



Antwerp Diamond Innovation Opportunities

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CITY OF ANTWERP – SANDY CEULEMANS – DIAMOND & INNOVATION MANAGER
THIS REPORT WAS PREPARED BY VERHAERT NEW PRODUCTS & SERVICES BUSINESS

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01 Programme introduction



Antwerp Diamond Innovation Opportunities is a support programme initiated by the City of Antwerp in collaboration with Verhaert, Masters in Innovation.

During this operating year, the city called on a committee of experts to **update the innovation opportunities** for the industry. The city also offered **individual innovation coaching** to four companies. Each innovation pathway is built on one or more priority themes that will be discussed in this report. The envisaged achievements can potentially **offer inspiration** and lessons learned for the diamond industry.

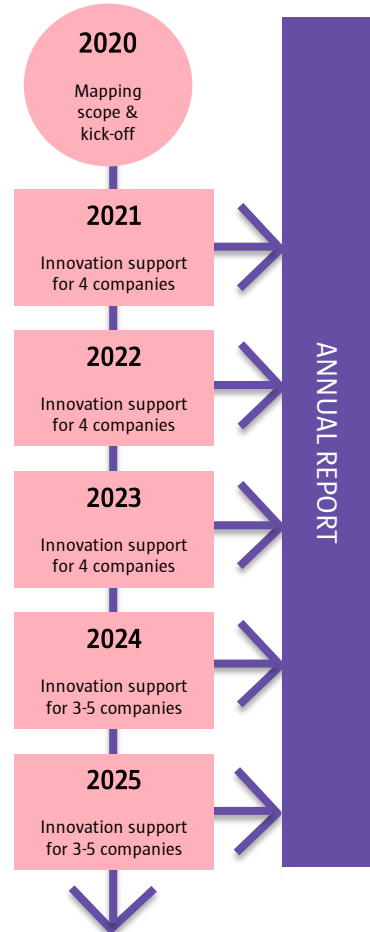
The entrepreneurs discuss the **challenges** they faced, as well as their **solutions**, in a brief interview, and how the coaching helped them to innovate.

Are you **interested in starting up an innovation pathway** in 2024? Find out more about the selection criteria and procedure via the link or email below.

Find out more about the selection criteria and procedure via the link or email address below:

businessinantwerp.eu/diamond

Email: antwerpsmostbrilliant@antwerpen.be



FINANCING



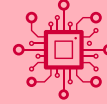
CROSS-INDUSTRY NETWORKING



ROBOTISATION & AUTOMATION



DIGITALISATION



DATA ANALYSIS



SUSTAINABILITY & ESG



02 Executive Summary

The six priority levers for innovation briefly summarized

This executive summary outlines six key innovation topics with immense potential for the Antwerp diamond industry. Embracing these opportunities will drive growth, enhance sustainability, and position Antwerp as a central player in the global diamond market.

1. Robotisation & automation

The integration of planning software and diamond polishing machines poses a challenge, but customized solutions that reduce manual operations can streamline processes, minimize errors, and reduce costs. Diamond entrepreneurs can invest in custom software development and utilize digital twin solutions to achieve accuracy and consistency in diamond cutting comparable to manual cutters. Collaboration with Flemish Strategic Research Centers, subsidies, and innovative business models can further propel automation efforts.

2. Digitalisation

Blockchain-based traceability solutions can enhance pipeline transparency, ensuring ethical sourcing and improving brand reputation. Antwerp can establish standardized protocols and certifications to enable reliable software selection.

ERP software will run businesses more efficiently and can be tailored to specific corporate needs. Finally, embracing digital marketing, sales and online presence can expand reach, attract new customers, and showcase unique craftsmanship and provenance.

3. Sustainability & ESG

Antwerp's leading role in supporting traceability technologies can extend beyond origin verification to convey the positive impact of the industry on society. Initiatives can promote ESG aspects, while compliance with upcoming European legislation on sustainability reporting can attract financing. Collaboration with the Responsible Jewellery Council and other platforms can shape the future of a responsible diamond & jewellery industry.

4. Cross-industry networking

Exploring technology transfers between the diamond industry and other sectors can bring mutual benefits. Traceability technologies can find applications in the medical field, while collaboration with the fashion and design industry can create successful partnerships. Establishing cluster groups across the educational field can address the industry's need for a skilled workforce, while collaborative research with universities will thrive innovation.

