Unit – II

During the pandemic, business executives accelerated their digital transformation initiatives. They had to do that to continue working. Companies deployed digital tools to handle work-from-home demands and negotiate strained supply networks in the face of unprecedented uncertainty. Customers now anticipate better products, more individualized services, and rapid reaction times due to the accessibility of the new cloud, social, mobile, and AI technologies. Companies automated as many manual business procedures as possible to meet these elevated demqands.

The driving force behind the digital revolution across all industries and enterprises is Intelligent Automation (IA), a term first used in 2017. Intelligent automation has a lot in store for businesses, whether small or enterprise, B2B or B2C, with emerging technologies.

Intelligent Automation (IA) creates end-to-end business processes that learn, and adapt on their own by combining Robotic Process Automation (RPA) with cutting-edge technologies like Artificial Intelligence (AI), Analytics, Intelligent Character Recognition (ICR), Optical Character Recognition (OCR), and Process Mining. Hyper-automation and Intelligent Process Automation (IPA) are other terms for Intelligent Automation.

Any business inside an organization can benefit from using intelligent automation technologies to promote digital transformation of business. These consist of:

1. Enhanced Productivity and Efficiency
2. Lower Costs
3. Enhanced Client Experience
4. Increased Inventiveness
5. Improved Quality Assurance
6.

1. Enhanced Productivity and Efficiency

Less time is spent on manual labor due to task automation, which also enhances workflow. Higher levels of employee performance and workplace productivity may arise from this. Tt replaces everyday office duties like manual data extraction and filing with intelligent document processing (IDP). Regardless of the data type, IDP synchronizes and processes documents more quickly, increasing productivity and effectiveness at work. The banking, legal, healthcare, and logistics sectors are some of the most well-known IDP users. RPA technology also mimics repetitious human orders to boost productivity simultaneously as cost- and time-saving measures.

2. Lower Costs

Your business expenditures can be decreased with automation. That's because technology does not require humans to carry out certain activities.

Additionally, it enables remote management of dispersed teams worldwide from a single hub. This reduces expenses and frees up stretched resources for other essential purposes. Technology behemoths like Amazon, Intel etc regularly incorporate AI and RPA into their IT

architecture which helps provide a quick and improved client experience at reasonable prices.

3. Enhanced Client Experience

To compete in the digital era, businesses must deliver outstanding consumer experiences. Intelligent automation can assist you in achieving this by automating processes that ordinarily need human interaction, such as responding to consumer inquiries or complaints.

Your staff will have more time for other crucial activities, like connecting with and building customer relationships. This increases your level of client satisfaction (CSAT).

Additionally, it improves the efficiency of even the most fundamental routine tasks. This enhances your overall customer experience while assisting you in achieving your financial and non-financial goals.

4. Increased Inventiveness

Constant innovation and keeping up with technological developments are two of the most crucial components of prospering in the digital age. Employees at companies must continually come up with innovative and inventive ways to outshine rivals.

Of course, intelligent automation allows you to do this by giving employees more time to concentrate on other jobs that demand higher levels of invention and creativity. Your staff may focus on ground-breaking business initiatives and innovations thanks to IA.

5. Improved Quality Assurance

Your firm may closely monitor operations by utilizing intelligent automation. Overall, this results in improved quality control and increased productivity. IA decision engines also use RPA in work processes that result in profitable business outcomes.

In other words, implementing IA solutions into your regular company activities leaves less opportunity for error. Before instructing RPA bots to automate related operations, iA decision engines utilize machine learning and deep learning to investigate patterns and analyze pertinent data. iA decision engines provide authentic knowledge and data analysis in process automation.

How Can Intelligent Automation Help Enable Digital Transformation?

Now that you've read about the benefits of using intelligent automation for enterprise digital transformation, let's look at how it can enable digital transformation at your organization.

By automating tedious operations and enhancing customer experiences, intelligent automation solutions help accelerate digital transformation. Your company will save time and drastically reduce costs as a result.

Automate Manual Processes

Automating manual procedures and repetitive chores is crucial to digital transformation. What if, for instance, your business still collects data from potential clients or consumers via paper forms? These procedures need to be automated with iA to be digitized.

Decision engines can be used in financial and accounting organizations to automate human invoice checks and compliance evaluations. RPA, for instance, can extract data from invoices, sort them, and then put them in the proper order for intelligent automation.

Improve Customer Experiences

Improving customer experience is essential for supporting digital change. Intelligent automation, for instance, can be used to automate routine jobs like accepting phone orders and responding to frequently asked inquiries. All pertinent client issues and interactions can be analyzed using intelligent automation.

Simultaneously tailoring several client experiences will be beneficial. Significant advantages include shorter customer response times and higher customer satisfaction.

You must understand that intelligent automation goes beyond reducing employees or increasing profits. It's intended to be a tactical procedure. Additionally, it facilitates company optimization and operational efficiency. Finally, a thorough digital strategy is required to support intelligent automation.

The second key to Digital Transformation is Intelligent Automation which opens doors to business growth and scale. Once you have built the foundations of technology across your company, in every workflow, only then can you build the layer of automation to make your operations more efficient.

The most sought-after outcome of automation is operational velocity. To drive business growth, your workflow should go beyond a certain speed to achieve work at scale. There is no other way to increase the pace of business than automating workflow processes.

Another outcome that is quickly visible after implementing intelligent automation is the reduction in human errors and manual processes that took a lot of time. You can create tools and platforms for both employees and customers to optimize how they interact with your brand. You can collect data at every step and reduce pain points to create genuine improvement in business.

One threat that looms over a business is the threat of being disrupted and becoming irrelevant. Technology and intelligent automation give you the pace and innovation to escape that and grow your business.

Here are some impressive statistics by Mckinsey from organizations that have implemented Intelligent Automation.

60% Manual Tasks Removed

80% Reduction in Process Cost

Implementation ROI of over 100%

The more a company is digitally transformed, the more human it appears to the customers. At the same time, interestingly, it has a strong foundation of technology within. It is possible only when all the repetitive and mundane tasks are automated and the workforce becomes more productive and meaningful.

Going beyond traditional automation, we develop intelligent automation for our clients. We have found that when automation is intelligent, it is simpler to be used by the employees, and adoption is much faster.

Coupled with system integration to reduce the use of multiple software, it can shoot up user productivity. The freed-up time can be used, as a resource, to improve the customer experience.

Techniques like decision modeling software in sales and attribution automaton in marketing can transform how customers are acquired while bringing down the cost. Machine learning is used to automate AR processes which help in revenue collection with zero errors.

Adapting to the Future: Embracing Digital Transformation in Communication Infrastructure

With the advent of new technologies and the increasing need for connectivity, communication infrastructure has experienced a rapid transformation. From traditional telecommunication systems to modern digital networks, the industry has witnessed a paradigm shift that offers numerous opportunities for businesses and individuals alike.

The Role of Digital Transformation in Communication Infrastructure

Digital transformation has played a pivotal role in reshaping the communication infrastructure sector. It has enabled businesses to enhance their operational efficiency, improve customer experiences, and adapt to the changing market dynamics. Let's explore some of the key aspects where digital transformation has made a significant impact:

- **Enhanced Connectivity:** Digital transformation has facilitated increased connectivity, allowing businesses to build seamless networks that connect people, devices, and data. This has paved the way for the Internet of Things (IoT) and has opened doors for innovative applications and services.
- **Cloud Computing:** The rise of cloud computing has revolutionized the way communication infrastructure operates. Cloud-based solutions provide flexible and scalable services while reducing the need for physical infrastructure. This has resulted in cost savings, improved accessibility, and enhanced security.

- **5G Technology:** The deployment of 5G technology is another major development in communication infrastructure. With faster speeds, lower latency, and increased bandwidth, 5G is set to revolutionize connectivity, enabling a wide range of applications such as autonomous vehicles, smart cities, and virtual reality.
- **Big Data Analytics:** The availability of vast amounts of data has presented new opportunities for communication infrastructure companies. By harnessing the power of big data analytics, businesses can gain valuable insights for decision-making, optimize network performance, and improve overall efficiency.

The Advantages of Embracing Digital Transformation

Embracing digital transformation in communication infrastructure offers numerous advantages that can drive business growth and success. Some of the key advantages include:

- **Increased Efficiency:** By adopting digital technologies, businesses can streamline their operations, automate processes, and reduce manual effort. This leads to improved efficiency, reduced costs, and faster delivery of services.
- **Improved Customer Experiences:** Digital transformation allows businesses to offer personalized and seamless customer experiences. By leveraging data analytics and customer insights, companies can tailor their offerings and services to meet individual needs, leading to higher customer satisfaction and loyalty.
- **Competitive Advantage:** Embracing digital transformation enables businesses to stay ahead of the competition. By staying agile and adopting innovative technologies, companies can differentiate themselves, attract new customers, and capture new market opportunities.
- **New Revenue Streams:** Digital transformation opens up new avenues for revenue generation. With the ability to offer value-added services, personalized experiences, and innovative solutions, businesses can diversify their revenue streams and tap into new markets.

