

## **Capturing added value from new sustainability driven customer requirements: reassessing value chain position and business dynamics.**

On January 26th Squarewise hosted an inspiring Squaretable event around the topic of sustainability and value chain dynamics. The subject was chosen to stimulate cross-value chain discussion on the changes and challenges that face various stakeholders. In the near future, the industrial value chain might heavily come to depend on sustainability-driven material development and life cycle product considerations. We reflected upon these changes in an interactive session with influential representatives from companies in different value chain positions. In the short article below, the various viewpoints and topics for discussion are summarized.

### **Drivers for sustainable development**

In order for sustainability to become an intrinsic part of organizational development processes, incentives and advantages must exist or be created. During the Squaretable event, several drivers for sustainable development have been discussed.

Price ranks high amongst the most important drivers that were mentioned: either low cost-production or high consumer prices. As long as the margin is up to standard, the incentive for sustainability is there. Problem is, more often than not, this is not the case. In some cases the so-called green premium covers the rise in development and/or production costs. However, since this green premium is difficult to forecast and since it is largely dependent of marketing which is also expensive, green premium is not a strong driver. Mainly for this reason 'drop-in strategies' in which a "green" alternative competes with an identical existing product, do not provide the sought after added value or increased market share.

In many cases, non-price related drivers create potential added value for sustainability in the chemical industry value chain. Performance is one of these drivers. Increased functionality of raw materials or end products create direct added value for customers. In some cases, this goes hand in hand with an increase in sustainable performance. Good examples of this lever are the sustainable bio-based solutions for the future of plastics and other applications, developed by Avantium. Their substitute for terephthalic acid, FDCA, is now being considered as the next generation replacement of PET bottles. FDCA is not only 100% biosourced and recyclable (not degradable), but is also outperforming the original material on various mechanical properties and in terms of lower carbon footprint. Moreover, it can be processed in existing value chains.

Other drivers that were mentioned included marketing and long term shareholder value. Marketing was predominantly mentioned as a way to increase the perceived value of sustainable products to consumers, linking it to the green premium discussion. Long term shareholder value is also intertwined with the marketing aspect, claiming that sustainability in general provides a company with a positive business reputation. In the end, the only real incentive for large multinationals to actively pursue

sustainability at the moment is the possibility to counter the increased costs by a (sometime explosively) growing market share.

### **Key actors that drive sustainability**

The current reality teaches us that value chains are predominantly perceived in a linear way and that every player has its own reasons and incentives to either join in, or distance himself from the developments surrounding the added value of sustainability in the value chain.

Generally speaking, everybody agreed with the fact that OEMs (original equipment manufacturers) and brand owners hold a crucial position. They have direct access to end users and act in the high-margin regions of the value chain. Problem is: the ones that can potentially lose most, risk the least. In other words, in the current market dynamics, companies that earn high profits with current portfolio and production, tend to be risk-averse and do not accept lower margins. Therefore, innovation will most probably not be spun off by these multinationals.

Consumers were also mentioned as actors that drive sustainability. However, discussion arose around the fact that consumers in general are not able to state their own preferences next to pricing aspects. Consumer preferences are created. In this sense, returning to the earlier mentioned debate on marketing, it is about perceived value of sustainable products and materials, marginalizing the role of consumers as key actors that drive sustainability.

By creating regulations and laws, governments can be regarded as actors that (can) drive sustainability. Responding to among others macro-economic trends, governments are able to influence both the raw material producers, manufacturers, OEMs and consumers. Point of discussion was, among others the role governments should play in defining sustainability requirements by means of life cycle assessments, in a rigid way, providing both industry and consumers with clear definitions to base decisions on.

### **Different perceptions of sustainability**

Sustainability is a buzz word, and buzz words tend to become hollow shells without any meaning. As in every other discussion on sustainability, this word needed to be defined. Instead of extensively debating about the exact meaning, various interpretations of sustainability in this specific context were mentioned. The main contradiction arose around the difference between recycling / re-use and sustainable materials. Poly-lactic acid is widely known for its function to replace certain oil based plastics such as polyethylene and polypropylene. Considered a 'green' chemical, PLA's are not compostable. The same goes for the PDFA that was mentioned earlier as the replacement material for PET. In this respect, the choices are either to consider the feedstock of the material or its life cycle. Best would be to embrace a holistic approach, but this, as all agreed, is something still for the future.

