FEM Manifesto
Supporting the digital transformation of the European Materials Handling Industry

INTRODUCTION

The European materials handling industry manufactures equipment that enables the movement, storage, control and protection of materials, goods and products. We deliver organisational and technical solutions for efficient and sustainable materials flow. Our equipment is present in almost every production and distribution facility throughout the entire supply and logistic chain, and during the whole lifecycle of products from manufacturing to distribution, consumption and disposal. In a world that goes faster, we keep things moving.

The materials handling, lifting and storage industry covers different segments: conveyors for bulk handling, cranes and lifting equipment, elevating equipment, industrial trucks, intralogistics systems, mobile elevating work platforms and racking and shelving.

As a non-profit trade association, FEM has represented European manufacturers of materials handling, lifting and storage equipment since it was founded in 1953. Together with its 13 members from the EU, as well as UK, Russia and Turkey, FEM promotes a common vision for the industry and the preservation of its international leadership. As one of the largest mechanical engineering sectors, the European materials handling industry employs close to 300,000 people directly and generates an annual turnover of more than 60 billion euros.

PURPOSE OF THE MANIFESTO

Our industry is undergoing a profound digital transformation that expands business opportunities and offers major possibilities for developing and creating innovative 'smart' networked solutions to better respond to customer needs and requests. At the same time, new skills, education programmes, infrastructures and investments are required to explore these new markets and business models and to address new (cyber)security challenges posed by increasing interactions between products and systems, and with humans.

The logistics eco-system and its equipment providing industry is undergoing a major transformation through the massive introduction of digital technologies and services to address increasingly complex delivery issues in a globalised supply chain system. Most recent developments related to the COVID-19 crisis have increased the trend towards this transformation, where the (end)customer is expecting the delivery of most types of goods at their doorstep at the quickest possible speed, with full transparency of the whereabouts until it arrives.

Many European materials handling manufacturers are world leaders in their business segment. To retain their leadership at international level, where competition is huge and customers' expectations are increasingly demanding, the European materials handling industry must fully embrace the digital

world. To do so, it requires the full support of public authorities (mainly regarding the set-up of a favourable regulatory and investment framework) and the development and deployment of R&D and infrastructure programmes. It also requires the full collective engagement of industry in the development of standards (international and European) to ensure interoperability.

In this context, this Manifesto aims at highlighting the main expectations from the FEM industry towards public authorities, in particular the European Union institutions, to support our industry's digital transformation. It is complementary of the FEM Strategic Vision 2020-2025.

1. The digital transformation of the European materials handling industry: main aspects and challenges

Materials handling incorporates the movement, storage, protection and control of materials and products throughout the complete lifecycle of manufacturing, warehousing, distribution, and disposal. The materials handling process includes a wide range of manual, semi-automated and automated equipment and systems supporting logistics and making the supply chain work. The materials handling systems and processes of a company are established to enhance customer service, decrease inventory, shorten shipping times, and decrease general production, distribution, and transportation expenses[1]. It also contributes to enhancing the sustainability of the supply chain, notably in terms of space occupation and energy consumption.

◇◇◇ Trends

Our sector of industry is particularly affected by the profound digitisation of the entire supply chain eco-system, characterised by some major trends[2] and is intensively involved with industry 4.0 strategic developments:

- **Information Management** – General Supply Chain and Logistics: profound change in the information flow enabling data-driven decision-making, affecting the entire logistics distribution system, leading to a deeper integration of logistics in business operations and creating a shift toward service-oriented logistics on demand.

- **Space optimisation** - Materials Handling and its Support by Information Flows: with thousands of different kinds and forms of products being stored in today's average warehouse, every square meter of warehouse room needs to be optimally utilised to guarantee that certain products can be retrieved, processed, and supplied as quickly as possible. Global population growth and urbanisation, customers increased demand for personalisation are major drivers for 'same-day delivery', which puts requirements on future warehouse (closer to customer, limited space, high rental costs). To address an efficient usage of the space, limited inventory and other optimisation tools have to be implemented. Technologies such as the Internet of Things (IoT) coupled with Radio Frequency Identification (RFID) and sensors, Artificial Intelligence (AI), Automated Vehicles (AV),

---

[1] Current Status of Industry 4.0 in Material Handling Automation and In-house Logistics, Orestis K. Efthymiou, Stavros T. Ponis in World Academy of Science, Engineering and Technology International Journal of Industrial and Manufacturing Engineering Vol:13, No:10, 2019

[2] Current Status of Industry 4.0 in Material Handling Automation and In-house Logistics, Orestis K. Efthymiou, Stavros T. Ponis in World Academy of Science, Engineering and Technology International Journal of Industrial and Manufacturing Engineering Vol:13, No:10, 2019

drones, help improve machine performance, environmental conditions, energy consumption, preventive maintenance, stock status or material flow.