The Key Takeaways

As digital transformation continues to reshape the communication infrastructure sector, it is essential for businesses to embrace this change to stay competitive. Here are the key takeaways:

- Adopt digital technologies to enhance connectivity, improve operational efficiency, and leverage data for insights.
- Invest in cloud computing solutions to achieve scalability, cost savings, and enhanced security.
- Seize the opportunities presented by 5G technology to unlock new applications and services.
- Harness the power of big data analytics to optimize network performance and drive decision-making.
- Embrace digital transformation to gain a competitive advantage, improve customer experiences, and explore new revenue streams.

Remember, in this digital era, adapting to the future is not just a choice but a necessity. By embracing digital transformation in the communication infrastructure sector, businesses can unlock endless possibilities and position themselves for success in the dynamic and ever-changing marketplace.

Unlocking the Potential: How Digital Transformation Enhances Communication Infrastructure

One area where digital transformation has had a profound impact is communication infrastructure. In this article, we will explore how businesses can unlock the potential of their communication infrastructure through digital transformation.

The Importance of Communication Infrastructure

A robust communication infrastructure is the foundation of efficient business operations. It enables seamless collaboration between teams, facilitates timely decision-making, and enhances customer engagement. However, traditional communication systems often fall short in keeping up with the evolving demands of modern businesses.
To address this challenge, businesses are leveraging digital transformation strategies to optimize their communication infrastructure. By adopting advanced technologies and integrating digital tools, organizations can overcome the limitations of traditional systems and unlock numerous benefits.

Key Benefits of Digital Transformation in Communication Infrastructure

Improved Connectivity and Mobility
Digital transformation enables businesses to embrace cloud-based communication solutions, facilitating enhanced connectivity and mobility. Employees can communicate and collaborate from anywhere, anytime, using various devices. This flexibility boosts productivity, especially for remote or geographically dispersed teams.
- Cloud-based unified communication platforms provide seamless integration of voice, video, and messaging, enabling real-time collaboration.
- Mobile applications empower employees to stay connected on the go, enabling faster decision-making and problem-solving.
- Integration with customer relationship management (CRM) systems enables personalized and efficient customer interactions.

Enhanced Scalability and Cost-Efficiency
Traditional communication infrastructure often requires significant investments in hardware and maintenance. By migrating to digital solutions, businesses can enjoy greater scalability and cost-efficiency.
- Cloud-based communication systems allow organizations to scale up or down based on their needs, eliminating the need for expensive infrastructure upgrades.
- Virtual phone systems and software-defined networks reduce hardware costs, while providing advanced features like call routing and intelligent analytics.
- With digital solutions, businesses can avoid complex setups and save on maintenance and operational costs.

Advanced Collaboration and Innovation
Digital transformation in communication infrastructure fosters advanced collaboration and innovation within organizations.
- Real-time messaging and file sharing platforms enable seamless collaboration, keeping teams connected and productive.
- Video conferencing and virtual meeting solutions reduce the need for travel, leading to significant time and cost savings.

- Integration of artificial intelligence and machine learning algorithms enhances communication processes through automated responses, sentiment analysis, and predictive analytics.

Data-driven Decision Making

Digital communication infrastructure generates vast amounts of data that can be leveraged to drive insights and make informed decisions.

- Analytics tools provide valuable insights into customer preferences, trends, and behavior, enabling businesses to tailor their communication strategies for better engagement.
- Data-driven insights help optimize internal processes, identify bottlenecks, and streamline workflows.
- Integration with business intelligence tools enables real-time reporting and analysis, empowering organizations to make data-driven decisions.

Key Takeaways

Unlocking the potential of communication infrastructure through digital transformation can revolutionize the way businesses operate and compete in the digital age. Here are the key takeaways:

- Digital transformation enhances connectivity, mobility, and collaboration.
- Scalability and cost-efficiency are improved through cloud-based solutions.
- Advanced collaboration tools and AI integration foster innovation.
- Data analytics enable data-driven decision making.

As businesses continue to embrace digital transformation, communication infrastructure plays a vital role in their success. By harnessing the power of digital tools and technologies, organizations can unlock their true potential, stay ahead of the competition, and ensure seamless communication across all levels.

The Promise of Intelligent Automation Revolutionizing Communication Infrastructure

One of the most promising innovations in this realm is intelligent automation. By combining artificial intelligence (AI) and automation technologies, intelligent automation has the potential to revolutionize communication infrastructure in numerous ways.

What is Intelligent Automation?

Intelligent automation refers to the integration of AI-powered algorithms and automation capabilities to streamline and enhance various processes. It leverages machine learning, robotics, natural language processing (NLP), and other advanced technologies to automate repetitive tasks and make data-driven decisions. This transformative technology has already shown immense potential in various industries, including healthcare, manufacturing, finance, and now, communication infrastructure.

The Advantages of Intelligent Automation in Communication Infrastructure

Let's explore the remarkable advantages that intelligent automation offers to revolutionize communication infrastructure:

- **Enhanced Network Monitoring:** With the help of intelligent automation, communication service providers can efficiently monitor network performance in

real-time. AI algorithms can quickly identify anomalies or potential network issues, allowing for proactive troubleshooting and minimizing downtime.

- **Smart Traffic Management:** Intelligent automation can optimize network traffic by analyzing data patterns and rerouting traffic dynamically. By intelligently managing network resources, it ensures high-quality user experiences even during peak usage periods.
- **Automated Service Provisioning:** Provisioning new services can be a time-consuming process. However, intelligent automation can automate service provisioning, reducing manual errors and enabling faster deployments. This allows businesses to scale their communication infrastructure rapidly.
- **Intelligent Customer Service:** AI-powered chatbots and virtual assistants are already transforming customer service. By leveraging intelligent automation, communication providers can offer 24/7 support to their customers, resolving queries efficiently and improving overall customer satisfaction.

Industry Statistics that Highlight the Potential

To showcase the potential impact of intelligent automation on communication infrastructure, let's have a look at some compelling industry statistics:

- According to a study by Gartner, by 2023, organizations that have adopted AI will witness a 25% improvement in customer satisfaction rates due to faster problem resolution and better service quality.
- Research from IDC indicates that intelligent automation investments are expected to grow at a CAGR of 50% from 2019 to 2023, reaching a market value of $25 billion.
- A Deloitte survey found that 33% of telecom operators are already investing in AI and automation technologies to improve their network operations efficiency and reduce costs.

Key Takeaways

Intelligent automation holds tremendous promise for revolutionizing communication infrastructure. By leveraging this transformative technology, organizations can enjoy enhanced network monitoring, smart traffic management, automated service provisioning, and intelligent customer service. Through statistics, we have witnessed the tremendous potential of this technology in improving customer satisfaction rates and driving significant market growth.

As the demand for seamless connectivity continues to grow, intelligent automation will play a crucial role in building robust and efficient communication networks. Embracing this technology will enable businesses to stay ahead in the ever-evolving digital landscape, delivering exceptional user experiences and driving operational excellence.

The future of communication infrastructure is exciting, and embracing intelligent automation will undoubtedly be a game-changer. It's time for businesses to explore this transformative technology and unlock its full potential to thrive in the digital era.

The Role of Intelligent Automation in Communication Infrastructure Transformation

From streamlining processes to enhancing agility, intelligent automation offers a plethora of benefits that are shaping the future of communication networks.

What is Intelligent Automation?

Intelligent automation refers to the use of advanced technologies such as artificial intelligence (AI), machine learning (ML), and robotic process automation (RPA) to automate and optimize complex business processes. It combines the power of data analysis, algorithmic decision-making, and cognitive capabilities to enable autonomous decision-making and intelligent actions.

Intelligent automation in communication infrastructure focuses on automating various tasks, optimizing network operations, and enhancing the overall efficiency of communication systems.

The Advantages of Intelligent Automation in Communication Infrastructure

Enhanced Operational Efficiency:
- Intelligent automation streamlines communication processes, reducing manual intervention and improving operational efficiency.
- Automation of routine tasks allows network engineers and IT professionals to focus on more strategic initiatives.

Improved Network Performance:
- Intelligent automation enables real-time monitoring and analysis of network performance metrics.
- Automated network troubleshooting and predictive maintenance help identify and resolve issues before they impact user experience.

Increased Agility and Scalability:
- Automated provisioning and configuration management enable faster deployment and scaling of communication infrastructure.
- Intelligent automation allows for dynamic adjustments in network capacity to accommodate changes in user demand.

Enhanced Security:
- Intelligent automation strengthens communication infrastructure security through continuous monitoring and threat detection.
- Automated incident response and remediation minimize potential vulnerabilities and reduce the impact of cyber-attacks.

The Key Takeaways

Intelligent automation is revolutionizing communication infrastructure by offering:
- Improved operational efficiency and reduced manual effort.
- Enhanced network performance through real-time monitoring and troubleshooting.
- Increased agility and scalability to meet evolving business demands.
- Enhanced security through continuous monitoring and threat detection.

