An Inclusive and Circular Value Chain: Armor

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Armor is a French medium-sized company specialized in printing consumables. Based in Nantes, and with 25 sites across the world, the company has 1800 employees and had a turnover of 245 million euros in 2016.

The overhaul of Armor was driven by a simple observation. When Hubert de Boisredon joined the company in 2004, he stated, in clear terms, that the business would die unless it completely overhauled its model.

de Boisredon found a company dogged by a tense social environment and stifled by a vertical management structure. Its financial information was so opaque that it was difficult to identify the profitable areas of the business. Its *Thermal Transfer* ribbon business, named Armor Industrial Coding and Printing—one of the company's key revenue drivers—had received no investment for three years. Its ink cartridge business, meanwhile, was making a significant loss. The advice from banks and investors was to shut down this area of the business, putting 800 jobs at risk. The shareholder family intended to sell the company in the medium term.

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Through a combination of personal conviction and economic necessity, a decision was made to transform the company's business model to secure its long-term survival.

Additional investment was needed in the core business, Thermal Transfer. A 50 million euro investment plan was launched, against a backdrop of the total Group turnover of 140 million euros. Several directors were replaced in order to build a team that would support this long-term project. The company's international focus was strengthened, and work was undertaken to promote and resurrect its ink-related business.

This was at a time prior to the French government's environmental roundtable discussions, when the concept of the "circular economy" had not yet been popularized. Armor was already making "remanufactured" ink cartridges, but these products were almost treated with embarrassment by sales staff, who failed to promote their potential benefits to customers. The new idea was to make sustainable development, a central component of the company's strategy, focusing on transforming a process that could be seen as a source of costs into something that was economically profitable.

Many companies treat CSR as entirely separate from or an accessory to their main business. Instead, Armor leaders prefer to use the term "societal innovation," with the understanding that these activities play an important role in improving society as a whole, and can potentially transform every aspect of a business. So the intention of Armor's leaders is to make societal innovation an integral part of Armor's business model, driven by a strong belief that this innovation is critical to its long-term future, as well as to the human race, the environment, and the profitability of the economy in general.

1 The Company's Profile

Armor was built on a series of technological breakthroughs in printing technologies, and a creative, diverse approach to its business activities.

Galland et Brochard was founded in Nantes in 1922 in response to growing demand for carbon paper. The business rapidly expanded to

become an industrial enterprise, opening a factory at the Chantenay site in 1956. Less than 10 years later, the company (now known as Armor) was already France's leading film and carbon paper manufacturer. Armor went on to develop ink ribbons for typewriters, followed by fax rolls.

In 1983, Armor became the first company in Europe to use Thermal Transfer ink film technology, the world's most widespread product identification and tracking system used in applications such as bar-code labels, use-by dates on food products and washing instructions on clothing labels. A new factory was opened in La Chevrolière near Nantes in 1990 and doubled in size in 2006. Armor is now the world's leading supplier of Thermal Transfer consumables. This business, Industrial Coding & Printing, accounts for around 70% of its turnover.

Armor also invested in inkjet and laser cartridges technologies in 1992. Inkjet cartridges are produced in Poland and are destined primarily for retail customers, whereas black and white and color laser cartridges are produced in Morocco and are mainly sold to business users. This area of its business representing the other 30% of its turnover is consolidated under Armor Office Printing activity. Armor has become the leading European producer of compatible consumables for printers, offering cartridges that comply with original patents. The decision that has been made within the transformation of the Group is to focus the production of laser cartridges only on remanufacturing, instead of new-built cartridges. This is part of Armor commitment toward the protection of the environment as within the European market, only 20% of laser cartridges are remanufactured. Today 140 million laser cartridges are sold every year in Europe, amounting 140.000 tons of materials. Only 20% are recycled, then more than 100.000 tons are sent to garbage dumps or incinerated.

Beyond the remanufacturing of printing cartridges, Armor's know how is based on two strategic competences: *chemical formulation* (more than 40 tons of ink manufactured each day) and *thin-film coatings*. These skills have been traditionally used for the thermal transfer activity. Hubert de Boisredon, at his arrival at Armor, invited the team to innovate beyond the traditional printing consumables. Following several brainstorming sessions, two new business areas appeared: coated

collector films that improve the performance of electric batteries; and photovoltaic films.

Battery manufacturers and their customers have extremely demanding requirements. *En' Safe*™ offers a practical solution to these requirements. The product is an innovative new type of current collector, made from coated aluminum thin-film. This technology boosts battery performance and lifetime and has potentially new applications for laptops, electric vehicles, etc. With the release of this new type of technology in 2015, Armor is setting its sights on high-growth markets. Armor develops individual products tailored to its customers' specific requirements, with all products designed for industrial production. A total of 15 million euros has been invested in this new activity. An additional 30 staff will be recruited by 2020, with an expected turnover of 30 million euros.

Armor has developed a new organic photovoltaic film technology capable of converting light into electricity. This new technology does not use any rare metallic elements, avoiding the need to consume mineral resources. The aim of the *Beautiful Light Project*© is to develop photovoltaic films and solutions capable of transforming any surface that is exposed to light into a source of energy. This new development unit is expected to reach a threshold of profitability in around 2025. The first modules of flexible photovoltaic films, called *ASCA*©, are already available for industrial applications. Armor has invested 40 million euros in this new activity and is expecting a turnover of 30–50 million euros by 2022–2025.

