

# B2B Services and Their Impact on Sustainable Development – Case Study

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**Abstract:** In the last 30 years, the pressure to sustainable development in an educated society has been increasing. Manufacturers face the challenge of manufacturing more products of a higher quality while using fewer resources, polluting the planet less with emissions and waste. However, it is clear that a strategy of sustainability is no longer enough, as the damage already done is so extensive that it is not possible to be satisfied with the current situation and maintain the status quo. Regenerative Development takes sustainability to the next level and provides a framework for incorporating regenerative design principles into the current business processes. The aim of this paper is to identify, analyze and highlight possible ways to transform traditional business models through the services provided into more sustainable, or even into regenerative ones. A case study from a chemical holding company is used. It turned out that this holding, due to its size and especially its strong research base, is transforming towards more sustainable business models, and processes and services leading to regenerative business models are in the research and development phase. It sees more effective results in the combination of servitization with the circular economy and digitalization.

**Keywords:** sustainable development, regenerative development; services; servitization; manufacturing companies

**JEL Classification:** O14, L10; Q01

## 1. Introduction

The impacts of unsustainable human activity affect not only present but in particular future generations. Due to this fact, there has been increasing pressure over the last 30 years to promote sustainable development in educated society. The public is taking an ever more intense interest in climate change and the impact of its behavior (Han et al., 2020). The public also often adopts a negative attitude towards manufacturing companies, and in particular the chemical industry, with regard to their impact on the environment. The chemical industry is the second largest industry in the Czech Republic and is also a key producer for other non-chemical manufacturers. Manufacturers therefore face the challenge of manufacturing more products of a higher quality while using fewer resources, polluting the planet less with emissions and producing less waste (Hami et al., 2015). Key sustainability objectives include social development, economic growth, and environmental protection for future generations (Jelinkova et al., 2021; Lee et al., 2021). Implementation of these objectives is ensured by

engaging in various complex global socio-ecological challenges such as climate change, loss of biodiversity and depletion of all the resources in the world (Opazo-Basáez et al., 2018). In the chemical industry, this concerns use of efficient, effective, safe and environmentally friendly processes and chemical products. The aim is to use the necessary resources efficiently to meet the needs of customers and therefore to reduce wasteful use of essential resources by using efficient production methods or by substituting substances which are less demanding in terms of their subsequent disposal (OECD, 2022).

However, it is now clear that a strategy of sustainability is no longer enough, as the damage which has already been done is so extensive that it is not possible to simply settle for the current situation which we find ourselves in and to maintain the status quo (Gabel, 2015). The negative impacts of unaddressed challenges would further exacerbate and even accelerate slow but, for the time being, irreversible destructive processes, which is why we now need a regenerative approach to addressing environmental, social, economic, and cultural challenges (Nemethy, 2021). Regenerative Development and Design takes sustainability to the next level and provides a framework for incorporating regenerative design principles into your current process (Regenesis Group, 2016).

Businesses are therefore looking for ways to transform their traditional business models into not only more sustainable ones but ideally regenerative models. Manufacturers adopting responsibility for the entire life cycle of products/chemicals, i.e., from their efficient use, all the way through to environmentally friendly treatment or reuse of waste, could represent an important step towards this. The adoption of a business strategy, for which the term “servitisation” has been coined, could contribute significantly towards increasing this accountability (Vlckova et al., 2021). The development of a service-based economy may be the way out of this situation in our consumer society which is unsustainable over the long term (Bellos & Ferguson, 2017).

Therefore, we formulated a research hypothesis: providing B2B (Business-to-business) services with significant support of own research and development is one of the paths to Sustainable even to Regenerative Development. To verify this hypothesis, the following aims were set: to identify, analyze and highlight possible ways to transform traditional business models, not only to become more sustainable, but also to become regenerative. Use is made of a case study from the chemical holding BASF. The holding includes a Czech subsidiary which engages in sales on the Czech, Slovak and Hungarian B2B markets. With a turnover of € 78.6 billion in 2021, the company is the largest chemical producer in the world. It has manufacturing facilities on every continent in more than 90 countries. It is a major employer and employs around 10,000 people in research and development. The holding was granted 820 patents in 2021 (BASF report, 2021). Given its size and strong research base, it can also be expected that this company will be a leader in the ongoing transformation of chemical companies towards more sustainable and regenerative business models.