By embracing the power of intelligent automation, organizations can ensure that their communication infrastructure remains robust, secure, and capable of meeting the demands of the digital era.

Industry Statistics

Here are some industry statistics that highlight the significance of intelligent automation in communication infrastructure:
- According to Grand View Research, the global intelligent automation market size is expected to reach $256 billion by 2027, growing at a CAGR of 19%.
- A survey conducted by Deloitte revealed that 53% of organizations have fully adopted intelligent automation, while 19% are in the advanced stages of implementation.

- According to Gartner, by 2024, organizations that have adopted intelligent automation will achieve at least a 50% reduction in network outages.

In conclusion, intelligent automation is playing a pivotal role in transforming communication infrastructure. By integrating advanced technologies, automating processes, and leveraging data-driven insights, organizations can unlock new levels of efficiency, scalability, and security. As the digital landscape continues to evolve, embracing intelligent automation is crucial for organizations to stay competitive and drive meaningful innovation.

The Future of Augmented Analytics and Its Advantages

In the year 2022, the global augmented analytics market achieved a valuation milestone, reaching USD 15.84 billion. Projections indicate a notable upswing, foreseeing the market's value to ascend from USD 18.68 billion in 2023 to an impressive USD 66.54 billion by 2030. This anticipated expansion is underpinned by a substantial compound annual growth rate (CAGR) of 19.9% throughout the forecast period. The driving forces behind the market's growth encompass the escalating intricacy and abundance of data, a burgeoning demand for decision-making grounded in data, and the imperative to democratize analytics across a spectrum of organizations.

What does the term "Augmented Analytics" mean?

Augmented analytics automates **Data Analysis** using machine learning and natural language processing. It minimizes the need for specialized skills and makes data exploration accessible to a broader audience. Users possess the capability to streamline tasks like data preparation and produce valuable insights that can result in significant business outcomes.. Augmented analytics offers context-based insights, explanations, and recommendations. It democratizes data-driven decision-making with natural language interfaces, such as chatbots and voice assistants, making analytics more efficient and inclusive.

Why are augmented analytics important?
- **Data as a Key Asset**

Recognizing data as a critical asset in the modern economy acknowledges its central role in shaping business strategies and outcomes. However, the vastness and complexity of data pose challenges for human analysis alone.

- **Automation and Enhancement through AI and Machine Learning**

AI and machine learning are used in augmented analytics to automate and improve the analytics process, including data collection and generating insights, to efficiently handle large amounts of data.

- **Reducing Dependence on Scarce Data Scientists**

The scarcity and cost associated with data scientists can be mitigated through augmented analytics. These tools automate mundane tasks, freeing data scientists and empowering other roles to perform better.

- **Faster Discovery of Deeper Insights**

In a landscape dominated by data, businesses can secure a competitive advantage by leveraging augmented analytics to derive timely and strategic insights, enabling them to make informed decisions.

The Evolution of Analytics

Data and analytics have undergone a significant transformation in recent years. Advanced tools once reserved for experts are now accessible to everyone thanks to machine learning.

1. Traditional Analytics: Traditional analytics is usually driven by the IT department or specialists with the expertise and skills to handle complex data and tools. Users cannot explore and analyze data independently and rely on specialists to perform most tasks. The tools used for traditional analytics are advanced and designed for data and analytics professionals. Traditional analytics also produces large-scale reports covering various topics and metrics.

2. Self-Service Analytics: One of the trends in analytics is the emergence of business-led analytics, where business users take a more active role in driving the analytics process. This requires user-friendly tools that enable users to conduct analytics tasks independently without relying on IT or data experts. The goal is to empower users to generate insights and make data-driven decisions.

3. Augmented Analytics: Augmented analytics is a new paradigm that combines AI and machine learning-led technologies with complete user independence. Users can leverage **AI tools** and guided workflows to drive the analytics process without relying on experts or IT. Augmented analytics enables fast, deep, and previously hidden insights that can transform business decisions and outcomes.

Key Components of Augmented Analytics

The cloud-based platform of augmented analytics, also known as AI analytics, effectively merges data and analytics. By streamlining data management and empowering various types of analytics, it offers a simplified approach to data analysis.

- **Data Collection and Preparation:** AI automates data collection, cleaning, and integration from diverse sources. It handles big data sets, identifies potential errors, and recognizes specific attributes. The automated nature of AI ensures rapid and accurate data processing, improving overall efficiency. It minimizes manual effort for routine tasks, allowing data professionals to focus on more complex aspects of analysis and decision-making.

- **Data Exploration and Visualization:** The incorporation of sophisticated algorithms for analysis and visualization greatly enhances the process of data discovery, mining, and representation. Utilizing Artificial Intelligence (AI) techniques such as clustering and anomaly detection allows for the identification of hidden patterns and anomalies within the data. AI-driven visualization tools enhance data exploration by providing interactive and user-friendly visual displays. These tools allow users to understand data and extract actionable insights comprehensively.

- **Machine Learning and Statistical Analysis:** <u>Machine learning</u> (ML) constructs models by analyzing historical data in order to forecast patterns and make informed choices with limited human involvement. These models are used in AI data analytics applications, such as recommendation systems and search-based analytics in natural language processing. The best-augmented analytics tools are equipped with AutoML capabilities, enabling custom ML models to be created without requiring extensive training.

- **Natural Language Processing (NLP) and Natural Language Generation (NLG):** NLP and NLG are crucial tools for data analysis. They help computers and humans communicate effectively, extract critical information from large amounts of text-based data, and perform sentiment analysis to detect emotional tone. With NLG, analytics tools can provide easy-to-understand responses and generate reports in your language. This automated process enhances efficiency and conserves valuable resources, enabling compliance teams to efficiently extract crucial information from organized data. Sophisticated natural language generation (NLG) tools equipped with machine learning capabilities have the ability to provide comprehensive responses to intricate inquiries.

- **Predictive Analytics:** AI allows for the development precise prediction models that handle complex data, nonlinear relationships, and intricate features. Algorithms like ensemble learning and deep neural networks improve the accuracy and reliability of these models even further.

- **Prescriptive Analytics: Prescriptive analytics** uses advanced techniques to analyze data and provide specific recommendations for the optimal action or strategy to take in the future. It helps companies optimize inventory levels, pricing strategies, marketing campaigns, or customer service. It can also suggest the best actions in other applications, such as CRM or ERP software, based on data and rules. It answers the question, "What is the best course of action?" using mathematical models, algorithms, and simulations.

The benefits of augmented analytics and augmented analytics tools

- **Agility:** AI-powered augmentation streamlines the search space, presents relevant data, and suggests productive analysis paths. This agility lets users answer data questions faster, freeing time for more strategic tasks.

- **Accuracy:** Machine learning and AI technologies ensure accuracy by efficiently handling repetitive tasks. Augmented analytics provides a comprehensive view, reducing the risk of confirmation bias and enabling users to make informed decisions based on thorough analysis.

- **Efficiency:** Augmented analytics leverages machine learning and AI to automate specialized, repetitive tasks in data preparation, discovery, and statistical analyses. This automation enhances efficiency, saving users time and energy.

- **Confidence:** Augmented analytics tools are designed to be user-friendly, making data analysis more approachable for a broader audience. Integration into business workflows allows seamless exploration of specific questions. The context-aware nature of augmented analytics instills confidence in conclusions, leveraging users' industry expertise.

Challenges of augmented analytics tools
Adopting Augmented Analytics is a significant step in transforming the data and analytics market, offering the potential for a competitive advantage. However, several challenges and resistances may impede its integration. Key challenges include:

Adoption Challenges
- **Outcome Expectations:** Organizations often expect quick and favorable results from augmented analytics. However, technology has its lifecycle, utilizing AI

computation, analytics, and automation techniques. Maturation and improvement in analysis and outcomes require time.

- **"Black Box" Image:** Augmented analytics is perceived as a "black box," lacking transparency in decision-making. Trust in recommendations and insights is hindered without clear explanations, impacting user confidence.

- **Dependency on Legacy Platforms:** Organizations may face challenges due to a reliance on legacy analytics platforms, acting as barriers to adopting augmented analytics.

- **Job Security Concerns:** Automation in analytical operations raises concerns about job security as traditional workloads and processes undergo significant revamping.

- **Resistance from Business Leaders:** Business leaders may resist adapting to changing scenarios, preferring intuition and traditional decision-making practices over augmented analytics.

- **Misconception of Linear Progression:** There's a misconception that augmented analytics maturity follows a linear, progressive path, implemented once a robust foundation is established.

Governance Challenges

- **Need for AI Governance:** There's a critical need to emphasize AI and analytics governance and collaboration between analysts and data scientists to support the growing presence of citizen data scientists within business units.

- **Governance for Analytic Content:** Leaders must establish rules to govern analytic content and insights generated by augmented analytics. This ensures accuracy and validity and manages bias levels in findings and recommendations.