"By developing innovative, practical solutions to support the energy transition, Armor is seeking to promote 'made in France' cutting-edge research and technology." (Hubert de Boisredon)

Armor's growth model is based on the concept of coindustrialization, according to which the Group's international expansion drives the development of its French production facility. At its site in Nantes, Armor manufactures vast jumbo rolls of semifinished products for its Thermal Transfer business and has 24 logistics and industrial cutting facilities that transform these semifinished products into ribbons designed for various types of industrial printer. With sites on every continent, this ensures that the company is able to meet the needs of local

customers while limiting the environmental impact of its logistics activities. Emerging countries are also a major driver of the Group's growth. Export sales account for 80% of Group turnover outside France, and around 50% of its turnover outside Europe.

After graduating from HEC in 1986, Hubert de Boisredon set off for Chile where he worked for *Banco del Desarrollo*, founding Chile's first venture capital company. He then joined forces with a friend to found *Contigo*, a microloan company that he led until 1993. He then embarked on an international career at the chemical company *Rhône-Poulenc*, which later became *Rhodia*, then *Solvay*. Keen to take on a long-term entrepreneurial and industrial challenge, he decided to lead a medium-sized enterprise, joining Armor first as managing director in 2004, then chairman and CEO from 2008 onwards. He believes that Armor combines the enterprising spirit of Contigo bank and the multinational experience of a major industrial group. He set about introducing a participatory management culture, founded on the principles of trust and entrepreneurial dynamism. Hubert de Boisredon was chosen as *Entrepreneur of the Year* for the Western France region in 2013.

As part of the overhaul of the business, a major shake-up occurred at the top of the company in 2008. A total of 13 people were replaced. The former 16-member management committee was subsequently replaced with a smaller governance structure, featuring a five-member general management committee, plus specific executive committees for each business and three cross-functional committees (a sustainable development committee, a communication committee and an innovation committee).

This new governance structure is designed to be closer to the front line and to foster greater responsibility among staff. Executive committee members are responsible for the overall management of their business, in particular, through developing internal partnerships between departments. Some 90% of decisions are now managed directly by operations teams.

Moreover, the introduction of a general management committee has created a more collegiate management structure which is responsible for defining the Group's future direction and overseeing areas of joint responsibility.

In 2013, majority shareholder *Orfite* was preparing to sell its stake. Given the real risk that the Group could be taken over by a foreign competitor or a speculative investor, the management team decided to purchase Orfite's shares in 2014, with the support of the Group's banking partners.

The adopted model, known as *Capital Management and Industrial Innovation (CMII),* combines both investor-based and social capitalism and is underpinned by a family business model. From the investor-based model, Armor has adopted the requirement of being a profitable business, communicating regularly with its financial partners, and supporting growth through investment. From the family business model, it has adopted the need for long-term investment in innovation, as well as staff involvement.

This model is founded on the long-term, personal financial commitment of the management team, a decision to make shares available to employees through the company savings plan, and the support of regional private equity investors. The management team and employees (including 300 employees who became shareholders in January 2015) now own a total of 57% of the Group's shares and 73% of its voting rights.

Armor has also received a vote of confidence from several new capital investors, with *Arkéa Capital Partenaire* investing 25 million euros, alongside *Ouest Croissance, Siparex,* and *Amundi PME Partenaires*.

Because Armor uses solvents in its activities, the Group addressed the question of site and personnel safety, as well as the impact of its activities on the environment, at a very early stage. Hubert de Boisredon deploys a strategy that is supposed to be adopted and reflected at local level by all employees. Armor's Vice-President, Industrial and R&D Operations, Christophe Derennes, is also a keen advocate of safety and societal innovation.

Responsibility for implementing Armor's strategy rests on the collective shoulders of its employees. In 2009, all Group employees were involved in a participatory process of selecting four core values to guide their professional conduct. The four values selected were humanism, innovation, commitment, and customer focus. Working groups within each subsidiary review day-to-day practices against these values on an

annual basis, identifying areas for improvement and establishing practical action plans.

The Group has adapted its governance and procedures to reflect the challenges posed by sustainable development and local issues specific to each site. This decision was taken under the authority of the *Quality Assurance, Societal Innovation, and Sustainable Development Division*, under the same Director, Annabelle Guillet, who is part of the Executive Committee. The Group's CSR governance structure comprises the following entities:

- The quarterly *Sustainable Development Committee*
- A network of coordinators within subsidiaries
- *Dec@plan* and *Alternative Print Program* project managers, who coordinate the steering committees for these two programs in France.

According to Armor leaders, CSR aspects are connected and have a combined impact on the quality of human relationships within the company. These relationships, in turn, foster stable human resources and drive profitability.

Improving the social status of its 1800 employees across all of its sites is one of the objectives defined by Armor leaders. It is seeking to achieve this aim by focusing on providing high-quality jobs, with 96% of its global workforce on permanent contracts. The need for balanced social dialogue through effective employee representation is also taken into account. In addition to the statutory representation bodies, there are also a number of local initiatives designed to encourage discussions on socioeconomic themes with management.

Thus, two participatory programs for continuous improvement have been deployed since 2008: Dec@plan for the *Armor Industrial Coding & Printing* activity, and the Alternative Print Program (APP) for Armor Office Printing activity. In both cases, the objective is to work on various themes involving employees, and some staff representatives: responsible purchasing, waste management, human development, eco-design, environmental impact, territorial integration, health and safety, energy, sustainable transport and social life for the Dec@plan; eco-design, responsible production, engaged collection, material recovery, human

development, and societal involvement for the APP. Each axis can lead to the implementation of several development groups to address specific topics. Thus, the Human Development Axis is divided into several working groups: the integration of disabled workers, retention in employment of older workers. For instance, the group *Maintaining the employment of seniors* has contributed to the implementation of several initiatives: the reorganization of end of career planning, and the tutoring of younger employees.

In 2011, the Group signed the *Diversity Charter* in France. This charter encourages businesses to promote diversity within their workforce.

