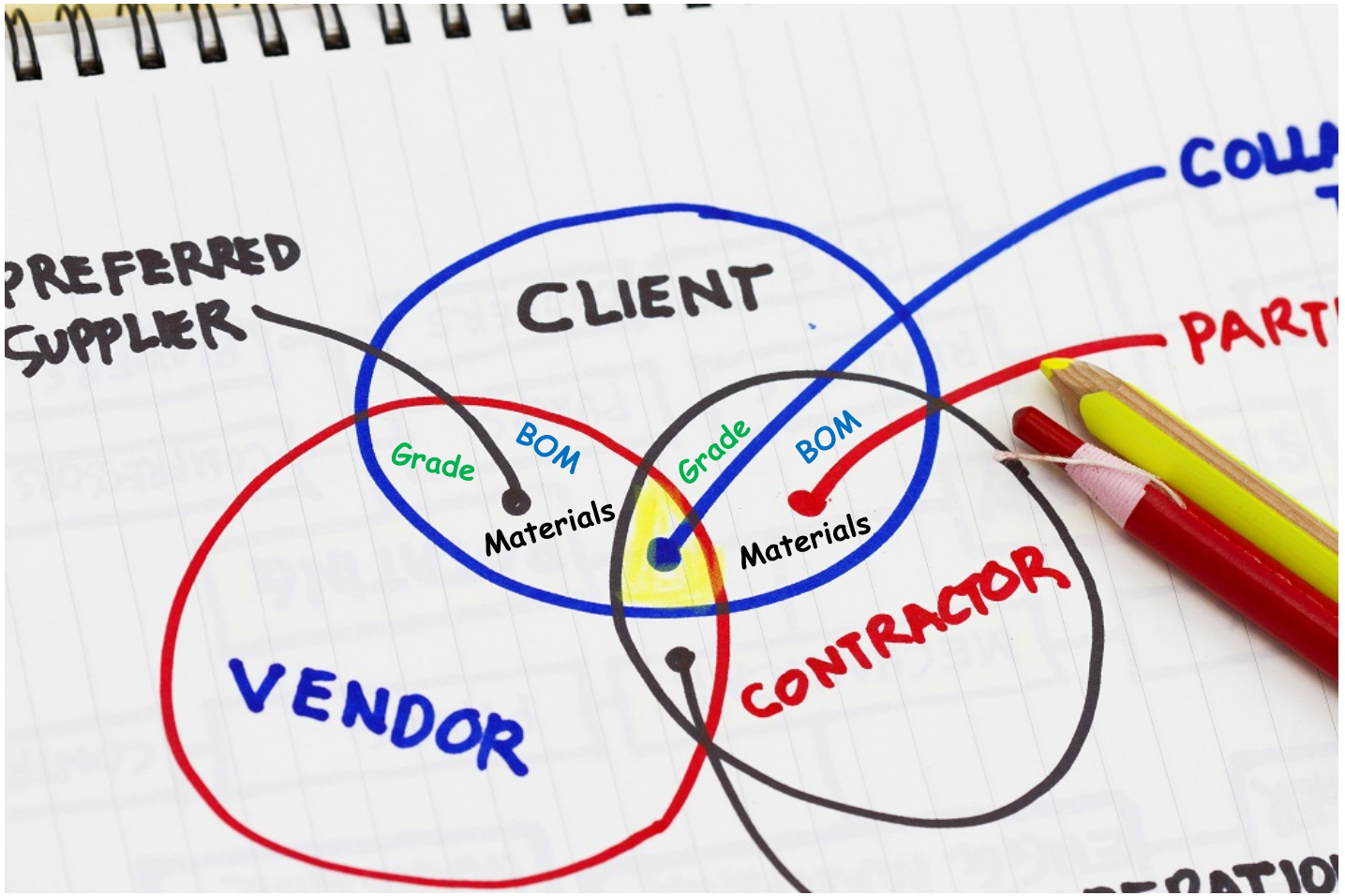
- Environmental Product Declaration, EPD (ISO 14025)

What software functionality will be required

PLM Framework

- Ideation for innovation
- Requirements
- BOM management
- Materials management
- Supplier management
- Compliance grading
- Analytics and reporting
- …

What is your plan?



To summarize

- Regulatory compliance and sustainability goals are becoming increasingly important for manufacturers
- Getting the required data from your supply chain to meet these goals can be a challenge
- Before attempting this you need a plan and software

Tedie West
Siemens PLM
Product Manager

Kerri Doyle
Siemens PLM
Product Marketing
Manager

THANK YOU