5. Data analysis

Data analysis applications can optimize pricing, supply chain management, sales strategies and customer engagement. Research on the potential of data analysis within the diamond industry and utilization of platforms like Uni Diamonds can enhance market insights. Effective interpretation of these data will drive informed decisions and improved outcomes.

6. Financing

Strengthening trust and transparency with financial institutions is crucial to secure access to financial services. The use of digital platforms for KYC information can ease onboarding processes. An "Excellence" quality label for transparent diamond companies can enhance credibility. Foreign banks and alternative financing options can further diversify financial resources.

In conclusion, seizing these innovation opportunities will position the Antwerp diamond industry at the forefront of technological advancements, sustainability practices, and international collaboration. By embracing innovation, the industry can enhance its global competitiveness and ensure a prosperous future.

03 Robotisation & automation (I)

There are numerous opportunities and reasons for diamond entrepreneurs to embrace automation and robotics.

One of the challenges faced today is the **integration of planning software and diamond polishing machines**. When planning software and polishing machines are sourced from different suppliers, it can be difficult to establish direct cooperation between them. Diamond companies are taking the initiative to find customized solutions that reduce manual operations. Automatic integration minimizes errors, speeds up the process, and ultimately reduces costs. A possible approach for connecting planning tools and polishing machines is by utilizing API's (Application Program Interface). However, these are often not offered in existing market solutions.

Another approach is to analyze data files utilized by software and employ custom software development to convert files from one system to another. In such technologies it is common to use open-source solutions to lower the overall efforts. This requires collaboration with software developers or specialized IT teams to ensure security aspects of the solutions. Diamond entrepreneurs who invest in custom software development have the option to **market their developed solution** by offering the self-developed software to the market and selling these licenses through an innovative business model.

Diamonds require extreme precision in their cutting, and the challenge in automation lies in achieving the accuracy and consistency that skilled diamond cutters can provide manually. Firstly, a **digital twin solution** can aid in diamond cutting by creating a virtual replica of the cutting process.

Through the use of advanced algorithms and sensors, the digital twin can mimic the exact movements and parameters of experienced diamond cutters. This enables automation to achieve accuracy and consistency comparable to manual cutters. The digital twin can provide real-time feedback and optimization suggestions to further improve the cutting process. By utilizing the digital twin, diamond manufacturers can enhance production quality and improve the efficiency of the cutting process.

Secondly, synthetic diamonds can be utilized in optimizing existing cutting processes. One idea is to establish a **polishing unit with synthetic diamonds** and test innovative techniques until the highest quality requirements for natural diamonds are achieved. Once the quality standards are met, the same production unit can be used for natural diamonds.

03 Robotisation & automation (2)

The quality achieved by Antwerp's diamond cutting ateliers is unmatched worldwide due to their advanced techniques and processes. It is crucial for the city to **maintain its position** as a central player and compete effectively. The opportunity lies in continuously investing and innovating in this unparalleled Antwerp craftsmanship.

To maintain the city's competitive position, the legislative framework needs to be tailored to robotisation and automation. A first step was taken with the recent abolition of regulated working hours in the diamond industry. More **flexibility and consecutive work shifts** can facilitate the employment of diamond machine operators. In addition, the Syndicate of the Belgian Diamond Industry (SBD) is lobbying for a change in the workshop licensing system, which today still requires the installation of manual, non-automated diamond processing equipment.

On the other hand, when it comes to polishing large size diamonds, there is a significant opportunity for Antwerp players to directly or even exclusively collaborate with diamond-producing countries and implement an integrated vertical pipeline with these countries of origin.

The increasing automation of the polishing process could create a win-win situation for both the countries of origin and Antwerp entrepreneurs, integrating supply, manufacturing and the best sales market.

To **support these opportunities**, the diamond industry can rely on one of the Flemish Strategic Research Centers:

Flanders Make, which aims to enhance the competitiveness of the Flemish manufacturing industry on an international level. Additionally, there are organizations like Sirris, a non-profit organization that assists companies with technical innovations.

These entities can provide valuable support and resources to diamond entrepreneurs looking to implement automation and robotics.