In terms of access to employment for disabled people, some 6% of Armor's workforce was disabled in 2013, which is the legal minimum. According to the latest data available from AGEFIPH[2], the direct employment of disabled workers in France was 3.1% in 2012 (compared to 3.0% in 2011). The objective of Armor leaders is to fully integrate these employees into the company.

The company has produced a *Comparative Status Report* on gender equality, in line with statutory requirements, and has established a monitoring mechanism for the *Equality Agreement* signed in 2011. The first step was to make changes to the recruitment process to ensure genuine equal opportunities at every stage. Following the extensive consideration of inter-generational employment matters, the Group may well introduce a new age management policy with a view to simplifying the retirement process and introducing a mentoring system to encourage knowledge transfer.

Training needs are identified during annual performance appraisal meetings, as well as through so-called later-stage career meetings in France. In 2012, the ongoing training budget accounted for 3.1% of the total wage bill in France (i.e., 2.5 times the statutory requirement under French law). The Group is also developing separate training programs in the USA, Brazil, Poland, and Morocco. The launch of *Armor University* in France is the first stage of a more ambitious project, under which the Group is aiming to become a training organization in its own right. This will ensure that it is able to boost the skills of its employees. In 2010, new facilities were installed at the La Chevrolière site to enable employees to obtain vocational qualifications, including *Facility*

and Automated Machine Operator certificates—a higher level vocational award whose training is delivered during working hours. Armor handles all the associated administrative formalities and ensures that the necessary human resources and equipment are in place.

In light of the nature of its activity, Armor has recognized the need to mitigate the environmental impact of its activities at an early stage. These considerations are incorporated into its corporate strategy, along with detailed action plans.

An environmental management mechanism for the Group's subsidiaries is currently under deployment. In 2012, Armor's site in the USA obtained ISO 14001 certification (ISO 14001 is an international standard which specifies the requirements for an environmental management system that applies to those environmental aspects that the organization identifies as those which it can control and those which it can influence), following in the footsteps of its French, Polish, and Moroccan sites. Activities in this area include regulatory compliance, waste collection and treatment and, at certain sites, significant reductions in energy and water consumption and ecosystem preservation.

Two of the Group's businesses are continuing their efforts to reduce the environmental footprint of their products:

- Armor Industrial Coding & Printing focuses its efforts on ink ribbons and the associated production process. Through concerted R&D work, a range of *Solfree* solvent-free ribbons has been launched. Armor is the only company in the world that manufactures this type of ribbon.
- Armor Office Printing focuses its efforts primarily on the second lifecycle of ink cartridges, through collection and recycling, the production process and the selection of components.

In November 2011, Armor became a signatory to a voluntary national agreement covering the collection and processing of cartridges. Under this agreement, companies undertake to increase the volume of cartridges that are collected by 5% per year. This is primarily achieved through the provision of user information and the development of the collection point network. These waste cartridges are then used to

produce remanufactured cartridges or are dismantled and the materials recycled. 100% of cartridges are recycled.

Since 2009, French sites have conducted regular assessments of the greenhouse gas emissions associated with their activities with a view to measuring and reducing their climate impact. Significant reductions have already been achieved through more efficient use of raw materials, significant reductions in energy consumption, and the promotion of the use of public transport among employees. For instance, an incinerator has been installed at the Chevrolière site which, through acting as an energy recycler, reduces gas consumption by 80%: the energy released by the combustion of solvents is reused in the process of heating water. Armor has made a firm commitment to supporting France's leading role in the COP21 Conference (the United Nations Framework Conference on Climate Change that took place in Paris in December 2015, at which nations presented their commitments to restricting climate-change-related temperate changes to less than 2° Celsius).

By acting in line with these values, Armor also seeks to improve its day-to-day practices toward both its customers and society as a whole.

Armor has a quality management system which helps to make its production sites more competitive. A total of 28 staff work exclusively on quality inspection. Customer satisfaction is said to be at the very heart of the system. Armor conducts regular surveys to measure the impact of its activities. In 2012, 93.7% of Armor's customers worldwide stated that they were satisfied or very satisfied.

By developing high-quality relationships with its suppliers, Armor wants to deliver impeccable products that comply with all patent and intellectual property requirements, while limiting the impact of its purchasing activities on the environment. In France, its suppliers undergo annual performance reviews which include meeting CSR criteria. The Group's subsidiaries are encouraged to select local suppliers with a view to supporting the local economy and limiting the distance over which goods are transported. Audits and visits of all suppliers are undertaken throughout the year. Through its relationships with local partners, the La Chevrolière site injects yearly more than 1 million euros of investment into the economy of France's Loire Atlantique region.

Responsibility is likely to become a determining factor in customer decision-making. In line with this vision, the Group's marketing campaigns are supposed to be now more transparent about issues such as customer guidance, product usage, and the selective sorting of end-of-life products. Moreover, Armor is working closely with public authorities to improve transparency within the ink cartridge market, including environmental labeling. For example, Armor was involved in the government's printer cartridge environmental labeling project under the environmental roundtable laws. As a result of this project, Armor Office Printing was able to demonstrate the feasibility of measuring the environmental footprint of its products, and subsequently produced a methodology reference guide, which was formally approved by the French Environment Energy Management Agency (ADEME) in April 2014.

2 Armor's Business Model

Armor is a profitable company that posts substantial rises in turnover year-on-year. This strong financial performance is critical to the Group's ability to fulfill its social commitments. In other words, Armor leaders consider that there is a direct correlation between its economic and societal performance.

The company's societal innovations are intended to benefit its employees, its customers and partners, the company itself, and society as a whole.

