

Whitepaper

# THE PATH TO DOMINANCE IN THE CHEMICALS INDUSTRY

A Guide to Accelerate Digital Transformation

unvired.com



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Technology is digitally transforming the industrial landscape and COVID-19 has made contactless interaction the new norm. Digital transformation enables businesses to improve operations, enhance customer experience, and drive employee productivity. It also eliminates traditional bottlenecks in production and innovation. Digital technologies have created opportunities for businesses to reimagine business models and position themselves as disrupters in the industry.

Chemical companies have always been open to the adoption of digital solutions. However, the rising uncertainty from COVID-19, increasing volatility of raw material prices (like crude oil), and advancements in IoT, have shifted Digital Technologies towards the core agenda even more.

It is quite apparent that digital transformation needs more than the underlying technology to be successful. Only the right convergence of talent, know-how, application, and commitment can provide sustained returns from digital initiatives.

While every organization understands that digital is the future of business, many do not see a clear path to success. Data indicates that a large percentage of companies are either struggling to get started or are stuck in endless pilot exercises.

Businesses need to adopt a holistic transformation approach which empowers employees, engage customers, streamline operations, and transform business models. A clear business direction, vision, and roadmap can turn these business challenges into exciting revenue opportunities.

The future is arriving, act now to create your own digital advantage.





### **Digital Strategy- Multi-experience Development**

Digital Transformation enables businesses to create new business models and value that deliver great Customer Experience (CX). Not just customer experience, Employee Experience (EX) should also be foundational to your digital strategy. But achieving Digital Transition at scale isn't easy.

In this new era after COVID-19, customer and employee interactions are more virtual, remote, mobile, and distributed, and this will be normal even after COVID-19. Non-stop proliferation of new devices, digital touch points (Chatbots, wearables, immersive, IoT, etc.) and modalities of interaction (voice, natural language, vision, etc.) require Multi-experience (MX) solutions.

"Through 2024, organizations with an established multi-experience strategy will outperform competitors in customer experience and employee experience satisfaction metrics."

#### Gartner

In most organizations, the User Experience (UX) is still maturing and a multiexperience approach is typically lacking. Success in digital transformation requires an integrated approach. While excellence in one area is good, the whole organization can benefit if these four disciplines- MX, UX, CX, and EX are connected as a 'MUCE strategy' as the term coined by **Gartner**.





A mix of the right technology, approach, and expertise can transform operating procedures, accelerating innovation and business growth. But the balance is difficult to achieve and the majority of digital transformations projects do not go past the initial stage. Though the approach of fail-fast is widely implemented, it is often poorly executed, making it difficult to measure and learn from the failures.





### **Digital Transformation – Business Drivers**

Digital Transformation is not new. It is ongoing from decades, starting with minicomputers and progressing through desktop, internet, mobile, cloud, and more but the growing commitment among businesses to undertake digital transformation is mainly due to the following business drivers:



### 😤 Enhance Customer Experience:

Successful companies will be the ones who deliver exceptional customer experience. Therefore, organizations in the chemical industry are undertaking digital initiatives, using data to improve transparency, delivery, and ease of creating orders. In the B2B environment, where most chemical companies operate in, customer service has become an equally important differentiator as the product.

## 🔨 Empower Employees

Digital tools empower employees and give them autonomy to perform their work from remote locations. They enable employees with easy access to data and analytics to make quick decisions in real-time. Adopting new technologies like Virtual Assistants/Chatbots can free employees from tedious and repetitive tasks and enable them to perform critical tasks that improve their productivity.



### (<sup>©</sup>) Optimize Business Operations

Digital tools can streamline business processes and enable better collaboration between cross-functional teams (Manufacturing, procurement, sales, marketing, finance, and HR) to improve efficiencies and cut down operational cost. Today, organizations have a variety of solutions (like Chatbots, artificial intelligence, machine learning, mobility, IoT, cloud, blockchain, and big data analytics) which can increase operational efficiency and generate a quick return on investment.