A Life cycle assessment is a tool which is considered to create sustainability driven material and product development. Monitoring a product throughout its life cycle not only provides the opportunity to create

sustainability ratings, it also provides value chain actors with insight into their specific impact in each phase of the process. It helps to create future solutions in recycling, and if used effectively, can initiate design and production changes that increase value chain efficiency. This brings us back to the consideration mentioned earlier: the importance of turning long term business perspectives into reality, enlarging shareholder value in the process.

### **Value distribution throughout the value chain**

All in all, it is not clear that sustainability holds added value in itself. It needs to be created. Or, as some pointed out in the discussion, existing value needs to be re-distributed in order to spin off sustainable development throughout the value chain. The existential question here is: who invests and who gains?

Here we come perhaps to the most crucial paradox in the current system. Investment is propelled by the outlook of (high) returns, and is set against the lowest percentage of risk. The highest investment potential lies within the realm of the companies with big market shares that earn significant profits with their current business, diminishing their motivation to step out of the traditional systems to create new dynamics by means of sustainable solutions: they stand to lose most if things go wrong and gain a similar amount they're earning in traditional business if things work out. The potential loss of market share holds the value chain hostage. It also decreases cooperation potential between various value chain players, while at the same time, also during the discussion, cooperation was mentioned as one of the key drivers for change. The smaller player needs the big corporates to develop technologies and materials that bring the industry to a new (sustainable) level.

In this respect value chain integration plays a crucial role. By cooperation, experience and knowledge is shared in an initial phase that plays a crucial role in deciding the best direction of product development. Furthermore, as most agreed upon, it is vital to align the complete value chain to integrate and profit from sustainability in the value chain. This brings us to the next question that we discussed in relation to this topic.

### **A paradigm shift in business dynamics and models?**

Co-creation, cooperation and value chain integration: all were mentioned during the discussions that tried to come up with an answer on how to capture added value from sustainability. Although these are familiar terms, they are notoriously difficult to turn into reality. The fact is, the chemical industry value chain has not seen too many radical changes over the last century.

With this in mind, more spectacular options for value chain alterations were discussed. Two of them are interesting to name in particular: a changing notion on ownership of products and materials throughout the value chain, and a change from thinking in efficiency to optimization. The former is meant to introduce circular or life-time thinking with respect to a certain product or material. Just imagine a situation in which a product is leased to a user/consumer during a particular period of time, remaining property of the manufacturer during the complete life time. The manufacturer re-collects the product at

the end of the life span. In this scenario, direct added value is created by designing and producing a product that is both qualitatively first-rate and recyclable, thereby combining added value for the manufacturer with advantages for the consumer/end user. In the end, by closing the loop in such a radical way, a cost advantage can be obtained as well. The latter, moving from efficiency to optimization is closely intertwined with the first option. An example best portrays this notion: a car is built in the cheapest possible way within certain segment constraints leading to the use of cheap materials for lower-segment cars. If a car would be designed and built with the intention to enable the re-use of the highest amount of materials at the end of the life cycle, more expensive materials can be used also on lower end segments, leading to better (and perhaps safer) products. High end segment cars might have less pricing constraints, but the far stretched development of weight reduction is based on energy-considerations, and not on life cycle or recyclability. It could also spark an incentive for companies that operate at the end of the value chain, in re-use and recycling. Furthermore, an intrinsic link would be created between designers and “end of life operators” because of their mutual dependency.

It should be noted here off course, that this discussion was intended as a brainstorm. No single participant claimed this situation to become reality in the near future, and many constraints can be identified as well that are applicable to the scenarios sketched above. However, a somewhat downplayed version of these scenarios was discussed. Some participants considered it to be a next step, or even a prerequisite, to move into the direction of a better balanced value distribution in the value chain.