By collaborating with these innovation agencies, the industry can benefit from their expertise, research, and development capabilities to drive technological advancements and stay at the forefront of innovation.

Moreover, **subsidies are available** for diamond entrepreneurs aiming to invest in technological innovation. The Flemish Agency for Innovation and Entrepreneurship (VLAIO) offers various subsidy programs for companies seeking to innovate and integrate automation and robotics into their activities.

It is worth mentioning that there are already companies in the diamond sector that have taken advantage of these subsidy opportunities and successfully integrated advanced technologies into their business.

04 Digitalisation (1)

Today, there are several solutions in the market that cater to the **traceability of diamonds**, enabling the verification of their origin and provenance. Blockchain-based solutions have been present in the market for a number of years, and within the diamond sector specifically, numerous companies have been vying for their position in the market. Given the availability of multiple systems, it is not easy for diamond traders to select the best and most reliable solution. Currently, there is no certification or standard that these solutions must adhere to.

One potential solution is the implementation of an ISO certification for these software solutions. However, obtaining such certification typically requires a significant investment of time and resources. Another approach is to seek involvement from European institutions that are engaged in certifications and standards.

Alternatively, consideration could be given to the development of a SWIFT-like protocol specifically tailored for this application. The protocol could encompass certain standards and specifications for data formatting, communication protocols, security, and verification. It could also define how different technologies, such as blockchain or other traceability systems, can be integrated and utilized to capture and share the necessary information. Crucially, the success of such a protocol would depend on the collaboration and adoption by various stakeholders within the diamond industry. Embracing standardized procedures and technologies would be key.

Digitalisation also plays a crucial role in enhancing business processes and meeting information reporting requirements for luxury jewellery brand houses. Software packages like **ERP solutions** (Enterprise Resource Planning) exist and help to efficiently run entire businesses.

However, diamond entrepreneurs often struggle to find the right providers. Mapping out this ecosystem for the industry remains a significant opportunity. The sector likely requires ERP packages that cater to its specific needs, such as traceability, ESG (Environmental, Social, and Governance) considerations, inventory management for rough diamonds undergoing the cutting process, certification management, and quality control, among others. Agoria (the Federation that supports the Belgian technology industry) has already made strides in identifying relevant suppliers who can assist in making rapid progress within this field.

A third opportunity lies in improving the **online presence** of these businesses. Even though having a professional company website or an active presence on professional social media networks seems obvious today, there is still ample room for improvement.

04 Digitalisation (2)

The internet serves as a crucial source of information for all diamond stakeholders, including banks, customers, investors, suppliers and others. As such, all types of diamond companies can leverage the internet to increasingly showcase their values, unique craftsmanship, and provenance. Notably, lab-grown companies have already made commendable strides in embracing the digital realm, setting an example for the broader industry.

The potential for each individual company to exert influence, educate, and flourish within the natural diamond industry through digital means is immense. By strategically harnessing the power of digital marketing and online engagement, businesses can expand their reach, attract new customers, and bolster their brand reputation.



05 Sustainability & ESG

Within sustainability and ESG (Environmental, Social and Governance) the topic of origin and pipeline transparency plays a significant role today. The market is fundamentally shifting from a quality-based diamond assortment to an origin-based assortment. Antwerp has a leading role in supporting and embracing technologies related to traceability.

The applications of traceability can go **beyond origin alone** and can also convey the positive story about the impact on the planet and its people. How do we protect the planet, and how do local communities throughout the value chain benefit from the diamond industry? Specialized companies are already addressing this by providing **ESG transparency** across the diamond supply chain.

On the other hand, the industry can also become more proactive in supporting local initiatives that promote sustainability or even start their own endeavors: offsetting CO2 emissions through various methods such as reforestation, renewable energy projects and restoring ecosystems.

Making ESG aspects demonstrable to generate interest from investors and attract financing is also an opportunity that will continue to grow.

The upcoming European legislation on **'Non-financial/Corporate Sustainability Reporting'** (CSRD) will soon impact a growing number of companies. As a result, businesses must prepare themselves to conduct Due Diligence risk analyses and implement necessary measures and actions.