A partial aim of this paper was to conduct a targeted literature search focused on possible paths towards more sustainable processes in the chemical industry, particularly through the B2B services provided i.e., services offered by manufacturing companies on the industrial market. This transition of manufacturing companies from selling products to selling product-

service systems (PSS) is also referred to as servitization. On the basis of these results, the objective was then to identify opportunities for businesses to contribute towards achieving sustainable or even regenerative development through their offer of services on the industrial market. The results should help direct manufacturing companies in the Czech Republic towards making greater efforts in transformation of their business model towards servitisation as a strategy to support not only sustainable development but also as a path to regenerative development.

## 2. Methodology

Primary and secondary sources were used to verify the formulated hypothesis and to address the objectives. Secondary sources used were mainly foreign scientific articles and studies. The Web of Science was used as a source for finding thematically focused professional articles. During the search, the following keywords were entered: servitization, services, product service system, PSS, B2B services, sustainability, sustainable development, B2B, manufacturing companies and various combinations of their chains, with a time limit between 2010–2022. The official BASF website was also used as a source of information, where, among other things, reports for 2020 and 2021 are published (BASF, 2020), (BASF, 2021). These set out the overall corporate strategy, the results in the three main areas of sustainability with more precise specification for each area of business, the sustainability targets for the coming years and the processes used to achieve them.

The results of in-depth interviews conducted using interview scenarios prepared by us were used as the primary source. These were aimed at identifying and analyzing the services provided and demanded in the industrial market and their influence on sustainable development. Interviews were conducted with the Technical Sales Manager in the Performance Materials Division and the Marketing Manager in the Agricultural Solutions Division and took place from January to April 2022. From a total of 11 BASF business divisions, these two divisions were chosen because they have an independent sales office in the Czech Republic and, above all, they offer interesting services to their customers with an impact on sustainability and, especially in the Agricultural Solutions Division, on regenerative development.

The outputs of the article were elaborated on the basis of content analysis, comparison and synthesis of information obtained from the primary and secondary sources.

## 3. Results

### 3.1. Possible Paths to Sustainability in the Chemical Industry

The current strategy for sustainable development has generally evolved from efforts to change the poor condition of the environment, gradually all the way to prevention of this situation (Vezolli et al., 2014), e.g., by changing the materials used, the technology, the amount of energy and understanding customer requirements etc. Current trends towards sustainable development applicable to the chemical industry include the circular economy, principles of Green Chemistry as well as application of a business strategy of servitisation

(Han et al., 2020). These directions can be mutually complementary, enabling manufacturers to achieve sustainability in all three areas (Parida & Wincent, 2019). The success rate in implementing these strategies is very closely related to the use of appropriate project management methods and tools (Kostalova & Tetrejova, 2018; 2014).

In the circular model (3R-Reuse, Recycle, Reduce), the waste generated is reused, recycled or otherwise recovered, thereby reducing consumption of primary material and energy (Korhonen et al., 2018). Materials used in production and energy consumption should in particular be reduced, waste and old used products or their parts should be reused and recycled (Kirchherr et al., 2017).

By applying the concept of Green Chemistry, companies seek to minimize waste, hazardous substances, workplace hazards and inefficiencies in production by designing optimal processes (Linthorst, 2010). This corresponds to Responsible Care, which aims to promote improvement of performance through efficient and effective manufacturing using minimum resources. In 2021, 54 chemical companies in the Czech Republic were entitled to use this logo (<https://www.responsiblecare.cz/companies>). The contribution of Responsible Care towards sustainability consists in particular in implementation of the so-called European Green Deal.