### 📀 Evolving Business Models

In today's digital business, market dynamics are changing at an unprecedented pace. Chemical businesses need to continually evolve, innovate, and respond quickly to survive and grow in this environment. New technologies enable businesses to change their business models and evolve with innovative offerings to differentiate themselves from the competition.

### Real-Time Insights

We live in a world where tons of data points are shared every minute. Businesses now want to capitalize on these data points and evolve their offerings based on these insights but success no longer depends on how much data you collect but how quickly you can analyze that data. Digital tools like big data analytics, automation, and AI-powered tools can help turn data into insights quickly to make informed decisions.





### **Current State of Chemical Industry**

The chemical industry has a wide-reaching impact in today's world. The origin of the materials we touch, the houses we live in, the food we eat, and the medicines we receive can be traced back to the industry. Therefore, it is equally affected by a wide variety of trends. From the sustainability movement, changes in consumer demand, fluctuations in commodity prices to trade restrictions will influence the industry in one way or another.

Chemical companies can be categorized into sub-sectors- commodity producers, intermediary companies, and specialty producers. Specialty producers, catering to paints, beauty products,

fragrances, performance chemicals among others, are well placed to capitalize on emerging demand.



Due to consolidation, diversification, and increasing batch sizes, the industry is moving towards a few key players with larger-scale production.

Innovation in the chemical industry has stagnated. With the exception of crop protection chemicals, there have rarely been any new chemical blockbusters released in recent years. The specialized chemicals are gradually getting commoditized, squeezing margins out of companies specializing in them.

The majority of the sales in the chemical industry happen in business-tobusiness markets in similar domains, namely, construction, food, automotive, oil & gas, pharmaceuticals, clothing, and cosmetics.

Furthermore, the industry is at the cusp of a major shift in workforce demographics. A large portion of chemical workers is nearing retirement age. Unless a centralized knowledge management program is in place, there is a risk of loss of invaluable tribal knowledge, decreased productivity, and worker safety.



Supply chains are ever complex, and safety/compliance issues are paramount. Uptime has to be maximized, processes have to be optimized, cycle times reduced, and the workforce has to be engaged by leveraging digital technology. The need for real-time information to manage demand and supply is making chemical companies adopt sensors to collect data and make predictive decisions. Digital, indeed is being embraced by chemical companies.





### **Analyst Reports on Digital Transformation in Chemicals**

Digital transformation is well underway but it is only the beginning. Leading research companies like Gartner, Mckinsey, and others have surveyed several IT leaders and business decision-makers in Chemical Industry to find out the current state of digital transformation. According to the Research firms:

#### World Economic Forum

87% of executives believe that chemical organizations that don't embrace digital will lose their competitive edge and possibly face extinction

#### **Deloitte**

23% of chemical enterprises rate themselves "above average" in digital maturity.

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40% of chemical executives expect to outperform competitors using digital.

#### McKinsey & Company

85% of chemical B2B buyers would prefer digital channels over salespeople when reordering products.

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*30-50% reduction in machine downtime and a 20-40% increase in machine life can be expected from predictive maintenance.* 

#### **Bain & Company**

70% of executives believe the chemical industry would experience significant disruptions from digital transformation by 2023.

#### **IHS Chemical Week**

8-13% increase in profit margins are to be expected from Digital Transformation.

#### **ECEG**

43% to 49% of chemical industry stakeholders expect concrete applications of big data analytics, AI, and AR/VR in the future.



### **Digitizing Manufacturing Operations**

Chemical plants with a large installed base of equipment or assets require regular inspections, audits, and preventive and unscheduled maintenance to avoid unexpected downtime, safety & environmental risks, and lower production. Most of the time, equipment inspections and asset maintenance is a paper-based process where data is captured on the paper forms and later re-entered into SAP Plant Maintenance or other such systems. A Mobile EAM solution can remove this barrier and help the companies move from reactive to predictive maintenance.