Thankfully, **various organizations** such as the Responsible Jewellery Council, the Watch and Jewellery Initiative 2030, AWDC, CIFAL Flanders and VOKA offer valuable opportunities for learning and sharing ESG expertise. These platforms focus on integrating responsible business practices, accelerating positive impacts in critical areas like building climate resilience, preserving resources, and promoting inclusiveness within the industry.

Embracing these opportunities will not only help companies comply with new regulations, but also contribute to a more sustainable and responsible future for the diamond jewellery sector.

06 Cross-industry networking

Cross-industry networking refers to the collaboration, integration, or interaction between the diamond sector and other industries. Exchanging knowledge, resources, practices, and technologies can create new approaches, solutions and innovations. Diamonds are already widely used in **various industrial applications** today, such as in the mining industry for drilling and cutting, in the medical field as surgical tools, and in high-end electronic devices, among others. However, diamonds as a product is not the only valuable exchange that can benefit other sectors. It is also important to explore which technology transfers can uplift other industries.

Traceability software, for example, is currently being heavily invested in for the diamond industry. But **which sectors and applications could also benefit from using this solution?** Could the medical field, for instance, map and document complex processes through such blockchain and AI? And what other technologies could be shared with the space industry, and others?

The other way around, the diamond industry can also **adopt technologies** from other distinct industries, such as spectroscopy applications. Swiss company Synova initially marketed its lasers for other industrial applications before introducing them to the diamond industry. Can the diamond industry draw inspiration from other sectors to address different challenges, such as the CO2 challenge?

The exchange of knowledge can also occur **through collaborative marketing and sales**. Apart from its reputation in the diamond industry, Antwerp also stands as a world-class powerhouse for fashion and design. The combination of diamonds, jewelry, design, and fashion has already proven successful and continues to be stimulated by the city through collab events. Recently, Baunat (Diamonds) and Tesla, two digital native brands, have started collaborating on luxury events because they target the same audience, the smart buyers.

Given the current context of an aging workforce, it is essential for the industry and the **educational field** to collaborate

and ensure a steady influx of skilled, young polishers, sorters, and graders. The existing Education Covenant, an MOU between industry stakeholders, the educational field and the city aims to strengthen the future labour market.

The University of Ghent recently introduced a course on "Introduction to the Diamond Sector." In addition to this new initiative, experts see an opportunity to establish a cluster group across universities to educate on topics such as diamond business, materials, technology, legal aspects, and more.

The faculty of science at the University of Antwerp engages in collaborative research with private companies on diamond physics. Additionally, the Antwerp open innovation hub for sustainable materials, BlueApp, aids companies in developing and preparing promising sustainability technologies for market exploitation.

At IMO-IMOMEC, the integrated research institute of UHasselt and imec, international scientists conduct research on CVD diamonds for high-tech solutions, such as quantum computing.

07 Data analysis

An effective level of digitalisation is a prerequisite for processing data. Data analysis applications require sufficient and timely available input. The types of collected data can encompass both industry-level and corporate-level information. Until last year, Bain & Company and the Antwerp World Diamond Centre (AWDC) jointly published an annual report on macroeconomic industry performance and trends in the global diamond sector.

The consulted experts indicate that they are **not enough familiar with the possibilities** of data analysis within the sector. This already presents an opportunity to conduct thorough research on the potential of data analysis and relevant applications for the various stakeholders in the diamond value chain.

Data on **market prices** already exist in the sector and are marketed through platforms such as Uni Diamonds, IDEX, Rapaport, Tenoris, etc.

With these solutions, diamond traders can track market prices in real time and optimize their pricing strategies and inventory management.

On the other hand, experts emphasize the importance of knowing your own niche market, and since the sector is relatively small, there is a perception that one already knows the performance of the market and the prices of the competition well.

In addition to insights on market prices, there are numerous data analysis applications with **significant untapped opportunities**. For example, data analysis can play a role in identifying trends and patterns in customer behaviour, enabling personalized marketing and sales efforts that lead to more profitability and an increased customer loyalty. It can also help detect bottlenecks in the supply chain, identify suspicious patterns that may indicate fraud to strengthen the sector's integrity, and enable predictive maintenance of production machines, among other things.