The main priority of the circular economy is to reuse products without additional processing. Where that is not possible, all cartridge materials are recovered and processed. Furthermore, the provision of the materials assessment report to companies and public authorities helps to support the Group's CSR policy, particularly in respect of ISO 26000 audits (an international standard that provides guidance on how businesses and organizations can operate in a socially responsible way) and the annual CSR report. Armor is a member of the *Institute of Circular Economy* that helps economic actors leave the current linear system (extracting, producing, consuming, and dumping) behind, and develop more circular business models.

In 2009, at the height of the financial crisis, Armor saw laser cartridge sales rise by 40% following the introduction of the Alternative Print Program (under which 100% of laser cartridges produced by Armor are remanufactured). This is a prime example of an environmental decision that has delivered financial success. It is because of this differentiation factor that the business returned to profit, having seemingly been doomed to failure 10 years previously, prior to the shift in focus toward sustainable development. We should also mention the situation of 2008. At this time, companies faced two challenges: an economic one in terms of the need to reduce their costs in times of crisis, and an ecological one, since the *Grenelle Environment Forum* ("Grenelle de l'environment"), an open multi-party debate in France that defined French ecological ambitions in 2007, raised awareness of the importance of sustainable development. This is also the year when Armor decided to communicate about the remanufactured cartridges.

From a purely economic perspective, the OEM business is the most profitable activity, since it is less expensive to manufacture new cartridges than to produce remanufactured cartridges. The strategy in this segment is clearly based on the concept of "new," with the aim of generating the maximum possible margin on consumables (80–90%). Armor sells its recycled cartridges at 30–40% less, for the benefit of its customers, and therefore has a reduced margin on these products. However, this model delivers sufficient profit, provided that there is a high volume of sales.

Wouaid Nouri, Director of Management Control, clarifies this approach: "Yes, our prices are lower, our costs higher and our margin is lower than that of our competitors. But it is enough because we do not have the weight of the OEM's structure or the need to fund the development of printers. This is a margin that we call "reasonable" to the extent that it is important for our identity to maintain this link to sustainable development. Our products [have] interested the major French banks and major groups - including the CAC40 listed [ones] - which environmental concerns continue to increase. It is our heart target, especially since they are accountable to their CSR. We bet that the consciousness of environmental issues will continue to increase, including in small structures."

The model, therefore, has a dual positive impact:

- For Armor, recycling is an important sales argument, as proven by its turnover: the company currently supplies products to six out of ten French banks and various CAC 40 listed companies,[3] and has become a key player in the printer cartridge sector.
- For customers, this model delivers savings, enabling the company to promote this activity as evidence of their own societal commitment.

Customers seem to value the three different characteristics of Armor Office Printing System, which thus appear as factors of differentiation and competitiveness:

- The quality of the cartridges, due to Armor's industrial expertise
- The low cost of the products
- The environmental dimension and the limitation of carbon footprints.

Having been in fourth place in 2004, Armor is now the world leader in thermal transfer (industrial coding & printing), having 25% of the global market share and more than 50% of the European market share. (Table 1)

Table 1 Thermal transfer business: Market share by volume and competitors (2014)

Company	Country	Market share (%)
ARMOR	France	25.6
DNP	Japan	19.4
IIMAK	USA	16.8
ITW	USA	8.6
Ricoh	Japan	6.4
Zhuorim	China	3.7
Dynic	Japan	3.1
Fujicopian	Japan	2.9
Others	Others	13.5
TOTAL		100.0

In environmental terms, the major challenge facing the Thermal Transfer business is to reduce the volume of material used in product design. Engineers are focused on designing products that have the minimal possible impact on the environment. For example, reducing the volume of materials that is used helps to drive down oil consumption, reduce production costs, and therefore keep product retail prices down. As a result of these efforts, a finished roll of the same weight can be longer and therefore cover a larger surface area, resulting in a 10% reduction in material consumption on a like-for-like basis. This, in turn, enables industrial customers to increase the time that each roll lasts by 10%, thereby helping to improve their competitiveness.

As with the Solfree process (that eliminates solvent usage in the production process), there is a dual environmental and economic objective: to create a beneficial impact and help to keep costs down over time, despite fluctuations in the price of oil.

The aim of Armor University is to develop the Group's personnel and transform skills into qualifications. It also helps to meet employees' needs in terms of career progression. The investment made in Armor University is designed to ensure that the Group has well-trained and skilled personnel and to develop support and loyalty among employees and labor relations partners.

Working conditions have improved significantly as a result of the management changes. "Tensions may still arise, but conflicts are a thing of the past, since decisions are now made on a consensual basis," explains Christophe Derennes, Director of the Thermal Transfer Industrial and Expertise Centre. By making shares available to employees, Armor has enabled each individual staff member to take a more proactive role within the business. These measures generate measurable positive impacts, with minimal staff turnover, participatory recruitment, infrequent resignations, and a low absenteeism rate. This, in turn, helps to boost the company's profitability. The numbers speak for themselves (Table 2)

The company has increased in value as a result of this new strategy. The Rufenacht family would have been unable to sell the company in 2008 on such beneficial terms without the extensive program of investment that put the company back on the right track 4 years earlier,

Table 2 Absenteeism and Resignations since 2004

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Absenteeism (%)	780	788	490	453	570	540	423	325	288	297	312
Resignation	15	14	31	22	18	4	5	9	4	4	4

despite the negative and uncertain economic environment. In a similar vein, in 2008 (just 2 months after the collapse of Lehman Brothers), industrial private equity firm *Orfite* demonstrated its faith in Armor's business model by acquiring an 85% stake in the business. This event suggests that, at least in the case of Armor, societal innovation has a demonstrable positive impact on a company's value and its ability to generate profit in the future. During a period of crisis—and perhaps even *because* of the crisis—the company's decision to adopt a different approach to its competitors generated interest within the market for its value proposition. In short, businesses are now more sensitive to cheaper, environmentally friendly, high-quality printing solutions.