Use cases for augmented analytics

Different Sector	Benefits

Finance	**Financial Forecasting:** Augmented analytics leverages historical data and external factors for forecasting revenue, expenses, cash flow, and profitability. It facilitates scenario and what-if analysis for evaluating diverse outcomes and risks. **Financial Reporting:** Augmented analytics generates interactive, dynamic reports and dashboards to concisely present financial performance and key metrics. It also offers natural language explanations and narratives. **Financial Risk Management:** Augmented analytics identifies and monitors financial risks like credit, market, liquidity, and operational risks. It provides alerts and suggestions for mitigating or preventing potential losses.
HR	**Turnover and Engagement:** Identify turnover and engagement factors for informed retention strategies. **Talent Acquisition:** Analyze resumes, skills, and job fit to find optimal candidates. Automate tasks for streamlined hiring processes. **Learning and Development:** Use data analytics to assess workforce skills gaps, guiding targeted learning programs. **Diversity and Inclusion:** Detect and reduce bias in HR decisions with AI, fostering workplace diversity and inclusion. **Employee Performance:** Utilize data analytics to set SMART goals for employees. **Feedback and Recognition:** Provide timely, personalized feedback and recognition for enhanced employee performance

Retail	- **Optimize Pricing and Promotions:** Utilize augmented analytics to optimize pricing and promotions, considering customer behavior and demand patterns. - **Customer Segmentation and Personalization:** Segment customers and personalize marketing using data-driven insights from augmented analytics. - **Demand Forecasting and Inventory Management:** Forecast demand, manage inventory, and reduce stockouts with predictive analytics powered by augmented analytics. - **Fraud Detection and Prevention** Employ machine learning and anomaly detection from augmented analytics to detect and prevent fraud and anomalies. - **Customer Loyalty and Retention:** Increase customer loyalty and retention by leveraging sentiment analysis and natural language processing from augmented analytics.
Health care	- **Forecasting Health Outcomes:** Augmented analytics utilizes patient data and AI algorithms to forecast health outcomes, enabling healthcare professionals to tailor treatment plans to individual patient needs. - **Enhancing Patient Care:** Augmented analytics analyses data trends and provides healthcare providers with deeper insights into patient health, facilitating better decision-making and proactive care. - **Predicting Disease Outbreaks:** Augmented analytics contributes to predicting disease outbreaks and enhancing clinical trials by applying data analysis and natural language processing techniques.

Sales and Marketing	**Optimizing Pricing Strategies:** Augmented analytics analyzes customer behaviour and demand patterns to optimize pricing strategies, increasing profitability and competitiveness. **Enhancing Customer Segmentation:** Augmented analytics segments customers based on preferences, needs, and potential value, enabling personalized and targeted marketing and sales efforts. **Predicting Customer Churn and Retention:** Augmented analytics predicts customer churn and retention rates, allowing personalized interventions to retain valuable customers and improve satisfaction. **Improving Lead Generation and Qualification:** Augmented analytics, employing natural language processing and sentiment analysis, enhances lead generation and qualification for more accurate targeting based on customer sentiments and needs. **Measuring Marketing Campaign Effectiveness:** Augmented analytics provides insights to measure the effectiveness of marketing campaigns, allowing for data-driven improvements and strategic adjustments.
Manufacturing	**Enhanced Logistics and Resource Management:** Improves logistics and resource management by estimating shipping timings, production capabilities, and warehouse space availability through data analysis from multiple sources. **Proactive Decision-Making with Sensor and Machine Data:** Augmented analytics utilizes data from sensors and machines to optimize production processes, enabling proactive decision-making and minimizing downtime. **Improved Manufacturing Operations:** **Quality Control Enhancement:** Augmented analytics enhances quality control processes, ensuring products meet specifications. **Predictive Maintenance:** Predicts maintenance needs, allowing for proactive scheduling and reduced downtime. **Optimized Production Schedules:** Enhances efficiency and reduces lead times through data-driven insights in production scheduling.

	● **Margin Increase:** Supports cost optimization, resource efficiency, and strategic decision-making, leading to higher margins.

Conclusion

The functionalities of augmented analytics have transformative applications across all sectors, streamlining business operations and improving access to valuable data. Successful adoption requires a holistic approach, addressing challenges in strategy, people, process, data, and technology components.

The Role of Artificial Intelligence in Digital Transformation

The terms artificial intelligence (AI) and digital transformation (DX) are linked. Even when organizations or thought leaders only name one, they will likely still be referring to both working in tandem. AI, in short, already is and will continue to power the next phase of DX initiatives and software, creating opportunities and improvements not possible previously.

Since AI has myriad definitions, depending on setting and usage, we must first elaborate on its meaning as it relates to the concept of DX.

What is artificial intelligence (AI) in digital transformation?

Most often when AI is discussed in the context of engineering and manufacturing, we are actually referring to artificial narrow intelligence. It is not a matter of machines thinking like people, but rather sophisticated algorithms designed for a pre-defined task with a well understood set of inputs. Artificial narrow intelligence designed for CAD applications, for instance, will never have a "thought" outside those specific, previously outlined parameters.

Unlike standard automation, AI-powered processes can react to new information or unexpected changes. That is its biggest benefit. Unrestricted by predetermined outputs, AI algorithms learn from success and failure. They are capable of self-correction and can analyze data to detect incoming challenges before they occur.

From another perspective, automation provides optimal value when deployed in a pre-existing, well-defined process, such as established manufacturing lines. The user always dictates automation processes within the confines of a set of given inputs. AI, by contrast, is best utilized when trying to overcome challenges that are more complex, or not defined by preset rules. If the user gives an AI a set of inputs, the AI will analyze the data and suggest the optimal course of action, or just execute it automatically (depending on the situation).

Why AI is important to digital transformation

At PTC, we believe that the greatest power of digital technology is to transform the physical world – improving productivity, innovation, and impact. To that end, AI is essential for many complex DX applications. Without it, the digitization of products and processes would produce amounts of data that no human could be expected to analyze and react to within an

acceptable timeframe. As a result, if you lift up the hood of nearly any PTC product, you'll find AI powering critical applications, such as the generative design in Creo, or predictive analytics in Thingworx.

Let's use Vuforia for an example. Vuforia is a powerful, scalable enterprise augmented reality (AR) platform – but what makes it so? Well, unlike simpler GPS-based or QR/barcode-based AR programs, which rely on data stored outside the object for AR functionality, Vuforia products increasingly use computer vision to actually identify the hardware components the user is looking at based on shape and other visual features. To do that it needs access to a database, and it needs to be able to read the patterns in the shapes to accurately identify what the user is seeing. This creates a greater level of efficiency for the user.

For another use case, let's look at how generative design is used in CAD. It is no secret that many of today's engineers use 3D CAD programs (such as Creo) as essential tools for creating and developing product designs. While this process is definitely faster than creating paper-based copy, it still is not necessarily optimized. For instance, many engineers are given system design requirements before they begin – and in a non-AI-enhanced program they would have to build the design from scratch. Generative design uses AI to automate this complex process, automatically generating the optimum design with minimal manual input. It's a powerful behind-the-scenes technology that makes engineers faster and more efficient and results in innovative designs.

It is not enough to collect data from DX initiatives. Without an AI component, the likelihood of any collected information from various stages of the product lifecycle being utilized to improve efficiency or reduce breakdowns is low. In addition, organizations not currently pursuing AI initiatives within a larger DX strategy risk falling to digital laggard status. A 2021 study from PwC found 86% of its respondents identified AI as a mainstream technology. Roughly 33% have already started implementing limited AI use cases, while a quarter of respondents had fully enabled, AI-augmented processes in widespread adoption.

What are the benefits of AI in digital transformation?

Any technology, AI included, must be considered with an organization's profitability in mind. Companies today are already looking to apply DX initiatives in very controlled settings, where the outcome can be weighed against the bottom line. It isn't enough to simply say "using this DX technology makes this process better." Organizations should be measuring to identify exactly how and why their investments are impacting their workflows. This mindset removes ambiguity and allows executives to speak and act with greater confidence regarding company direction. With this approach in mind, we have identified four key, measurable benefits of AI in DX initiatives:

1. More effective decision-making

Important decisions, contrary to many films and shows, cannot rely solely on gut instinct. Even a seasoned leader needs access to any and all relevant data in order to reach the optimal conclusion. Time is always a factor, so this decision must often be reached with speed. AI can help identify and highlight important information regarding product performance, workflow optimization, and predictive outcomes. A well defined program can, for instance, run millions of simulations to calculate roughly how a new product should perform within the first six

months of its lifecycle, based on the data available. With information like this in hand, decision makers can better evaluate what work still needs to be done, identify where potential pitfalls lie, and make more accurate estimations and predictions of the time and resources they will need to move forward.

2. Increased profitability

AI is not a replacement to human judgment, but can be a highly effective tool when it comes to optimizing time to value. Manufacturers are constantly faced with the need to more consistently deliver working products that meet any and all regulations within a set (and usually shrinking) time table. AI helps optimize product timelines in many ways, whether it is assisting in catching problems before they occur, running simulations, or fact-checking against existing proprietary data. By fully automating many time-consuming tasks such as these, AI software frees up human resources to be better deployed on the more cognitive aspects of product development, all while reducing the resources needed, thus increasing the profit margins.