Analyzing the collected diamond data is merely the starting point, as effective interpretation of the data and formulating relevant actions based on the insights obtained are equally crucial. The true value of data lies not only in its collection but in how it is comprehended and utilized to drive informed business decisions and meaningful outcomes.

08 Financing

The Basic Banking Service is the right for every Belgian business to minimal banking services such as access to a bank account. The initiative has only come into effect this year, when the Royal Decree was published so the impact is still unclear.

For the diamond industry to increase/regain the interest of financial institutions, it is essential to **strengthen the trust and understanding** of banks in the sector. This includes transparency at company level and keeping all relevant compliance data accessible easily and up to date for the banks.

When establishing new investor relationships, the main challenges revolve around collecting and accessing **Know Your Customer (KYC)** information and **Transaction Monitoring** data on new customers.

As part of the 2022 Antwerp Diamond Innovation Opportunities Programme, AWDC explored solutions aimed at enabling banks to more conveniently access all the essential documentation required to familiarize themselves with a new diamond trader. Such a digital platform will not only reduce costs for banks but will also increase credibility, as organizations like AWDC and FOD Finance (Federal Public Service Finance) could **automatically transmit information** to the system. On the other hand, diamond traders will need to make less effort to provide the required onboarding documentation to their bank. This creates a win-win situation that benefits all parties involved.

The next tier is to implement an **"Excellence" quality label** for diamond companies that display the highest level of transparency.

These days unlike Belgian institutions, foreign banks appear to be more open. Diamond companies may thus consider looking for banks and investors outside the Belgian market. This presents a significant opportunity for innovators to find solutions for their financial needs.

New financial products and **alternative forms of capitalization**, including inventory financing, factoring, and forfaiting, have become available for the diamond industry. However, there is still a need to explore and fully embrace these options.

09 Interview Baunat

BAUNAT, founded in 2008 in Antwerp by Steven Boelens and Stefaan Mouradian, is a leading digital native diamond jewellery brand. The brand is known for its commitment to customer centricity, exquisite craftsmanship, personalized offerings and constant innovation. 65% of Baunat's clients purchase online in more than 50 different countries. The company also has 12 showrooms, located in 9 different countries.

Innovation challenge

Today diamond jewellery brands are encountering a fresh wave of customers driven by ethical considerations and a digital mindset. These discerning consumers seek an engaging purchasing journey that emphasizes transparency and reliability. Consequently, BAUNAT places a high priority on transparency across all aspects of their operations and focuses on upholding ethical practices and governance. To cater the diamond jewellery consumers who desire thoughtfully and ethically crafted pieces, BAUNAT is committed to constantly innovate their product offering and customer service. This includes sharing the unique story of the diamond journey, adopt state-of-the-art traceability technologies,

and look for ways to create a captivating in-store and online shopping experience. These endeavors collectively highlight BAUNAT's innovative and disruptive approach within the diamond jewellery market.

Solution developed

The project started with an evaluation of BAUNAT's current customer touchpoints in the sales process, utilizing mystery shopping and the creation of a service blueprint to assess their ESG (Environmental, Social, and Governance) presence.

During this process, the company's ESG philosophy and credentials were formulated, leading to the emergence of inspiring marketing communication headlines. Together they thoroughly explored various traceability technologies based on blockchain and carefully selected the most suitable application.

Finally, Verhaert developed a prototype for a new packaging design, intended for the future BAUNAT traceability collection, serving as an instrument for the ESG communication strategy.

How did the coaching enable you to accelerate?

The coaching from the experts made us realize a lot of our business practices already revolve around the ESG-values and meet our consumer's demand. By asking us the right questions and challenging certain topics the team discovered many low hanging fruits within the traceability project.

“Taking part in the Antwerp Diamond Innovation Opportunities programme helped us to realize our CSR & ESG communication strategy needed to be improved. This trajectory also allowed us to enhance the customer experience, by integrating facts & figures that are self-evident to us, but of great added value for our clients.”

More info on www.baunat.com



Steven Boelens
Executive Director



Leslie Ruijs
Marketing Officer

10 Interview M.S.D. & Flanders Diamond Manufacturing

Antwerp is home to the best and most creative master polishers worldwide. The city continues to be the place for prototyping and pioneering developments within the industry.