Digital Transformation provides chemical companies the ability to bring together equipment data, people, and systems together under one platform. In order to achieve these objectives, here is what chemical companies are deploying:



#### **Predictive Analytics**

Chemical Manufacturers are using predictive analytics from realtime IoT data for preventive maintenance, increased productivity, and compliance with EHS regulations. Collect real-time data from IoT sensors and send data to the cloud. Based on AI/ML algorithms, companies can predict asset failure and create work orders in EAM systems like SAP Plant Maintenance or send a notification to technicians to perform preventive maintenance.



#### **Mobile Apps:**

Plant production can be maximized by replacing paperbased maintenance processes with mobile apps for Operator Rounds (Inspections) and Work Orders. Spare parts inventory levels can be checked before workers are dispatched to repair equipment. Environment, Safety, and Health (ESH) forms can be filled out on tablets or smart phones instead of on paper . This allows for data analytics that can lead to better preventive maintenance and reporting for audits. Production orders in backend systems like SAP can be created from the shop floor as well as quality notifications using mobile devices. The production status and asset information can be shared through mobile devices, which enables remote monitoring and decision making to enhance operations in chemical production sites.





#### Internet of Things (IoT)

Chemical companies are starting to realize the benefits of Industry 4.0 which focuses on integrated supply and interconnected systems. Using IoT devices and mobile apps, plant operators can gather real-time asset health monitoring and conditioning data. The whole chemical plant becomes an intelligent and interconnected data model, providing constant feedback on the operating conditions. The data can be further used to develop predictive algorithms that automatically trigger work orders to alert workers of sub-performing assets.



#### **Digital Forms:**

In the chemicals industry, there is a myriad of paper forms used for inspection rounds, work orders, checklists, and safety compliance (EHS) requirements. Companies are now converting these forms to Digital, collecting data on the mobile devices, and sending that data with back end systems in real-time, enabling better decision making and improved data quality. These forms work offline and are dynamic. From a user experience perspective, filling a complex multi-page form is far easier on a tablet than on paper.



#### Augmented Reality (AR)/Mixed Reality (MR):

AR and MR are seeing increased adoption in the manufacturing sector. Remote assistance to Experts, training, and live annotations are some are the popular use cases. With AR, field technicians can view the 3D model of complex components and infrastructure such as pipelines and cables.



#### **Computer-based Procedures (CBPs)**

In the chemicals industry, there are standard operating procedures and policies that need to be followed during repair or inspections. Companies are transforming paper-based work instructions, procedures, documents, forms, drawings, equipment datasheets, and media into Computer-Based Procedures that enable technicians to access CBPs in the field using a mobile device in both- connected and disconnected environment to improve data quality, efficiency, and minimize the risk of human errors.



#### Chatbots

Chatbots are cost-effective solutions for customer service and field service management. They can perform simple tasks like answering FAQs, updating customers on service requests, enabling the field engineers to report issues, and many more.



### **Digitizing Supply Chain Management**

By establishing a digital base across the supply chain, managers can leverage the data collected from it to identify bottlenecks and drive efficiency.

Plant leaders can exchange stock information, delivery schedules, forecasts, and other data between suppliers and customers, all in real-time. It brings into practice joint planning exercise and smoothens transactional procedures. An integrated supply chain decreases the risk of stock-outs, improves visibility, asset utilization, and synchronizes all the nodes along the supply chain.

The digital ecosystems give chemical players the ability to experiment and innovate initiatives that will improve the supply chain as a whole. The digital plant will no longer function as an isolated unit but become a center to the web of beneficial partnerships.

Digital Technologies can enhance processes across the chemical production value chain. The infrastructure can be extended beyond the digital plant to synchronize with production, suppliers, customers, and logistics division carrying out the delivery.



#### Transportation

Chemical companies ship products that are frequently hazardous. Many times, they outsource the shipping to thirdparty carriers. These carriers can be shipped via trucks and rail. However, the liability to ensure that the transport vehicle is roadworthy still rests with the chemical company. So, the employee of the chemical company has to do inspection checks and record them. Calculations need to be performed as the quantity of chemical loaded depends on various parameters. These are today performed manually, and results are recorded on paper.