- **Human-to machine cooperation** - Materials Handling Physical Activities (picking, packing, storage and retrieval among others): Materials handling equipment and packaging are increasingly equipped with information technologies, which makes assets such as forklift trucks able to autonomously identify themselves, determine their present location and collect data on their status and the products being transported. Another point is the human-to-machine interaction. In the near future, the human-to-machine interaction within the warehouse and the collection of data will help analyse and improve workers' process routes, making employees' work easier, faster and safer; greater human-to-machine interaction increases workers' safety, efficiency and added value. Moreover, it helps improve ergonomics.

- **Improvement of decision and prediction** - Materials Handling Managerial and Strategic Planning: employing big data analytics to sensor data, not only imminent issues, but possibly hazardous developments can be predicted well in advance. Logistics decisions will become more data-based in order to allow continuous process improvement, and the efficacy of these decisions will be empowered by the wide-spread use of AI and digital solutions. As an example, warehousing facilities, transport units and autonomous vehicles are fitted with sensors and are connected to systems that share and organise their produced data; this creates a digital shadow or twin of the real world that can be used to simulate and appropriately address hazardous situations.

◇◇◇ Technologies

The digitalisation of the materials handling industry is driven by a variety of key technologies, all of which need to be cybersecurity-proof in order to operate efficiently and securely: IoT (including Industrial Wireless Networks that can sense, identify, process and communicate), Cyber-Physical Systems, Cloud/Edge Computing, Robotics, Big Data analytics, Augmented Reality, AI (including Machine Learning), Digital Twins, Blockchain, and Simulation and Additive Manufacturing.

Blockchain technology combines chain of custody controls with the transparency of immutable record-keeping. Applied to logistics and supply chain management, Blockchain technology can improve transparency. Indeed, customers will be able to track their orders, thus helping them make informed decisions. Auditors will have full access to the history of transactions and their related resources. Overall, Blockchain technology will enable better data sharing, cut intermediaries, and simplify administration. The very structure of blockchain also increases security. Going into the system to change past events will alter the coding of the event, thus making the change almost certainly visible to others. Advanced encryption will thus enable fraud detection but also decrease errors and improve anti-counterfeiting.

AI, a technology surrounded with significant misconceptions, requires specific approaches in the machine to machine/B2B context as regards establishing trust through transparency, explainability, controllability, etc…, bearing in mind that the interaction with human beings is very limited compared to the B2C context.

To allow for their full deployment by all, small and large, digital and the less digitally minded, companies in the sector, a fruitful cooperation with policymakers is required.

2. Requirements for a supportive EU policy environment

The European Commission has put digital policy very high on the EU agenda. Aiming to create Europe's digital decade, it has announced a roadmap with clearly defined goals for 2030, such as connectivity, skills, and digital public services. It intends to follow clear principles: ''the right to privacy and connectivity, freedom of speech, free flow of data and cybersecurity''[3].

Consequently, the Commission's digital programme is very ambitious and diverse: AI, Data, Cybersecurity, Digital Services are many subjects for new potential legislations. Besides, this programme promotes investment and encouragement in infrastructure, education and R&D, as well as raising a new "digital tax" to finance the COVID-19 crisis Recovery Plan.

The political choices to be made and policy directions to be taken in the next couple of years will define the digital framework in which our companies will operate in the next decade. As Europe's competitors are heavily investing and supporting their companies, the EU has an immense opportunity to set the right conditions for its industries.

◇◇◇ A supportive regulatory framework

On the regulatory side, FEM would first recall a set of fundamental principles that should guide any development of the EU regulatory framework.

As equipment manufacturers, materials handling companies are extremely keen on preserving and developing a fully functioning Internal Market ensuring, in particular, the free circulation of goods, services and people. There is a very solid corpus of EU legislation, notably the Machinery Directive, the Radio Equipment directive (RED), the Low Voltage Directive and the Electromagnetic Compatibility Directive, which are all pieces of legislation that ensure the free circulation of goods, based on the New Legislative Framework (NLF) and on the inclusion of "essential requirements" in the legal text. Harmonised standards offer manufacturers the tools to comply with these requirements[4]. This corpus of legislation is completed either by horizontal pieces of EU legislation (e.g. on product liability or on general safety of products) or by general principles of law such as the freedom of contract.