3. Enhanced analytics

Data sets can be huge and complex, coming from various sources and geographical locations. In the past, it took serious time and personnel to culminate, process, and analyze this data. While humans should absolutely remain a vital part of the final analysis, AI can rapidly streamline every aspect of this process - delivering data results in a fraction of the time. For large manufacturers with numerous assets spread throughout the globe, AI is arguably essential to delivering actionable insights within a timely manner.

4. Holistic view of the customer

The digital world is built on data, and what that data is and where it comes from is constantly changing. In the past, tools like cookies were used to help organizations gain insight into consumer behavior. Now, however, privacy concerns and other factors have led to a steep decline in cookie usage, so companies will need new tools to better understand how their customers are behaving. AI-enhanced software can and likely will be this next iteration, helping decision makers see their customers arguably better and more comprehensively than cookies were able to do.

How AI drives digital transformation initiatives

Given these benefits, it's not a shock to see why AI already is and will continue to drive DX initiatives across a wide range of industries. To better illustrate, let's look at two specific ways AI makes a difference: automation and data analytics.

Automation

Automation has always been as good as the program controlling it. Yes, a machine can automate certain assembly processes, but the work stops very suddenly if this machine doesn't know it's connected to a larger assembly line, or which process comes next. Software has been guiding automation for some time, and AI programs like machine learning have been optimizing automation for years - and we expect this to only continue. Automation is a crucial aspect of DX, because with automation often comes visibility. Once a company has

automated a process, they understand it fully, they can see the average completion time, average down time, and other crucial details.

Now, apply a well-designed AI application, such as machine learning, to better understand this data, understand where the bottlenecks are, why/when the downtime most frequently occurs, and not just for one automated system but the entire ecosystem. This information comes from software yes, but from IoT sensors, edge computing devices, service reports, and many other aspects already frequently dependent on DX technology. By implementing the right AI tools into existing DX deployments, organizations can see even more benefits.

Data analytics

As said before, AI and data analytics greatly complement one another. Important information comes from many sources, even before the product is launched into the real world. With the help of AI, companies can start to fully utilize the power of the digital thread, a connected closed loop of data that comes from a product during every stage of its lifecycle, from design inception to end-of-life service. This plethora of information provides unprecedented levels of product understanding and PLM optimization opportunities.

But data that comes from this many sources must be aggregated as quickly as possible, and AI simply can compile information faster than any human can. It may not understand what it's looking at, but AI can surface any and all relevant information to make the right decision. For one quick example, please see this video from Open AI on how data can be quickly compiled into a readable chart:

How AI works with the cloud to empower digital transformation

Frequent readers or current clients of PTC may have noticed a shift in our messaging as we promote the increasingly cloud-based nature of our software. AI is part of the reason for this shift. AI needs processing power and most organizations do not have the space on-premise for extensive server rooms. Software as a Service (SaaS) products like Onshape and Arena make special use of AI, as the larger the database, the more capable and efficient the AI becomes.

SaaS solutions, which place the vast majority of computer processing in the cloud, give the benefits of AI without so many burdens. AI is key for companies becoming more agile and more reactive—even predictive—in their problem solving. A traditionally automated solution does not need the cloud the same way AI does, but it also is not utilizing nearly the same amount of computing power to analyze the data in way that will give a competitive edge. For more information on just what impact this will make, please see this highlighted video from LiveWorx 2021:

Real-world use cases of AI and digital transformation

Decision makers understand the value of technology, but they tend to be sold on its practicality. AI is not a "couple years" solution or even "a couple months" solution, it is actionable now and many organizations are already using it to augment their offerings and improve internal workflows. Here are three quick examples of AI working within DX initiatives to improve operational efficiency:

1. Customer service

Chatbots are nothing new and remain the most common form of AI customer service many people think of. Chatbots can be effective but they are often extremely limited, simply matching a customer query to one of many preset answers. These presets are often made from the most common Q&A, so they can solve a great deal of customer questions, but nowhere near all. Large language models—such as ChatGPT—by contrast, are more advanced.

These new models do not rely on any presets. Instead, the value of a large language model is often tied to the information it is pulling from. ChatGPT, while impressive, cannot tell truth from fiction, so its dependability is directly linked to where its model comes from. A large language model pulling from the entire internet may not be helpful, as there could be conflicting and false information present to dilute actual answers. That said, this new form of generative AI can be tooled to much more specific language models. For instance, PTC could create a ChatGPT-like program that only draws information from PTC and related websites. This means it is only scanning for information from approved sources, and its knowledge is far more likely to be accurate.

This new wave of chatbots will be able to react to the customer and answer them directly. It still isn't a perfect system, but it is a significant step up from earlier preset-based chatbot models.

2. Manufacturing

Manufacturing in its broadest sense has many segments and many areas when AI can be applied, so for the sake of brevity, we'll focus in on smart manufacturing. Smart manufacturing, as its name suggests, is the application of smart, connected technology (including AI) to facets of traditional manufacturing. For instance, failure prediction: Understanding when and where machinery will break down to better equip and prepare technicians. Without failure prediction, organizations are purely reactive to downtime, a stance which often lengthens the period of inactivity and exacerbates the costs associated with every single failure.

While humans are certainly capable of calculating failure predictions, it is an intensive process. AI, in smart manufacturing, can instantly read and analyze the data and offer human operators strong indicators of when and where machine failures will occur. This lets companies be more strategic and more proactive in maintenance operations, and greatly increases first-time-fix rates. Of course, AI goes far beyond this role in smart manufacturing and, to see more, please have a look at this PTC webinar on AI in the production space:

3. Healthcare

Preventative maintenance saves dollars in manufacturing. Advanced, AI-powered, healthcare analytics can save lives and improve preventative healthcare—solving problems before they become life-threatening. AI can be used to analyze millions of X-rays in seconds, helping to identify issues that even skilled technicians might miss. The same is true with CAT scans, ultrasounds, and essentially every other piece of data. All of it can be analyzed against a much larger set of results, helping doctors detect patterns and formulate treatment strategies with higher levels of information.

What is the future of AI in digital transformation?

The effects of AI in DX efforts are already felt today at multiple access points. Engineers designing CAD files with generative AI can see automatic updates in their design parameters, which opens up new design possibilities, including viable alternatives not considered before—but, when used, may be lighter, reduce material cost and save on part construction and deployment.

The executive trying to improve efficiency across her multi-location organization has access to analytics offered by the AI platforms, rather than just a surplus of data. With it, she can better execute an AI enterprise strategy. Improvements include greater visibility into company initiatives (either at the corporate or departmental level), which can accelerate the approval and production processes for new products and solutions, thus shortening time to market without bypassing key steps.

Going forward, PTC expects to see more companies embrace AI in their DX initiatives to maintain a competitive advantage. AI is integral to some of our most exciting products and will continue to power PTC solutions for years to come. This is not about replacing people with computer software. It is about efficiently analyzing and acting upon cloud-based data, giving people the tools they need to succeed today and tomorrow.

A New Approach to Supply Chain Digitization

Conventional wisdom says that it takes three to five years and tens of millions of dollars to digitize a corporation's supply chain. However, a few companies have reaped major benefits—including higher revenue and customer retention with a faster, cheaper approach. This new approach involves leveraging available data as well as using analytics to segment and better understand customer or supplier behavior. It also optimizes inventory, production and procurement by adding additional automation to revamp or reintroduce novel processes. The current environment may be the new normal for a while. It will be critical to operate with agility in meeting customer demand while controlling fulfillment, manufacturing and procurement costs.

The A&MPLIFY team believes that when a company embarks on an investment cycle, it is critical to identify the use case, implement and quickly prove value that can potentially fund continued investment cycles. As an example, identify a digitization opportunity for inventory management, invest and implement the specific use case. Then, use some of the savings to invest, implement and win in the next supply chain function. This cycle is continual and agile, re-evaluating priorities regularly as the investment cycle continues.

As companies seek to exploit the benefits of improved levels of supply chain digitalization and networking, innovative technologies have the potential to significantly disrupt the existing supply chain operating models and offer dramatic advances in supply chain management. These cutting-edge innovations are streamlining customer fulfillment, aiding in the attainment of profitability objectives and bolstering the resilience of supply chains. By offering comprehensive supply-chain visibility through real-time data and intelligent insights, these technologies empower companies to make agile and informed decisions amidst evolving market dynamics.

Here are the top technology trends to consider in your supply chain approach:

Hyper automation

A combination of technologies—artificial intelligence (AI), machine learning (ML), smart machines, robotic process automation (RPA), etc.—that can facilitate or automate tasks and activities at scale, that originally required some form of human judgment or action.

Embedded AI and analytics

Software capabilities that deliver real-time reporting, interactive data visualization and/or advanced analytics and intelligence—including ML, predictive and prescriptive analytics—directly into an enterprise business application.