Armor has 90 years of experience in innovation and expertise within its sector. As a result, it is a recognized specialist in printing technologies. Armor has been involved in several technological breakthroughs in the printing industry, whether in the driving seat or in a supporting role. Armor's engineers, for example, have designed robots to boost the company's productivity.

Armor is positioned as a company that offers a very high level of service quality. It is able to do so through its coindustrialization system, under which rolls are processed on-site, on-demand, and to exact printer specifications. Armor is, therefore, able to deliver to 84 countries in no more than three days.

R&D is a key driver of each and every one of Armor's businesses. It is through this constant effort that the Group is able to remain competitive. The decision to support R&D is first and foremost an investment decision, with the Group allocating 5% of its annual turnover to this activity. A 65 million euro investment plan is also scheduled for the 2015–2018 period, of which 50 million euros will be invested in France. The aim of this ongoing investment program is to continually fine-tune the Group's industrial facilities. Armor has a team of

36 people (engineers, Ph.D. students, and technicians) working full-time on R&D activities.

Armor is located in those areas where its customers are seeking to develop their businesses (i.e., where growth opportunities can be found). The Group is building on this strategy by opening three new Thermal Transfer subsidiaries in 2015 in India, South Africa, and Mexico. It also plans to open at least one new subsidiary each year, as close as possible to its customers. Although different cultures have varying approaches to sustainable development, some elements of sustainable development are truly universal. These include the use of solvent-free technology and ongoing efforts to save raw materials, especially given growing tensions over supplies.

Between 2009 and 2014, Armor's turnover rose from 143 million euros to 224 million euros. Non-EU sales rose from 20% of total turnover in 2004 to around 50% in 2015. The Group reinvests around 10% of its turnover each year—a substantial percentage for a company of this size. Despite persistently poor growth across the European economy, Armor's turnover rose from 7 to 76% in 2015, reaching €240 million. (Table 3)

A company's Return on Equity (ROE) figures provide a wealth of information. In 2004, Armor's ROE stood at 2%. The 2005–2008 investment plans heralded a major change. In 2008, despite the crisis and falling turnover, ROE was positive, signaling that the company had

Table 3 Financial data of Armor

€m*	2004	2008	2013	2014
Turnover	100	92	141	145
% export	81%	78%	75%	80%
% employees abroad	62%	51%	67%	65%
Foreign operating income	100	148	563	523
Investment	100	75	210	320
Investment in France	100	101	302	432
Production in France (million m^2)	100	145	195	204
EBITDA	100	127	260	272
Operating income	100	166	509	494
ROE (net income/shareholders' equity)	-2%	6%	16%	15%

*Base 100 (2004)

returned to profit. The subsequent rapid rise in turnover (between 2008 and 2013) was driven by international expansion and the launch of the Alternative Print Program for printer cartridges. Following a four-fold increase in investment both in France and abroad, and a five-fold increase in operating income since 2004, ROE increased by 10% points (ROE of 15% or more is sufficient to secure investor confidence). In 2014, the company continued on its upward trajectory with a strong emphasis on investment, thereby securing its long-term sustainability.

Armor's business model tends to create both financial and societal value-added. This value-added is shared by the different stakeholders. Each new project that the Group launches illustrates the profitability of this business model.

In 2006, for Amor Thermal Transfer activity, the Group decided to install robots in its cutting and packaging workshops for Thermal Transfer ink film rolls at the La Chevrolière site—the first time that robots have been used to perform these tasks[4] in the sector. The installation of robots in its production facility marked a genuine technological breakthrough, with the company combining its reputation as a roll manufacturer with its expertise in designing and developing automated robotics units. These technologies are *covered by a multi-invention international patent.*

Far from leading to job cuts, the introduction of these robots meant that it was possible to retain the cutting and packaging operations associated with the French branch's activities in France. The robots also took over responsibility for repetitive tasks from human resources. A number of senior employees were subsequently redeployed to manage the automated units. These changes represented a major opportunity for career progression, with operators reassigned to automated unit management posts and enjoying greater responsibility and a more varied workload. The company also benefited from the acquisition of new skills, creating a more highly qualified workforce. From 2004 to 2014, the quantity of products made in the Armor industrial plant in France increased by a factor of two thanks to investments and robots, while around 50 new jobs were created. Robots and productivity investments supported the competitiveness of the French site. Without such industrial policy, the plant would not have succeeded in remaining competitive and many jobs would have disappeared.

The cutting workshop significantly increased its output, amounting to a three-fold increase in productivity when compared with that of a traditional cutting machine. This increase in productivity also helped to meet implicit customer demand for shorter lead times. Between 2006 and 2010, production lead times fell from ten days to 3 days as a result of the new, ultra-efficient production facility. Moreover, the greater flexibility offered by the automated units in terms of cutting settings meant the company was able to expand its product range, offering 120 high-quality ink products and 15,000 roll products. These changes have also had a positive impact on the company's profitability, with operating income increasing three-fold since 2008. These impressive economic results also help to maintain jobs in France.

In environmental terms, automation helps to optimize floor space usage, limiting the need to expand the production site. This, in turn, reduces the site's environmental impact. An automated production facility consumes more than 30% less electricity than a traditional cutting machine.

In Armor's case, this approach presents, therefore, the two following advantages:

- the company gains in terms of competitiveness, productivity, and innovation
- employees gain new skills, become more flexible, and have less physically demanding jobs.