Applying the servitization strategy means the gradual transition of a manufacturer from offering a product, then adding services to go with products, all the way through to offering the service itself is referred to as PSS (Product Service system) (Baines et al., 2007; Baines et al., 2009; Haase et al., 2017; Yang & Evans, 2019). This comprises a system of products, services, support networks and infrastructure designed to be competitive, meet customer needs and have a lower environmental impact than traditional business models (Mont, 2002). PSS is considered to be the most appropriate business model for the circular economy (Michellini et al., 2017). Customers do not buy ownership of a product, they buy the service of using it (D'Agostin et al., 2020). This for example concerns a customer support service, a risk and reward sharing agreement, or payment for use of a product (Baines & Lightfoot, 2014). Companies in the Czech Republic are particularly trying increase the customer value and thus differentiate their offerings through the services (Vlckova & Podskubkova, 2020). Customers can also be offered an entire solution as the highest level of servitisation, where it is up to the manufacturer how to meet the customer's requirements (Geng et al., 2019). Barquet et al. (2016) described five main factors which lead to sustainability of PSS: application of a design for the environment, identification of economic value for all stakeholders, promotion of a change in behavior among customers and providers, definition of actions for social well-being and innovation on different levels. Typical business models associated with servitisation for the chemical industry are chemical leasing, chemical service management, Take Back Chemicals, outsourcing and conventional leasing.

The strategy of servitisation yields the best economic and environmental results, primarily due to cost reduction and efficient use for manufacturers (Annarelli et al., 2020). The advantage for customers is in particular that they gain the desired result without having to deal with repairs and maintenance, release themselves from any responsibility for operation of the product and achieve lower costs relating to care for the product

(Baines et al., 2007; Baines et al., 2009). Manufacturers remain the owners and operators of the products, allowing them to retain their know-how and improve the technologies which they use to generate revenue (Sakao et al., 2013). A positive legislative factor may be reduction of risk associated with regulation of the business and market environment, given the great flexibility of this business model (Sakao & Lindahl, 2015).

Other possible paths to sustainability in the chemical industry include combination of servitisation with green services or digitalization. The aim of green servitisation is to reduce the environmental impact associated with the manufacturing and use of products by offering green services (Marić & Opazo-Basáez, 2019). Digitalization in itself helps to achieve sustainability and in conjunction with sustainable servitisation forms the modern trend of digital servitisation (Kohtamäki et al., 2019). This concerns an offer of intelligent software services allowing for monitoring, control, optimization and autonomous functions.

### *3.2. The Essence of Regenerative Development*

The problem of sustainability is the absence of a holistic worldview, i.e., the perception of the world as interconnected and mutually interacting systems. However, in practice, systems do interact mutually. This has created the need to view the world holistically, i.e., through the principles of regenerative development. Its first definitions appear in architecture, in the context of the built-up environment, when Reed (2007) and Du Plessis (2012) come up with the idea that the process of building can also bring about positive changes within a system and add value to the unique place in which it is located.

Regenerative development is now understood as achieving positive, broader social, natural, financial and human outcomes through expedient investment decisions (Qadir, 2022). In general, sustainable development strategy has gradually evolved from trying to change the poor condition of the environment to preventing this situation from ever occurring (Vezolli et al., 2014). Sustainable development is about using resources to improve the well-being of society in a way that does not destroy or undermine the support systems needed for future growth. In addition to this, regenerative sustainable development is about using resources to improve the well-being of society in a way which builds the capacity of the support systems needed for future growth (Gabel, 2015).

### *3.3. Results – Case Study*

The Performance Materials Division of BASF's Czech subsidiary sells foam specialties and thermoplastic polyurethanes (TPU) which are used, for example, in shoe soles and roofing membranes. In 2021, the annual sales of the entire BASF holding in this division increased by 29.4% compared to the previous year. The Agricultural Solutions Division sells fungicides, herbicides, insecticides and biological solutions, as well as optimizing and developing desirable seed properties. Here, the year-on-year growth of revenue in 2021 was 6.6% (BASF, 2021).