All this paper and manual work could be replaced by a mobile app that can record data on a Smartphone/tablet and send that data to SAP or some other system. Results in better safety/compliance, faster shipping, and better customer service.





#### Production

In chemical processes, the yield is different from the theoretical value due to process parameter variations or impurities. Hence, it is difficult to know beforehand the exact quantity of a product produced. So, frequently, the production order has to be adjusted or a new order created. Mobile apps on tablets/smartphones can be used to adjust/create production orders in SAP straight from the shop floor.the probability of wrong product shipments by alerting warehouse workers in case of a mismatch.



#### **Product Shipping**

It is not uncommon for the wrong products to be shipped—the chemicals industry is no exception. However, shipping the wrong chemical is vastly different from shipping a wrong pair of sneakers. There can be serious legal and financial consequences. Mobile apps that scan barcodes to compare material numbers in various documents like Shipping Order, Bill of Lading , or Certificate of Analysis can minimize the probability of wrong product shipments by alerting warehouse workers in case of a mismatch.







#### Purchase

- Real-time & accurate database of raw material/asset availability.
- Quick and simple purchase order creation with precise material specifications.
- Automated Demand notification. Enables suppliers to plan ahead to meet production capacities at the required time.



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#### Logistics

- Provides enhanced supply transparency and real-time movement of materials across storage locations.
- Automated Exchange of data and simplified communication between carriers.
- Accurate estimates of delivery schedule, location, and shipment quantity.
- Delivery condition of temperature-sensitive and hazardous goods.



#### Customers

- Ability to make quick purchases and send feedback.
- Timely notifications on production and shipment status.





### **Industry Challenges & Solutions**

#### **1. Equipment Reliability**

Chemical plants rely heavily on the optimal functioning of each asset in the production line to yield, distribute, and securely store finished goods as per schedule. The unscheduled downtime can cause operational slowdown, increase maintenance costs, and limit throughput. Any such delays in batch production impact product quality and availability, and thus directly affecting revenue. Paper-based plant operators spend most of their time on reactive maintenance, which is a time-consuming and fragmented approach to asset management. The lack of realtime data from plant maintenance affects planning decisions and complicates any attempts to take proactive steps to replace underperforming assets.



**Solution:** Technologies such as the Internet of Things can improve shop floor connectivity. The stream of real-time data can help companies monitor asset health and apply predictive analytics to detect problems before they occur. By creating a digital twin of the assets, technicians can run simulations and determine the best period to replace equipment and create schedules accordingly. The whole chemical plant becomes an intelligent and interconnected data model, providing constant feedback on the operating conditions.

#### 2. Process Optimization

A chemical plant is only as efficient as the least productive link in the process chain. By identifying wasteful or underperforming assets, a chemical plant can decrease energy usage, increase workin-process, and improve batch quality. The ability to improve operations require gathering historical data, deriving insights, and quick decisionmaking ability.



**Solution:** Employing Digital Forms and mobile apps, organizations can effectively create a comprehensive validated database of plant performance at each stage of the process through asset maintenance and inspections. Technicians can capture images, verify readings, track location, create notes, and more. The insight from the shop floor through mobile devices will help the organization to detect problems, compare historical data, and generate reports to identify improvement areas in the production process.

#### 3. Quality Control

Quality and consistency of goods are paramount in the chemical industry where regulators have greater scrutiny and product rework can be expensive. Reworking substandard batch requires significant resource expenses and production delays, allowing plenty of leeways for competitors to make inroads. Without a proactive response to detect and rectify production quality problems, companies are exposing themselves to elevated business and legal risks.