For Armor office printing activity, situation is different as it is a work intensive, low margin and low investment activity, the business has always been in Morocco since its creation in 2002. The *Birjdid* factory is located 50 km from Casablanca and produces remanufactured laser cartridges. When the new logistics platform was launched in September 2012, particular emphasis was placed on quality of life in the workplace, with 150 square meters of space allocated to communal facilities and 250 square meters assigned to green spaces at a total cost of €800,000 in the first year. More than 400 people work at the factory, and these measures have helped to reduce staff turnover while boosting the local economy. (Table 4)

Table 4 Staff in Morocco

	2013 (%)	2014 (%)
Turnover rate	15.67	9.06
Leavers	23	29
New hires	77	33

By locating its business in Morocco, the company is able to remain competitive while focusing on the quality of life of its employees and the attractiveness of its pay (which is above the Moroccan minimum wage). In fact, the Group's growth helps to protect jobs in France and also in its subsidiaries abroad. This production activity in Morocco has led, indirectly, to the employment of 200 people at the Nantes site in the logistics warehouse and commercial activities—jobs that would not be financially viable without the remanufacturing business in Morocco. Armor is France's number one employer in the printer cartridge sector.

"Armor is open and transparent about its locations abroad," explains Hubert de Boisredon. "This strategy helps to boost financial profitability, employment in France as in Morocco, and create[s] a virtuous, win-win circle."

Moreover, at a time when European nations are struggling to cope with mass immigration by poor, unemployed people from North Africa, initiatives such as Armor's development of stable jobs in Morocco are also helping to tackle the problem of uncontrolled immigration at its root.

In June 2015, Armor created a brand for its office printing activity under the name: OWA (*One Way Ahead "Our Way to Act"*). This involves the sale of remanufactured laser cartridges, including an environmentally friendly free collection and guarantee that the whole cartridge will be recycled Customers can go online and request free collection of cartridges. In return, they receive a materials assessment report with details about the used cartridges that they have returned.

While 140 million laser cartridges are sold in Europe each year (representing 140,000 tons of material), barely 20% of these are recycled by remanufacturers or original cartridge manufacturers. The remainder are left for local authorities to deal with. This represents a loss of 100,000 tons of material each year, with no transparency for users.

OWA is an "all-in-one" offering, combining the product with a range of other services (personalized collection, sorting, dismantling with personalized reporting about used cartridges, a materials assessment report, and recycling). Armor's OWA offering also delivers savings of 30% for business customers when compared with the price of new cartridges. As such, sustainable development is helping to deliver economic progress for users. Additional services amount to 10% of the sale price, so Armor relies on volume to make up for this potential decline in margins.

Many CAC 40[5] and SBF 250[6] companies, medium-sized enterprises, SMEs and public authorities have expressed strong interest in this responsible printing solution.

3 Challenges and Areas for Improvement

As with any business model, Armor's model has both weaknesses and risks. In order to ensure the long-term sustainability of the model, certain aspects are closely monitored by the Group's personnel.

Financial investments in new societal innovation activities create long-term value but do not always deliver an immediate return on investment. As a result, the initial cost of these new activities must be offset by the profitability of traditional activities. For example, Solfree is an innovative solution that took 10 years to develop and is only now delivering financial rewards. Similarly, return on investment in flexible photovoltaic films will only be achieved between 2020 and 2025; i.e., 10 years after the project was launched. We face here again the well-known tension between exploration (of new businesses) and exploitation (of current and profitable businesses).

Armor's competitors may be more successful in achieving short-term profitability since their business model is not based on long-term investment strategies. The Group must, therefore, be careful not to hamper its traditional activities through its investment in other innovative fields. Armor's business model focuses on delivering value in the future through anticipation of forthcoming market and social trends.

Societal commitment requires a demanding and rigorous approach to management. Armor must secure the support of its investors and avoid

a drop in its revenue and profits. The Group must post rising profits year-on-year in order to reassure its banks and investors that its societal innovation strategy is effective.

Waste-related regulations may pose an obstacle in the future. For example, empty cartridges are imported into Morocco for recycling. The Moroccan government is seeking to limit waste imports since this waste is a source of local pollution. However, from a circular economy perspective, this waste is, in fact, a raw material for the cartridge recycling business. As a result, educational efforts are necessary to explain that the company manufactures products in Morocco, as well as collecting and recycling Moroccan cartridge waste. In other words, the firm has to demonstrate that this activity positively benefits the host country.

Ongoing care must be taken to ensure that societal innovation is properly exploited. "CSR must remain more than just a system, more than an impressive set of figures. We must not lose sight of its true meaning, nor must we overlook innovation and creativity." Says Annabelle Guillet, Quality Assurance, and Sustainable Development Director.

In other words, pursuing societal innovation for marketing and image-related purposes doesn't make much sense. Armor direction believes that this model is critical to every aspect of the business (R&D, production, sales, finance, and HR).

For thermal transfer-related activities, many initiatives have been developed to limit the environmental impact of production. The eco-design of new products, however, is a point of constant improvement. Limiting environmental impact is taken into account from the beginning of the project, as is currently the case with the development of photovoltaic films.

Ink polyethylene terephthalate (PET) film waste on ARMOR's production sites represents a significant proportion of all waste that is generated. Previously treated as an ordinary industrial waste, waste is currently transformed into SRF (Solid Recovered Fuel) to produce energy as an alternative to oil fuels, or goes through material recovery processes.

The energy consumption is still decreasing, especially at the Nantes site where the incinerator, which is used as energy recycler, is

continuously optimized. It is according to the logic that the consumption of energy must be limited that subsidiaries were created. Goods are delivered by sea container, and transport to the final customer is locally done by truck.