M.S.D. and Flanders Diamond Manufacturing are two innovative diamond polishing companies specializing in the polishing of large-size diamonds. To create the perfect diamond that meets the demand of high-end luxury brands a continuous investment in new technologies such as lasering and automatic polishing machines is needed.

Innovation challenge

In the continuous quest to further optimize the automated diamond polishing process both companies are looking to improve the data transfer between the planning tool and automatic diamond polishing machines. Due to the absence of automated integration, manual entry of data into the polishing machine is required after completing the planning phase. This lack of seamless integration raises the risk of inaccuracies that could negatively impact the value of the diamond.

Furthermore, the presence of planning tools and polishers offered by various independent suppliers on the market further complicates the standardization of synchronization between different systems. Both companies want to innovatively challenge these efficiencies as further automating the polishing process can yield substantial time and cost savings during the transformation of rough diamonds into polished.

Solution developed

In the research project, system engineers examined multiple potential solution directions. Since off-the-shelf solutions were not available, several custom-made software solutions were explored, suggested and validated. The technical approaches revolve around file conversion and screen capturing using OCR technology. Through the utilization of these technologies, data can be effortlessly and accurately transferred from the planning software to the ultimate polishing machine. All developed scenarios are realistic, and a positive ROI is foreseen on the mid & long term.

How did the coaching enable you to accelerate?

We've always realized that seamless data transfer is at the heart of our state-of-the-art automated production process. Now, thanks to the expert team we've managed to identify in a structured manner a number of possible solutions that we can go ahead with.

“With this project the Antwerp Diamond Innovation Opportunities programme strengthens the position of Antwerp as the unmatched polishing center for large-size diamonds.”

More info on polishing or repairing large size diamonds:
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Danny Meylemans
Owner M.S.D.



Hans Franckx
Owner Flanders Diamond Manufacturing

11 Interview Wouters & Hendrix

Since 1984, Wouters & Hendrix designs and makes uncommon jewellery in their Antwerp atelier. Born in an avant-garde moment the company bends the rules of traditional jewellery. In 2016, they have been awarded the Antwerp's Most Brilliant Label (*), a consumer quality label, granted by the city of Antwerp and the Antwerp World Diamond Centre.

As a proud member of the Watch & Jewellery Initiative 2030, this brand embraces the responsibility to act with integrity, help preserve the natural world and empower those it encounters.

Innovation challenge

A more sustainable jewellery operation requires increasing production efficiency, using less energy and generating fewer waste.

Since it is difficult to predict market demand, the stock risk and material waste associated with seasonal collections is considerable. Both could be reduced when substituting forecasts by actual pre-ordered quantities. To achieve this, the product development process (lead time) should be reduced.

How can new technologies make the production process leaner while preserving premium quality and the brand's authenticity? How to incorporate the unique craftsmanship into designs without relying solely on manual prototyping? Thirdly, how can we contribute to the Watch & Jewelry Initiative 2030 goals and better preserve our planet's natural resources?

Solution developed

One key area lies in reducing the design labor hours; particularly when multiple sizes (5-10) of rings are produced, which can be very time-consuming.

Leveraging scanning technology, it is possible to scan a handcrafted ring and automatically generate a digital model. This model can then be easily scaled, enabling the efficient design of multiple sizes. The resulting designs can be printed using 3D technology, leading to significant time savings.

Another approach for rapid prototyping is 3D design, as opposed to 3D scanning. This involves utilizing 3D modeling software to construct a digital model. While the applicability of this technique may decrease with increasing design complexity, it proves to be an efficient solution for less complex ring designs.

To ensure a favorable return on investment, it is crucial to consider the costs associated with scanning systems and 3D printers. While a quality 3D printer can be found for as little as 1000 euros, investing in a scanner with high-resolution capabilities may entail a more substantial financial commitment.

These technologies not only offer an interesting business opportunity with re-shoring options, but also contribute to lowering the carbon footprint and reducing raw material waste by eliminating the need for grinding and sawing.

How did the coaching enable you to accelerate?

From start of the trajectory the expert team illustrated a very good understanding of our goals. We learned from the structured approach and the gradual development of our case. This experience has strengthened our belief we can combine innovation and craftsmanship without renouncing from our values.

“We will keep exploring new ways to source, operate and create in harmony with our employees, our stakeholders and our customers.”