Augmented data intelligence

A tool consisting of existing and new technologies combined with near-real-time data from the ecosystem, which facilitates advanced data processing and allows for the delivery of insightful information, predictions and suggestions that are relevant and adaptive to user experiences toward more connected supply chain data.

Digital supply chain twin

A digital—dynamic, real-time, and time-phased—representation of the various associations between the data objects of the physical (and often multi-enterprise) supply chain, as a basis for local and end-to-end aligned decision making.

Edge ecosystems

The combination of edge computing and edge data processing, delivered through networks of human resources, devices, smart machines, sensors, and computing systems that allow people to make informed, reliable, secure, and agile decisions at the edges of enterprises.

Blockchains in Supply chain

A blockchain is irrevocable transactional records (blocks) that are shared and accessible by all supply chain participants in a predetermined blockchain ecosystem (network). Blockchain's distributed ledger can track highly complex supply chains at a more granular level than otherwise, by overcoming concerns related to suppliers' business confidentiality and privacy or when requiring a trustworthy system of records. This can be used to improve efficiency through analytics to detect theft, fraud, or even tax evasion.

Internet of things (IoT)

IoT is a network of physical objects that contain embedded or covert technology to communicate, sense, or interact with their internal states or the external environment. The adoption of IoT is growing in supply chains, but much activity is still focused on critical areas such as logistics, sourcing, and transportation. However, the IoT could have a broad and profound impact on the supply chain in areas such as, improved asset utilization, governance, higher uptime, improved customer service, improved end-to-end supply chain automation, or improved supply availability, and supply chain visibility and reliability.

The A&MPLIFY team advises technology leaders responsible for innovation in supply chain and operations to:

1. Consider a company's supply chain maturity and the risk culture of the organization, identifying digital initiatives (value hypotheses) that have the highest value, serves the mission and aligns with company values and resources (budget, talent, etc.).

2. Adopt robust digital operating and governance models that provide the muscles around new capabilities in the organization to succeed.

3. Target efforts around integration, visibility and data to address challenges during periods of disruption.

4. Create an acceleration roadmap that fosters new initiatives being designed, implemented, reiterated and improved over time based on the company's overall strategy.

What is Digitalization in Healthcare?

Healthcare is being transformed through digitalization, which is also enhancing services. With the development of technology, patients are increasingly accessing the internet to learn more about their health, particularly in the case of cancer and chronic illnesses, and returning to their doctors with tons of fresh insights and inquiries. It is, in a way, increasing awareness and how people are making the best use of the internet to enhance their knowledge.

Organizations can help patients with digital health solutions like mHealth apps to maximize the patients' drive for this self-guided study. The apps can help patients in enhancing their self-management and help them clear their doubts. Additionally, it will enable them to provide healthcare professionals with a more significant ally in the collaborative decision-making process.

In the best-case scenario, digitalization in healthcare can easily pave the way for a holistic cultural shift from traditional to collaborative care. It'll make the shared decision-making process normal.

Furthermore, introducing healthcare software development will not only keep you ahead of digitalization but also it'll provide precise and high-quality clinical services.

Digital Healthcare Solutions Use Cases

By now, you must know that digital transformation in healthcare makes a comprehensive overview of how medical units monitor and manage patient health. Implementing innovative healthcare IT solutions is one of the main goals that come with it. It aims to enhance compliance, primary task operations, and care of the patient while cutting down costs.

Let us now delve into the examples of digital transformation in healthcare.

1. Automation

Automation is one of the most powerful things for the healthcare industry. The global AI market reached a value of $119.78 billion in 2022 and is expected to expand at a CAGR of 38% from 2022 to 2030. The data depicts that in the upcoming years, artificial intelligence will become widely used by several industries, with healthcare automating a couple of tasks to simplify workflow.

Automation helps hospitals in the best possible ways to do more with the learner workforce and fewer running resources, which results in time and cost savings. On the other hand, it is also beneficial for the patients as it enhances the quality of their care and reduces the time of their stay at the hospital. To be precise, automation helps healthcare with the following:

It enhances the safety of the patient.

It expands efficiency.

It improves access to care.

It engages the patients.

2. Connected Ambulance

A connected ambulance acts as an assistant to healthcare providers. It gathers and transmits the patient's vital information, which can be obtained using wearable devices, sensors, and HD cameras, and sends it to the hospital. In contrast, the patient is transported to the required hospital or department.

One of the most significant advantages of connected ambulances is that the doctors would already have access to all the necessary information to do the required medical procedures without wasting any time, even before the patient gets to the hospital.

Connected ambulances help healthcare providers with the following:

It helps in providing real-time care.

It offers transformative technology.

It is always connected to the hospital.

It transports doctors virtually to the ambulance.

3. On-demand Healthcare Solution

On-demand services in the modern world control the sphere dominated by technology. Additionally, the healthcare industry is rapidly changing, and efforts are being made to enhance the available services immediately.

When it comes to the aspect of health, nothing significant has changed. On the latter, patients need instant solutions for their problems, and that is precisely where on-demand healthcare solutions fall into place.

Consider the following scenario: you have a high fever, and instead of waiting for the doctor to see you, you can easily schedule an appointment at the clinic by tapping a few buttons; sounds fantastic, right? The on-demand solution helps you with the following:

It reduces the paperwork.

It offers people immediate access to medical care.

It gets rid of various hassles.

It provides effective patient interactions.

4. Telemedicine and Virtual Visits

The rise of virtual medical visits is one of the biggest trends in the healthcare sector. It enables phone or video appointments between the patient and healthcare practitioner, thereby benefiting both health and convenience. Telehealth is upscale that health IT needs.

Telehealth and telemedicine market is expected to hit US$ 912 Billion by 2033, growing at a compound annual rate of 24% from 2023 – 2033, according to Future Market Insights. Telemedicine and virtual visits can help you with the following:

Comfort and convenience.

It can control infectious illnesses.

It offers a better assessment.

It supports the management of chronic conditions and primary care.

5. Patient Portals

Provide patients easy access to health records and benefits such as electronic prescriptions and online doctor appointments. It helps in improving communication between patients and medical professionals.

Using patient portals, you can get test results, ask questions, or update patient profiles and insurance companies. A few patient sites also enable patients to arrange appointments and make payments online. You can benefit from a patient portal by doing the following:

It provides rapid growth.

Implementing a patient portal increases office efficiency.

It streamlines the workflow.

It supports telemedicine facilitation, which enables patients to consult with you via message or video calls.

Patient engagement is improved.

6. Health Wearables

Wearables are another great use case of healthcare IT services. They are designed to collect data on the users' health and exercise, and they can even send patients' information to a doctor or other healthcare provider in real-time. Patients today are more concerned about their health than ever before. Instead of going to the doctor when ill, they look for efficient ways to monitor their health indicators.

One of the main factors contributing to the significant rise in wearable medical gadget sales is this. Tracking multiple health parameters and providing reliable health data in real-time are made possible by the digital transformation of healthcare. Health wearables can help you in the following areas:

It reduces healthcare costs with digital health transformation.

It helps in boosting patient engagement.

It promotes proactive healthcare.

The workload of the workforce is reduced.

What are the Benefits of Digital Transformation in Healthcare?

Medical digital transformation offers several benefits for patients and healthcare organizations. These advancements of healthcare app development allow medical professionals and healthcare facilities to work more quickly and obtain reliable patient data and health measurements. It will enable them to develop a successful treatment in less time.

Let us go through how digital transformation in healthcare benefits patients and healthcare organizations.

Benefits of Digital Transformation for Healthcare Organizations

You must be aware by this point that digital transformation can assist healthcare organizations in developing procedures and systems that are interconnected for both patients and medical personnel, such as Software as a Medical Device (SaMD), and likewise. Thanks to it, they can deliver the necessary treatment and services more effectively and precisely. Keeping all this in sight, let's unleash how it benefits healthcare firms.

Advantages of Digital Transformation for Healthcare Organizations

1. It Offers an Optimized Workflow

The digital healthcare software solution helps in cutting down on paperwork. It eliminates the time required for patient examination and enables an easy and convenient way to access accurate patient healthcare data.

2. It Offers Better Interaction with Clients

With digital transformation, healthcare organizations communicate effectively with patients through chats and video calls.

3. It Helps in Creating a Secure Database of EHR

The EMH platform helps access the encrypted patient health data and its demand sharing with other laboratories and specialists. EHR software development from Radixweb can help you get started with it.

4. It Offers Advanced Communications

Accurate patient diagnosis, quicker data transmission, and other internal communication are all made possible for organizations because of enhanced communications.

Benefits of Digital Transformation for Patients

Gone are the days when in-person appointments were the only option for patients. There are several advantages that patients might gain from the digital transition. Let us go over the list of advantages so you can better grasp them.

Advantages of Digital Transformation for Patients

1. It Provides Personalized Medical Care Services

Using digital healthcare enables more precise health diagnosis and provides more efficient treatment. With that being said, you also need to know that custom software development can be the future of the healthcare sector as it also emphasizes providing excellent patient care.