Nonetheless, driving down energy expenditure remains a priority for ARMOR. Many activities have been taken to improve energy efficiency. ARMOR received ISO 50001 certification in 2012 (an international standard that aims at supporting organizations in all sectors to use energy more efficiently through the development of an energy management system) and has established a *Centralized Energy Management system* to quantify the expenditure of energy in the new activities that are being developed. Products related to these new activities (En' Safe®, ASCA©) have been specially designed within this logic of efficient and "clean" energy consumption.

ARMOR also uses a lot of solvents and is making efforts to reduce this consumption. As a result of the initiatives, the quantity of solvent consumed for every square meter of the coating has been cut by half since 2003. Incinerating solvents is also a way of producing steam that replaces the need for the use of a conventional natural gas boiler. Combustion residues and diffuse losses are the subject of permanent monitoring and an improvement plan.

It is important to ensure that all personnel is kept up-to-date with changes within the Group. This means that managers must be attentive and considerate of staff needs. Financial investment into internal communication tools is also needed. Christophe Derennes spends several hours each week discussing the Group's industrial strategy and projects with all employees within the industrial plant.

HR managers must listen to those employees who are not yet prepared for change and require additional support. Labor relations partners also need to be involved in societal innovation proposals (including employee well-being) as drivers of change.

Deployment of the *Decaplan* (an on-site ten-point CSR plan) has helped to improve the quality of life for employees through the introduction of rest areas, the opening of a nursery, the creation of new sports clubs, etc. However, these initiatives risk taking power away from labor relations partners. It is therefore important that the company's

management respects their role. This respect is reflected in the fact that four union representatives sit on the board of directors.

The Armor Office Printing business is based on the production of new cartridges by OEMs. These OEMs may create entry barriers to limit the development of cartridges that are compatible with the printers that they manufacture. The weakness of Armor's model in this respect stems from the ability of OEMs to "suffocate" the market by collecting their empty cartridges and destroying them, thereby preventing them from being remanufactured.

Armor is able to produce at a low cost without compromising on basic environmental safety principles. This ability is demonstrated through its Armor Industrial Coding & Printing facility in China. As for Armor Office Printing, Armor's current remanufacturing process is designed to prevent any infringement of the intellectual property and patent rights of OEMs, in particular, and of third parties in general.

There is a risk that a Chinese competitor could potentially develop the same products at an even lower cost, with little regard for intellectual property and patent rights or environmental protection rules.

Responsible innovation delivers commercial success because it responds to needs. However, it is important to ensure that this type of innovation does not lead to rises in product prices. From a marketing perspective, it is dangerous to believe that customers are prepared to pay more for higher quality product underpinned by a commitment to sustainable development.

The main purpose of societal innovation is not necessarily to earn more money per product that is sold. Instead, the aim is to differentiate. In other words, customers are more likely to choose an Armor product at an equivalent price because Armor is able to deliver financial savings on volume. A product designed with sustainable development in mind must be attractive, of at least equal quality and cheaper than a new product that has built-in obsolescence.

In conclusion, the challenge for Armor's societal innovation model is more to make sure that their main activity—Armor Industrial Coding & Printing (Thermal transfer ribbons)—maintains stable, with high-level profitability to support both innovation into new businesses and investment into CSR.

The other challenge is to monitor on regular basis the market pressure coming from OEM manufacturers (like HP, Canon) and Chinese competition and its negative impact on the Armor Office Printing (inject and laser cartridges) business profitability.

4 Conclusions

Armor traditional businesses have been concentrated in printing consumables. Thermal transfer ribbons industry going into the barcodes printing is still growing. However, the inkjet cartridges business is jeopardized by the decreasing trend in printing and Asian competition. Then it became a necessity for Armor to invent the future through new business opportunities.

The option that Armor has chosen is to innovate by taking into account on the one side its strategic technical skills and on the other side the increasing environmental concern for our planet. Thus the question has been: how can we use our strategic technical skills as solutions for the environment and human challenges?

The strategic decision proposed by Hubert de Boisredon and his management team, and validated by the shareholders, has been to incorporate societal innovation into at the heart of its corporate strategy.

Today, Armor's leaders have identified four major challenges to place at the heart of the strategy:

- Protect property and individuals through product traceability
- Reduce the environmental footprint of printing by offering ingenious and responsible consumables
- Convert light into energy for all
- Improve the safety and performance of electric batteries

According to them, it is through Armor's ability to generate value for society that the company will secure its long-term future.

The company's Thermal Transfer business is now 30 years old. It is therefore essential that innovation initiatives foster societal improvement and growth for this business. This is a process that has already

begun with Solfree, which is designed in anticipation of future regulatory changes that may well limit the use of solvents. This range will be extended to cover all aspects of the Thermal Transfer business. What was once a challenge has now become a driver of competitiveness and growth.

The Group's traditional businesses and activities face a number of challenges: the need to use as few resources and as many natural materials as possible, and to encourage Armor sites and customers to reuse products wherever possible. These challenges can only be met through innovation.

Armor's aim is to use its strategic resources—knowledge and expertise—to develop new activities to support the energy transition. The new *Armor Sustainable Energies* branch (collector films for electric batteries and flexible photovoltaic films) reflects this dual challenge which is both an entrepreneurial challenge and an environmental challenge. In short, Armor is seeking to be a central protagonist in the next industrial revolution.

The supply and management of energy is a global challenge. Yet the challenge that it poses differs in the industrialized and emerging markets. The Armor Group is preparing to contribute to the energy transition, offering custom solutions and proposing new practices.

For example, the flexible photovoltaic film Asca, once launched, will contain no rare, toxic or carcinogenic metallic elements. No chlorinated solvents will be used in the production process.