It is very important for the materials handling manufacturers that the EU refrains from changing product-related legislation or safety and liability legislation, which is still fit for purpose and creates trust and reliability on the market. Safety can also be strengthened through the work of the European Cybersecurity Agency (ENISA), in the area of industry automation. Likewise, it is also crucial to keep the concept of technology neutrality, which has proven to function well over the years and is a pillar of the NLF system.

Whereas this current legislative and regulatory framework allows for the deployment of new digital technologies, notably AI, it could be completed by a series of horizontal initiatives in two areas:

- **Exchange of Data:** a full digitisation of the supply chain eco-system can only become reality if the massive production of data generated by more and more sensor equipped products is exploited intelligently. Through smart networks that enable innovation, the supply chain becomes a value chain. This requires clean and exchangeable data, which implies

---

[3] COM(2020) 690 final

[4] https://ec.europa.eu/growth/content/%E2%80%98blue-guide%E2%80%99-implementation-eu-product-rules-0_en

interoperability, transparency, and openness to data. The European Commission is promoting the creation of Common European Data Spaces in a number of sectors, including manufacturing. A Data Governance Act has been proposed and will, amongst others, support business-to-business data sharing, addressing usage rights for co-generated data (such as IoT data, but also existing equipment data, in industrial settings). FEM supports the development of data exchange in the B2B area that should be based on the freedom of contract (no mandatory exchange of data). We need to work on an economic model that would incentivise the sharing of data (via remuneration), while guaranteeing the protection of trade secrets and intellectual property rights.

- **Cybersecurity:** smart networks (IoT, Operation Technologies, smart sensors, new connections, new partners) cannot be developed without a solid cybersecurity framework addressing one of the major challenges posed by digitalisation. Whereas infrastructure operators are required to comply with the Directive on Security of Network Information Systems (NIS Directive), equipment manufacturers have to develop and install cybersecure networkable products (including components and systems). In this context, beyond the application of the Cybersecurity Act, FEM supports the introduction of a horizontal NLF-based legislation that would avoid the provision of different or diverging cybersecurity requirements for networkable products in individual pieces of NLF product-related legislation[5]. This proposal would help develop a European approach to cybersecurity, introducing consistent and coherent legal requirements, and setting common cybersecurity goals to ensure horizontal consistency. It should be complemented by technical work carried out within ENISA either by creating a separate network or by endorsing existing standards such as the IEC62443 and ISO27k series.

◇◇◇ Research and Investments

On the investment and encouragement side, which is much more crucial than the regulatory aspect if the European industry is to sustain international competition, FEM would support actions in the following areas:

- Deployment of next generation digital infrastructures that conditions the deployment of the IoT throughout the supply chain,
- Creation of European Data Spaces where companies can freely experience exchange of data; this includes the development of data cleaning tools and interoperability standards,
- Support to the uptake of AI in the B2B sector, particularly the SMEs,
- Encouragement, coordination and benchmark of Member States' actions to upgrade education systems towards the digital transformation,
- Constant effort from the European Commission to facilitate access to the relevant EU programmes, notably Horizon Europe and Digital Europe and to finance European, national and business projects for research activities, with a strong focus on AI via European and national public research centres,
- Promote investment in AI applications at the European and industrial levels,
- Boost public and private investment and research, notably through the rapid adoption and deployment of the EU Recovery Plan and the EU Multiannual Financial Framework.

---

[5] Proposal made by Orgalim: https://orgalim.eu/position-papers/digital-transformation-proposal-horizontal-legislation-cybersecurity-networkable

3. The essential role of standardisation

Beyond harmonised standards required to support the application of EU NLF-based legislation, European and above all international standards are necessary to facilitate the digitalisation of the material handling industry. Many international standards are already in place or are developed by the industry to address AI or cybersecurity challenges (see notably ETSI standards or more recently ISO TR 22100-4 or ISO TR 22100-5). In this context, standardisation plays indeed a key role in supporting Europe's competitiveness. Therefore, FEM would support actions in the following areas:

- Support and promote the development of international standards for the development of industrial AI solutions,
- Keep the NLF concept in all laws that involve smart networks as a whole, including AI, cybersecurity or data exchange.

CONCLUSION

European manufacturers of materials handling, lifting and storage equipment see the digital transformation of their industry as a major opportunity for the development of its competitiveness and its global employment. They need the support of policy makers at two levels:

- Complete with new or revised texts the current legislative and regulatory framework where - but only where - it is required (data regime and cybersecurity),

- Mobilise the EU investment and R&D instruments and the opportunities offered by the EU Recovery Plan to support the modernisation of digital infrastructures, the upgrading of education systems and the strengthening of European Research and Innovation.

February 2021