2. It Provides Simple Access to Individual Health Records

Patients can acquire a complete health metrics analysis online with a solution in healthcare web app and monitor and manage their personal health information.

3. It Provides Easy Appointment Scheduling

Thanks to the digital change in healthcare, patients can pick the most convenient time and date for their visit.

4. It Offers Excellent Communication with Doctors Online

Patients can get professional assistance online through chat, or video calls with detailed prescriptions and treatment plans through email or on their personal portal page.

These are a few advantages that digital healthcare solutions can offer to healthcare professionals and patients.

Why Digitization Happens Slowly in Healthcare?

No matter how far the technology gets, a few challenges and stoppers sometimes hold the process back. It occasionally takes longer than usual to become used to new technology. So let us take a deeper look at why digital transformation happens at a slower rate in the healthcare niche.

1. Cybersecurity

First, it is essential to understand that when it comes down to integrating new technologies, they are always related to cybersecurity issues to guarantee the patient data's absolute safety. Having a cybersecurity expert is essential.

Today, it's not easy to find a medical software development company that follows high-end security measures. And this deficiency leads to increased risks and system vulnerabilities.

2. Distributed Workforce

The healthcare domain has become highly dynamic and distributed due to trends in telemedicine technology. This enormous transition has increased the risk of inappropriate worker authentication and access. The lack of a plan to connect healthcare practitioners and their dispersed patients increases the likelihood of worsening the situation.

Digital Trends in Healthcare Industry

Technologies have driven the healthcare industry through various innovations and advancements for quite some time. The advent of cutting-edge technologies, custom software development, and mobile healthcare platforms has also significantly pushed the industry.

Due to the presence of these, medical practitioners in the healthcare industry provide enhanced patient care through effective and timely communication. So let us review the latest digital healthcare trends that IT offers for the healthcare industry.

Digital Trends in Healthcare Industry

1. Artificial Intelligence

The global healthcare AI market is expected to reach $188 billion by 2030, increasing CAGR of 37% from 2022 to 2030. Several hospitals and physicians are using AI to enhance patient treatment based on the data compiled by medical practitioners. AI in healthcare helps in the

best possible ways to predict patient behaviors and creates highly accurate digital health profiles.

2. Blockchain

The decentralized ledger in blockchain facilitates seamless interaction between patients, administrators, healthcare services providers, and insurers. Blockchain helps in verifying health credentials in a privacy-preserving way.

It is finding new suppliers for critical goods. It eliminates risks while simplifying and accelerating supplier onboarding and supplier management.

3. Telehealth

This trend is changing the way patients interact with healthcare providers. A few impactful technologies under telehealth are mobile health apps (mHealth), telemedicine, remote patient monitoring, and video conferencing. Telehealth can be integrated with IoT and wearable devices to manage high-risk patients by tracking their activities and data. To be precise, telehealth is a futuristic solution that encompasses broad aspects of digital health.

4. Medical IoT

Hospitals have great success with IoT devices that do more than just assess patients' health. They are utilized to track the real-time location of medical equipment including wheelchairs, nebulizers, oxygen pumps, and numerous other monitoring devices since they are fitted with sensors.

IoT devices make it possible to monitor patients in real-time, improve care, and guarantee efficient healthcare operations with lower levels of mistake, waste, and system expenses.

5. On-demand Healthcare

An on-demand healthcare application works in the best possible ways to save patients from the hassle of visiting clinics and medical organizations regularly for follow-ups. Plus, this trend is not just user-centric.

With its help, patients can book appointments at home, make payments with the app, and get instant summaries of their medical reports that they can use for future medical consultations.

6. Big Data

The decision to digitize records and the quick advancement of medical technology have opened the door for big data to have a substantial impact on the sector. Big data is used by industries to study their consumers and then customize their goods and services.

Significant data sources in the healthcare sector incorporate patient medical records, findings from physical exams, hospital records, and data gathered by medical testing equipment.

Conclusion

By now, you must know that digitization integrates digital technologies in healthcare, i.e., digital health technology systems, to offer patients a great experience and enhance healthcare providers' efficiency. Plus, it is not just confined to the benefits that come with it, but it is also a call for cultural change that consists of using brand-new business models and new ways of thinking that you aim to offer the users.The blog aimed to walk you through digital transformation and how it benefits the healthcare sector. To get the most out of it, your processes will need to undergo a complete transformation.As a leading provider of healthcare software development services at Radixweb, we have developed heaps of scalable solutions in the healthcare industry based on the client's requirements. With a skipped team of dedicated developers and by using cutting-edge technologies, we will drive the ultimate healthcare digital strategy for your business.

Digital transformation in the retail industry is about implementing new technology to create better customer experiences, optimize business processes, enable retail workers, and build more agile, growth-oriented business models.

According to the latest research from Gartner, more than 50% of all consumer spending will be done online in 2024 and 60% of it will be done through mobile devices. Only mobile-centric retailers who embrace the digital revolution will be the ones who thrive and grow.

However, retail transformation goes far beyond simple eCommerce and mobile purchasing experiences. It includes integrating new and emerging technologies like AI, big data, AR/VR, and more to transform retail operations and models to sustain growth, keep up with competitors, provide better customer experiences, and continue to innovate.

What Is Retail Digital Transformation?

Retail digital transformation is the infusion of technology in the retail industry to enhance operational efficiency, improve customer experience and drive growth. Retail digital transformation includes POS systems, personalized shopping experiences, self-checkout systems, cost optimization, VR showrooms, branded mobile apps, geofencing, and AI-powered product recommendations.

What's Driving the Demand for Digital Transformation in Retail?

The retail industry is a $7T global market employing 1.8B+ people. Additionally, there are 3.2B consumers worldwide who shop online. Gone are the times when retailers created value and earned loyalty only through factors like competitive pricing, store proximity,

convenience, and variety. The current times are different from the one-size-fits-all era of communications and promotions. Personalization in communications and marketing tactics is necessary to retain customers and bring in new ones.

Retailers can now use data and insights to increase the frequency of purchases of their existing customers and target high-value customers of traditional retailers.

The demand for digital transformation in the retail industry has increased because it has the potential to directly drive revenue and growth for retailers.

Challenges in the Digital Transformation of the Retail Industry

Here are a few challenges of digital transformation in the retail industry.

1. Coping with change

Retailers managing their business traditionally might find it challenging to shift to a new system. This might create resistance to change to digital methods from in-store employees, store managers, corporate employees, and customers.

Large retailers must communicate change well in advance to secure buy-in from key stakeholders and everyday technology users to understand their problems and build solutions contextual to their needs.

2. Budget constraints

Digitally transforming a retail company is a costly affair. It involves both tech and human resources working together to implement an efficient management system. A significant challenge faced by medium and small-scale retailers is a lack of funds to enable a digital transformation.

3. Complexity

Implementing technologies such as blockchain, internet of things, and augmented reality is complex. The intricate details, analysis, steps, and procedures can be confusing, and people with little or no expertise can find it hard to navigate through a digitized retail system.

Even more familiar retail technologies like POS systems and self-checkout may seem like they've reached critical adoption. However, these technologies often still cause friction for customer and employee end-users, causing poor experiences, frustrated customers, and negatively impacting team member productivity.

What Is a Digital Adoption Platform?

Benefits of Digital Transformation in the Retail Industry

Let's discuss some of the most significant benefit of digital transformation in the retail industry

1. Increased customer retention

Retailers can segment their customers, analyze their buying behavior, set the customer strategy right, and then trigger personalized communications and promotions.

Let's take an example of a fitness enthusiast who regularly purchases health supplements from a retailer. Using data and insights, a personalized promotional campaign on health supplements can be created for them to increase purchase frequency and retention.

A case in point can be the digital transformation of Target's retail experience. Target is the 7th largest retailer in the U.S.A., headquartered in Minneapolis, Minnesota. Target is using sophisticated technology such as artificial intelligence, machine learning, and predictive analytics to identify the needs of their customers based on their past store purchases. This boosts customer experience and enables mass personalization for businesses, leading to more considerable customer retention.

2. Providing useful market insights

Consumer data analysis can be utilized to generate helpful market insights. These market insights help outline specific actions and strategies that retailers can take to increase their growth and profitability. The insights also help retailers know their customers better and establish a high sense of intimacy with them, which is a crucial growth-driving factor.

3. Implementing efficient marketing campaigns

Through digital transformation, retailers can collect customer data to create personalized and targeted marketing campaigns using technologies such as CRM, data analytics, and marketing automation. This allows retailers to identify patterns and trends while providing insights into their target audiences. Access to such information reduces the cost of marketing activities and helps tweak marketing campaigns with changing consumer behavior.

4. Easier inventory management

Using technology and data in the retail industry leads to efficient inventory management. It enables retailers to use digital technologies to streamline and automate their inventory processes. Digital transformation in retail helps increase operational efficiency, quick order fulfillment, warehouse management, figuring out lead times, and safety stock to avoid stock-outs.