**Solution:** A combination of sensors, digital forms, and mobile apps can deliver near-realtime data to better quality control. Technicians can capture images of product defects, annotate, and share with distributors, suppliers, and managers to raise issues. By analyzing massive amounts of data generated throughout procurement, production, and distribution processes, companies can uncover systemic quality problems at the micro-level and perform effective correction response.

#### 4. Aging Workforce

According to the US Bureau of Labor Statistics, over  $40\sqrt[6]{}$  of the chemical workforce is above the age of 45 years. The upcoming retirement crunch in labor will pose a challenge in transferring technical know-how. On the other side of the coin, the Chemical industry does not appear to be an attractive sector among the emerging workforce. Only 30% of chemical graduates are working in the industry. The retirement gap is also causing a mismatch between demand and supply for skilled engineers. As a result, chemical companies have to settle for inexperienced candidates.



Solution: Digital Transformation can automate most of the processes, resulting in the need for less workforce. Knowledge can be captured using the right tools and deliver them to the younger workforce when required. Virtualization, remote support, and training simulations through Mixed Reality platforms can optimize expertise delivery and minimize training costs. The increased usage of digital technology can make the chemical industry an attractive career destination for the young technical workforce. Digital training helps the workforce upskill and become less

reliant on human operators for operational success. The readily available information ensures safety among unskilled technicians, and they can complete tasks without the constant need for intervention.





#### **5. Raw Material Price Fluctuation**

In recent times, raw materials cost has been highly volatile. Since raw material purchasing costs between 20-60% of revenue for chemical companies, volatile prices can significantly affect the bottom-line. The regulatory environment too is in a constant state of flux with anti-globalization sentiment that is placing limits on various types of commodities.



**Solution:** Applying data from digital solutions, executives can determine which combination of products can deliver the maximum profit or yield under the current raw materials or prices. Using real-time inventory information, they can plan and stock up on the materials at optimal prices. By identifying consumption and energy use, managers can optimize processes and reduce overall sourcing expenditure. Digital technologies such as mobile forms solution can help chemical companies meet tighter regulations and improve compliance.



### Key Takeaways

- 1. Successful business transformation enables chemical organizations to take advantage of new possibilities, change the business model, and evolve with new offerings.
- 2. While most chemical organizations are making slow and study progress, successful companies are taking the lead, and have already deployed digital solutions to gain a competitive advantage.
- 3. Organizations in the chemical industry are actively working on adopting digital technologies like predictive analytics, mobile & web apps, IoT, AR/MR, and cloud.
- 4. Driving cultural change, bridging the digital skills gap, lack of clarity, system integrations, data privacy, and security are the major barriers in undertaking digital transformation.

#### **Digital Approach:**

- Define your Digital Strategy first
- Work with the Business
- Identify Key Digital Initiatives
- Prioritize. Select Key Technology Platforms. Go small with a Pilot/POC.
- Scale as business and volume increases.

#### Lessons for Implementation:

- **Data Quality:** At the beginning, you should define how the data should look. Various departments like Operations, Maintenance, and Customer Service have their own views of the data. Your data governance models should be able to support these varying views even if the data sources are the same
- **Understand Your End User:** The focus should be on answering the business question and truly understanding the stakeholder(s) process.
- **Quick Wins:** Projects with a Quick Win should be selected initially to generate momentum.
- **High Priority:** Tackle the Business Problems that are most important.



## **About Unvired**

Unvired Enables Digital Transformation resulting in Enhanced Competitive Advantage for Enterprises both large and small globally.

Unvired is a Digital Solutions provider of Mobile & Web Applications, Digital Forms, Augmented/Mixed Reality, and AIenabled Chatbots for Enterprises. Headquartered in Houston, TX, and with customers in N. America, Europe, South Africa, and APAC, Unvired is committed to helping businesses by rapidly building and deploying high-performance business apps that enhance competitive advantage.

To support businesses during these unprecedented times, Unvired is offering free POC and special price considerations to build and deploy business apps that enable remote work and manage efficient field service. Contact us now to speak to our technical advisors or send an email to sales@unvired.com if you have questions.

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