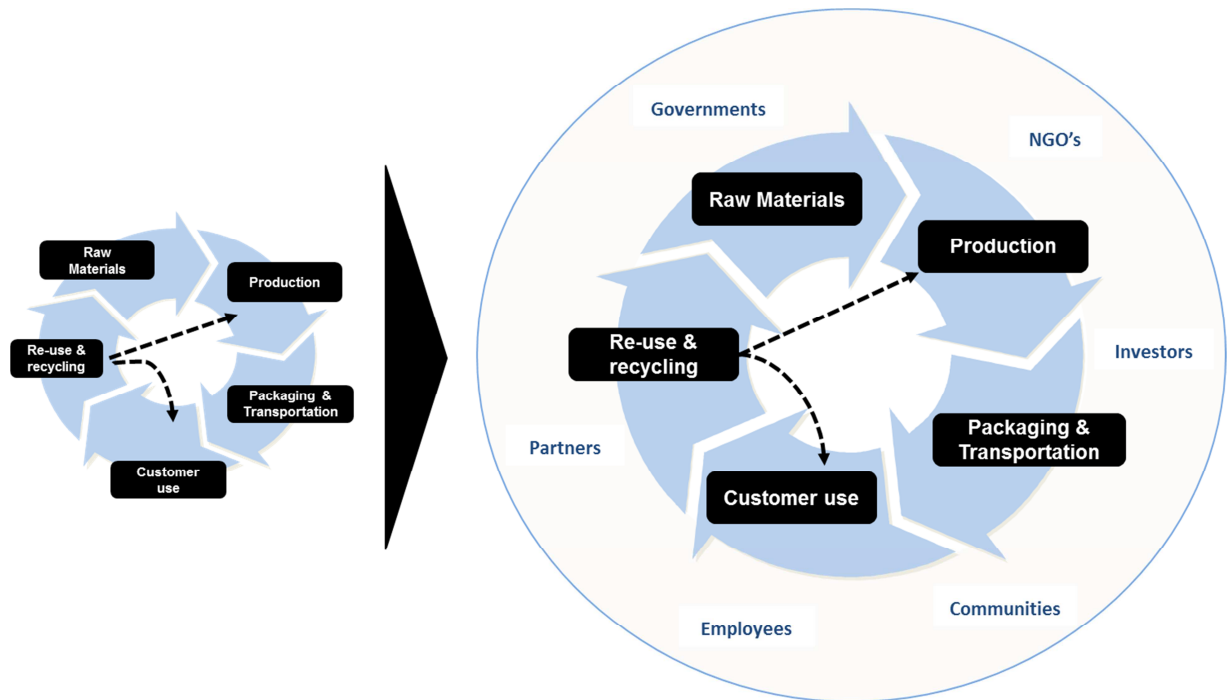
### **Move towards an open innovation oriented circular economy?**

In the end, all agreed that the most important change to take place is collaboration, co-creation and open innovation including nonprofit and academic considerations. For example, without cooperation in an early stage, Avantium would not have been able to either develop market or create added value for their PDFA applications. Another striking example is Van Gansewinkel. They not only depend on the secondary raw material streams, but also need cooperation with all value chain parties to develop the much needed knowledge to move towards recycling based on chemical constellation of materials and products.

But in practice, many constraints exist. The consumers decide, the brand owner influences this decision process and raw material producers initiate the movement from the other side of the value chain. But for these two incentives to merge together and create added value for sustainability, things need to change.

The first change is transparency and open innovation. This turns out to be difficult in practice (especially pricing and market share considerations play an important role) but best practices do exist. Another of these required changes is a new value chain approach, from linear to circular, in which the open innovation creates added value by aligning knowledge throughout the chain and closed-loop product life cycles (cradle-to-cradle) can become reality. This, in turn, requires focused waste management

practices. To close the circle here, the last important consideration that was mentioned during the discussion is the inclusion of material and product design in an early phase of this process.



All in all, the challenge is not to create intelligent new frameworks or business models. The challenge lies in making it a reality. Responsibility for these changes lays with all value chain parties. In the discussion, especially OEMs were mentioned in this respect. In order to create this new value for sustainability, a first step is to re-distribute the existing one. Basically, the message that everybody took home is that we are living in a complex world and environment in which the only way to win is to collaborate together in early stages of development, to be transparent and to translate the complexity towards transparency for sustainable solutions.