#### *Sustainability Goals of the Holding*

A content analysis of the annual reports from the point of view of their relation to sustainability as presented on the holding's website revealed the following findings.

- The holding is an active member of the Responsible Care initiative. It is focused on innovation of its products and technologies helping to use natural resources more efficiently, produce enough food for everyone, reduce emissions, enable smart mobility without having a negative impact on the climate and improve renewable energy options.
- The strategic objective of the holding is to continue to grow its profitability and make a positive contribution towards society and the environment. To make sustainability a greater force for innovation and achieve higher annual sales by 2025 with Accelerator products (products which meet strictly determined dynamic rules relating to sustainable impacts during manufacturing, use and disposal). This target was already exceeded by almost 10% in 2021.
- The holding measures its contribution towards sustainability via its own Value to Society methodology, which makes it possible to compare economic, environmental and social impacts.
- The holding is a supporter of the UN Sustainable Development Goals and has signed up to the Paris Agreement.
- The long-term goal, based on the Green Deal for Europe or the Paris Agreement, defined for the Czech branch is to ensure zero CO<sub>2</sub> emissions by 2050, e.g. through an intelligent manufacturing system which adds value through the efficient use of resources.
- The short-term sustainability goals are: to use renewable energy, to ensure efficient production and consumption of own energy, to implement sustainable water management, to respect human rights, promote employee diversity and inclusive workplaces, ensure a safe working environment, promote ecosystem protection (e.g. participation in the Waste Elimination Alliance), embrace responsibility throughout the supply chain, improve the supply chain CO<sub>2</sub> management program and to streamline consumption of resources e.g. with the aid of circular economy principles.

#### *Sustainability Objectives of Individual Divisions*

The in-depth interviews conducted with selected managers in both divisions were aimed at specifying and, if necessary, supplementing the sustainability objectives stated in the holding's reports and, in particular, at identifying the services offered and their potential impact on sustainable or regenerative development.

In the Performance Materials Division, the specific goal is to ensure that waste is recycled back into the company by 2025 and used in 40 products. Across the entire holding, the goal is generation of € 17 billion in sales of recycled granulate or recycled end products by 2025.

The following services provided to go with products were identified here: recycling of waste plastic products within the framework of the ChemCycling project, transportation to the customer warehouse with the aid of a third party, introduction of new projects to promote sustainability, education through online courses for the public about new TPU materials and their use, expert advice to customers on injection moulding of TPU, operation of an information center for customers on technical issues relating to plastic products, management of a publicly accessible materials database, processing of product information and measures for declaration of performance and certification of management systems,

materials testing, research and development to speed up the customer production cycle, as well as 3D modelling of products.

The following objectives have been set for the Agricultural Solutions Division throughout the holding: promotion of biodiversity, prevention of soil degradation, protection of water, soil and other natural resources, ensuring effective pest control, avoiding wasteful use of plant protection products, reducing CO<sub>2</sub> production in agriculture, increasing knowledge of agriculture among the general public, ensuring profitability for farmers, promoting higher yields and therefore avoiding famine in developing countries, reducing CO<sub>2</sub> production by 30% by 2030, using 7% more modern technologies with higher efficiency and digitalizing 400 million hectares of fields.

The following services provided were identified: arranging transportation with the aid of a third party, buy-back of packaging, optimization of product use and care for fields via mobile apps (for weather forecasts, soil analysis, identification of diseases and pests, as well as optimization of product application), support for the activities of farmers leading towards the correct use of products, advice on biodiversity, cooperation with other companies and research and development e.g. of smart sprayer functions or sprays contributing towards sustainability.