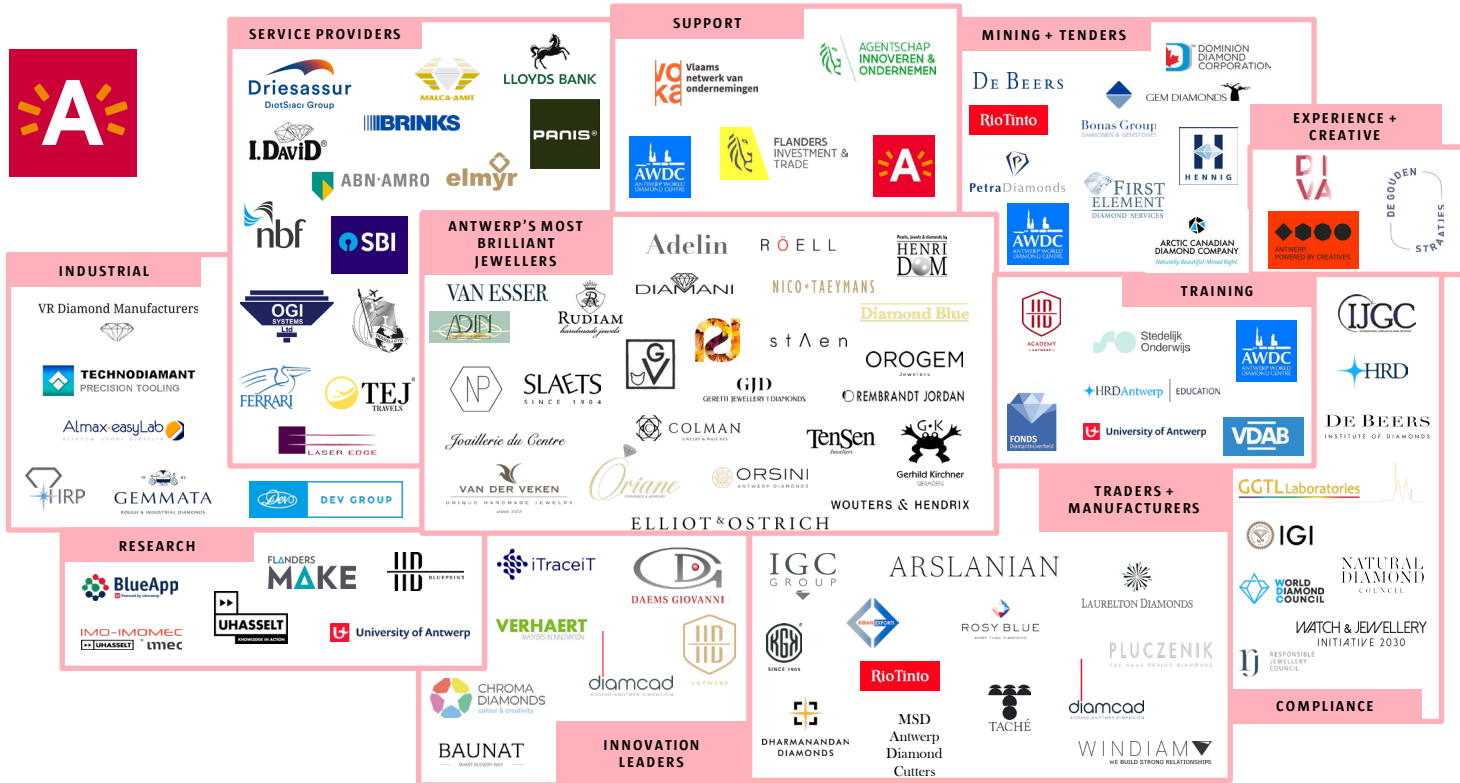
More info on www.wouters-hendrix.com



Elise Taillieu (CEO) & **Marco Schillemans** (COO)

(*) Jewellers comply with nine quality requirements, addressing sustainability, reliability, transparency and company stability, reviewed biannually.

12 Visual mapping Antwerp diamond ecosystem



We would like to thank the experts for sharing their personal business experiences.



Melissa Smet
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Syndicate of the Belgian
Diamond Industry



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Commercial Director
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Dominique Roose
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Vijay Goel
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