Innovation in new activities serves also to enrich existing activities. Chemistry experts, engineers, and researchers have been involved in developing these new activities (e.g., photovoltaic film and coatings). In the process of developing technologies for these new activities, they have also discovered new potential uses for the Thermal Transfer ribbon—uses that would never have been discovered without this innovative research. The company's different activities are therefore mutually enriching. And sustainability appears as an opportunity and a source of innovation, and transformation for the whole company.

Companies have an extremely pragmatic, grass-roots vision that the government often lacks. For example, Armor University responds to genuine needs and delivers training programs that are recognized by the

French Ministry of Labor. France has a lack of sufficiently skilled specialist workers, and the company must, therefore, step in and fill the gap left by the government, training its staff directly, in-house.

At Armor, each new subsidiary is subject to a CSR maturity study, with a view to developing its own CSR action plan.

This process is led by the Nantes head office, which communicates the results to subsidiaries. In South Africa, for example, a new social pilot project will be developed, involving the use of solar photovoltaic films to charge mobile telephones in areas with no access to electricity supply. This project will be conducted in partnership with a number of villages. In Singapore, meanwhile, a partnership has been established with the *Yellow Ribbon* program, under which Armor employs former prisoners at its production site.

Regarding the inclusion of more fragile people in business, the general belief in society is that disabled people are a burden and pose an obstacle to profitability. Philippe Pozzo Di Borgo, who provided the inspiration for the film *The Untouchables*, believes that disability needs to be seen in a new light: as an opportunity. Companies need to develop in such a manner that they are able to accommodate fragile individuals. This is reflected in the story of Patrick, who has a mental disability and was recruited at the request of his father, who is also an Armor employee.

In 2009, Patrick's colleagues raised concern about his movements within the premises, citing his potential hazard and distracting impact. They informed the site's warehouse manager. Serious consideration was given to sacking Patrick for safety reasons. The CEO Hubert de Boisredon heard about the case and asked the manager to keep him on board and offer him a genuine, meaningful, and purposeful role. At the time, Armor used Kraft paper to protect cartridges inside their packages—costing the company around €50,000 per year. The outer boxes containing the packaging were also incinerated. The team decided to invest in a shredding machine to convert packaging boxes into thin strips, which would then be used instead of the Kraft paper. The machine was suitable for use by Patrick. He is now proud of his job and the company has made genuine financial savings while reducing

its impact on the environment. Other local companies now send their boxes to Armor so they can be reused.

By integrating fragile individuals into the workforce, the company has been able to develop solidarity among its staff and generate a sense of trust and confidence. In short, employees know that they will be supported if a problem arises. This trust, in turn, helps to boost financial performance.

In the same spirit, Armor has developed a partnership with *ESAT CAP OUEST* (an enterprise that employs mostly disabled people) to pad laser cartridges within the Armor warehouse. Around 10 disabled people will progressively be employed by Armor in this project.

Armor shares its vision with other bodies and organizations, taking part in clubs, networks, and collaborative projects. In particular, it is a member of *Dirigeants Responsables de l'Ouest*, a business club cofounded by Armor's CEO and two other business leaders from the western region of France.

The aim of Dirigeants Responsables de l'Ouest is to bring together business leaders from the Pays de la Loire and Brittany regions, united in their belief that CSR has a positive impact on business performance. Its objective is to promote CSR to businesses and within the region, by encouraging directors to place CSR at the heart of their strategy and business models.

The Western France subsidiary CEOs of companies such as *Fleury Michon, EDF, Audencia Group, Bel'm* and *Banque Populaire Atlantique* have signed up to a charter signaling their commitment to reduce their environmental impact, increase societal involvement and respect the interests of their customers and suppliers.

The decision to develop influence networks and lobbying strategies is based on an ambition to enhance the reputation of the model, particularly among public authorities.

Sustainable development and societal innovation are not simply marketing gimmicks. They are important strategic choices based on the relationship between personal beliefs and values and the need to listen to consumer requirements. As Hubert de Boisredon explains, "the more consistently the company behaves, the more it is aligned on core values, the greater the financial outcomes of its business model will be."

Building a progressive business model has become one of the key drivers of economic revival.

Armor's only activity report is an integrated report, mainly focused on CSR. This demonstrates its intention to take a committed and consistent approach, and its core desire to align financial profitability and societal benefit.

The initial results of this new business progressive model, which Armor launched back in 2004, are very positive. The CEO is surrounded by a management team and staff, both at head office and at subsidiaries, who support the same social and environmental values and understand their importance to company growth.

Armor's case clearly proves that an industry founded on societal innovation can have a strong future both in France, in Europe, and throughout the world.

5 Questions to Address

- What key characteristics make Armor's business model being identified as "progressive?"
- What are the main difficulties Armor's leaders have been facing in transforming the firm?
- What are the key success factors in transforming an established firm into a progressive business model? How is this transformation maintained?
- What is the impact of this transformation on the competitiveness of the firm?

Notes

1. This involves applying perfectly uniform layers of ink (0.1–1 g per m^2) to a 4.5 micron polyester film (1/15th the thickness of a strand of hair) on reels 25–55 km long, at a speed of 600 meters per minute.

2. Association de gestion du fonds pour l'insertion des personnes handicapées, or Fund management association for the integration of disabled people.
3. The 40 larger French companies that are publicly quoted.
4. In the packaging workshop, rolls which leave the cutting workshop are marked, assembled on an incoming spool (optional), bagged, labeled, boxed, and palletised.
5. Cf. *infra*, note 3.
6. The SBF 250 (*Société des Bourses Françaises*) is a stock index computed and distributed by NYSE Euronext Paris from 1990–2011.