#### 4. Discussion and Conclusions

A targeted literature search showed that businesses are encouraged by the public, their competitors and also by their customers to find ways to contribute towards sustainable development. In the chemical industry, given the nature of the activities performed there, which significantly affect the environment, current approaches to sustainable development include the circular economy, Green Chemistry and, in recent years, also servitisation.

Through the interaction of these trends, and in particular by embracing digitalization, manufacturers can achieve greater sustainability in all three areas. For example, an offer of intelligent software services enables online monitoring, control, optimization and autonomous functions. However, it is now already clear that sustainability development needs to move beyond this, towards utilization of resources to improve the well-being of society in a way that also builds the capacity of the support systems needed for future growth. This means not merely maintaining the status quo but moving towards Regenerative Development and Design. This takes sustainability to the next level and provides a framework for incorporating regenerative design principles into your current process.

Content analysis, comparison and synthesis of the information obtained, particularly in the field of sustainability targets and services provided, showed that all of these trends are implemented to varying degrees at BASF. Our assumption was confirmed that BASF, due to its size and in particular its strong research base, is not only transforming towards more sustainable business models, but that processes and services leading to regenerative business models are already in the research and development phase.

Both divisions provide basic transport services as well as intermediate services such as professional consultancy, which can to a certain extent contribute to sustainable development, especially in the area of the environment. However, it is offers of customized

research and development services which fall under the green servitisation business model that turned out to be ~~are~~ particularly relevant to sustainable development. One example we can give from the Performance Materials Division is their offer of optimization of the properties of TPU granulate according to customer requirements and, in particular, shortening of the production cycle while maintaining the same manufacturing conditions, which reduces the customer's energy consumption per unit of production. In the Agricultural Solutions Division, this concerns research and development to improve the performance of products such as fungicides or to reduce nitrogen losses in manure, or, in cooperation with other companies, development and application of a capping system for filling of spray tanks which prevents exposure on the part of the operator and the spray dripping on the surrounding area, or a smart sprayer which can distinguish weeds from the crop which is being grown and target sprays effectively.

Both divisions offer digital services which enable application of the highest level of servitisation, i.e., the business model of customized integrated solution providers. For example, the Performance Materials Division offers a final product modelling service to determine the optimum material for their customers' specific manufacturing requirements with a positive impact on sustainable development.

The Agricultural Solutions Division provides farmers mobile applications to monitor, control and optimize the application of products or sowing time and harvesting in agricultural fields, including selection of suitable seeds. It also participates in development and research into these. It uses satellite imaging and photographs to do this. These services, aimed at monitoring, diagnosing and optimizing the agricultural cultivation process, provide not only significant support to farmers but also significantly contribute towards sustainable development. A solution-oriented PSS model is also in the trial phase. This should provide comprehensive services to the landowner to ensure not only the desired yield from a given harvest but also future growth through gradual soil regeneration thus also contribute significantly to regenerative development.

If we proceed from the established facts: (i) the servitisation is seen in the holding as a strategy to secure long-term relationships with customers (as it enhances social, economic and environmental sustainability) and (ii) the holding sees more effective results in the combination of servitisation with the circular economy and digitalization and (iii) the holding is focusing in this direction also the necessary research and development of products, processes and technologies, even beyond the framework of its own company and beyond the framework of sustainable development, although it has not yet explicitly mentioned regenerative development in its strategy, than it is possible to make conclusion about the acceptance of the formulated hypothesis, i.e. that providing B2B services with significant support of own research and development is one of the possible paths to Sustainable even to Regenerative Development.

This case study can thus be a suitable example and inspiration for other manufacturing companies in the Czech Republic to contribute to sustainable or even regenerative development through the expanding offer of B2B services. It is also a way to favourably change the often negative attitude of society towards manufacturing companies, especially



in such a sensitive sector as the chemical industry, with regard to its impact on the environment.

Acknowledgments: This study was supported by a grant from the Fund for Bilateral Relations within the framework of the EEA and Norway Grants 2014-2021 (EHP-BFNU-OVNKM-4-079-2022).

Conflict of interest: none.

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