5. Improved customer service

By using digital technologies, retailers can create an omnichannel customer experience, allowing customers to receive help and support across multiple channels, including websites, mobile apps, email, and live chat. Digital transformation provides self-service options for customers to put up their queries and grievances on the chatbot, allowing round-the-clock real-time personalized customer service. Such technology allows the customer to move through the customer journey with the most negligible interactions allowing cost efficiency for retailers.

Examples of Retail Digital Transformation

Emerging technology is changing the way enterprise retailers operate. Let's explore a few of the most impactful retail digitalization examples changing the industry.

1. POS systems

Today, enterprise retail point of sale (POS) systems like NCR, Lightspeed Retail, iQmetrix, Square, and more have undergone a significant transformation, playing a pivotal role in reshaping enterprise retail operations. These modern POS systems are no longer just transactional hubs; they have evolved into comprehensive retail management solutions. Integrating advanced technologies like cloud computing, AI, and data analytics, these systems offer real-time inventory management, sales tracking, and customer data analysis.

NCR-retail-pos

This integration enables retailers to make informed decisions quickly, improving inventory turnover and reducing waste. Furthermore, the incorporation of mobile POS systems allows for greater flexibility in customer service, enabling transactions anywhere in the store, reducing wait times, and enhancing the overall customer experience. Additionally, POS systems now seamlessly integrate with other business tools, such as CRM and ERP systems, ensuring a unified and efficient operational workflow.

Modern POS systems play a critical role in personalizing customer experiences, using AI-driven insights to offer tailored recommendations and promotions, thereby increasing sales and customer loyalty. The integration of omnichannel capabilities ensures a consistent shopping experience across online and offline platforms, crucial for meeting the modern consumer's expectations.

This seamless integration also enables retailers to gather comprehensive data across all channels, offering deeper insights into customer behavior and preferences. Moreover, enhanced security features in these systems ensure safe and secure transactions, building customer trust.

For large-scale retailers, the modern POS system is not just a tool for sales transactions but a cornerstone for strategic decision-making, operational efficiency, and customer relationship management, marking a significant leap in the digital transformation of the retail industry.

2. Personalized shopping experiences and product recommendations

Leveraging data analytics and machine learning, retailers can tailor offerings to individual customer preferences, enhancing the shopping experience and fostering loyalty. This customization, evident in online browsing, targeted promotions, and in-store interactive experiences, increases customer engagement and purchase likelihood. This approach is crucial for large-scale retailers aiming to maintain a competitive edge and build a deeper connection with their customers.

ai-powered-product-recommendations

For enterprise-level retailers, integrating AI-driven personalization into digital transformation strategies is key. It not only boosts conversion rates and average order values but also provides insights for inventory and marketing optimization. As retailers refine their AI

models with ongoing data analysis, the effectiveness of personalized experiences continuously improves. This shift towards advanced personalization is a core component of digital transformation in the retail sector, essential for large retailers adapting to changing consumer behaviors and market dynamics.

3. Self-checkout systems

Self-checkout systems have been on the verge of mass retail adoption for a decade. The main reason adoption hasn't occured is friction in the customer experience, with tedious machines, self bagging, and errors in the checkout process. With new self-checkout machines that overcome many user experience challenges, mass adoption of self-checkout has already happened.

4. Cost optimization

Cost optimization enables retailers to maximize the revenue from their products with big data on buying habits and trends, predictions in supply chain, and more. This process is critical in the current retail landscape, which is characterized by rapid technological advancements, changing consumer behaviors, and intense competition.

5. AR/VR showrooms

With AR/VR and related augmented overlay technology, retailers are now providing customers with digital projections to see examples of how potential purchases could look in their home or on themselves. Examples include brands like:

IKEA using AR to place furniture in your home to conceptualize how it will fit into your home's esthetic.

Warby Parker using AR to help online shoppers try on glasses without having to physically send trial pairs to homes.

BWM using VR for customers to take virtual test drives.

ASOS using AR to for virtual fitting rooms.

Digital Transformation Trends in Retail

Here are some of the major digital transformation trends in retail for the year 2024.

1. Big data

Retailers today are leveraging big data to understand their customers better. The modern customer expects a personalized and efficient shopping experience. The retailers are catering to the customer experience demand using predictive and prescriptive analytics, allowing them to manage their inventory, merchandising, and devising a procurement strategy.

Decisions informed by big data directly help retailers get a better return on investment.

2. Omnichannel

Customers involved in both retail and online touchpoints are likely to become more valuable to the retailer. Omnichannel retailing strategy involves connecting and synchronizing business transactions with the customers via different channels such as social media, emails, and website. Omnichannel helps in creating a seamless shopping experience for the customer.

Home Depot, an American multinational home improvement retail corporation, has created a personalized omnichannel shopping experience through offerings such as click-and-collect, and personalized marketing.

3. Internet of Things (IOT)

The Internet of Things in the retail industry has transformed how products are tracked in the supply chain. GPS and RFID technology has been a game changer for retailers.

The Internet of Things has also played a role in controlling shoplifting using geofencing. According to the association for shoplifting prevention (NASP), more than $25 million worth of merchandise gets stolen from retail shops each day. RFID tags allow store operators to create a virtual barrier around retail locations which helps in controlling theft.

4. Blockchain

Retailers are adopting blockchain technology for its increased security, efficiency, and transparency. Blockchain in retail is not limited to digital payment methods. It helps track products in the supply chain and allows retailers to store information in a decentralized ledger.

Nestle adopted the blockchain technology in 2017. The Swiss giant has been using blockchain to make product tracking smooth, easy and standardized. Over the years, it has expanded the use of blockchain to its Swedish coffee brand Zoegas.

5. Augmented reality (AR)

Augmented reality creates a unique digital experience. Brands can leverage this experience to enrich the interactions between the customer and the company. The "try and buy" technology is a part of the augmented reality experience. Brands are now creating virtual simulations to help users interact better with the product from the comfort of their homes. The creation of virtual stores using augmented reality combines the traditional retail experience with e-commerce in the best possible way.

How Digital Transformation Can Help The Energy Industry

Society started the process of digital transformation in the late 20th century. Further, the transformation developed rapidly in the first two decades of the 21st century. Digital transformation has already touched many industries, especially retail, healthcare, fintech, insurance, energy, and manufacturing. It helps companies stay competitive, increase their profit margins and optimize expenses.

Basically speaking, digital transformation is the process of implementing computer-based technologies into companies' products, processes or strategies. Digital technologies enable organizations to respond to customer and market demands faster and in a more flexible manner. In practice, we are talking about digital transformation processes, such as moving your business online or integrating RPA technologies.

What is Digital Transformation

We will focus on the digital transformation in the energy industry since this sector has been an early adopter of digital technologies. Digital transformation trends in energy utilities started in the 1970s. For example, power utilities were the first to use technologies to facilitate grid management and operation. After that, many companies started to use digital meters instead of the analog ones. Regarding Oil and Gas companies, they have applied technology innovations to improve decision-making for exploration and production assets, including reservoirs and pipelines.

Digitalization is a useful tool in dealing with climate change or optimizing power generation processes to decrease emissions and achieve the goal of decarbonization of the energy model.

Talking about digitalization, we have to be familiar with the term 'Industry 4.0'. It is a well-known concept in the world of manufacturing. Industry 4.0, or intelligent manufacturing, greatly affects the energy sector. It incorporates the period of mechanization, the gas and oil era, and the new digital revolution with the renewable energy era. It also includes automation and data used to optimize production and efficiency within a smart factory environment.

Going into details, digital transformation in the energy sector involves top-notch tech. For example, IoT, smart grids, and managing renewable energy. The experts predict the global IoT market could reach a value of USD 1,386.06 billion by 2026 from USD 761.4 billion in 2020 at a compound annual growth rate (CAGR) of 10.53% during the forecast period (2021-2026).

Implementing digital transformation in the renewable energy sector also helps to work with big data volumes. Why is this so important? The current situation in our world can be described as a huge explosion of data leading to fundamental changes in information technology. In the modern world, data comes from everywhere: drones, blockchains, IoT devices, documents, or videos. Collecting and analyzing these data to keep your production or work is crucial. For example, the giant of the energy sector – Shell, is using their robotic subsea inspection videos exceeding 7TB, their seismic land surveys, which are up to 20 petabytes, and their marine surveys range from 10-30 TB.

To illustrate the point, one terabyte is about 500 hours of video. Each of Shell's physical assets generates multiple measurements per minute. With the help of cloud technologies, energy sector companies can handle data management in real-time.

The key benefit of digital transformation in the energy and utilities industry is the way it affects decision-making, driving business value. It is the companies that can process these data sources using machine learning technology and provide business foresight that will be the ones impacting the whole future of the energy management systems.

Popular Digital Transformation Trends in the Energy Industry

Digital transformation in the energy sector doesn't only have to do with private companies or organizations. For instance, the EU has an action plan for the digitalization of energy. In October 2022, the Commission accepted the 'Digitalisating the energy system – EU action plan', a system-wide course of action aimed at the digitalization of energy. The goal of the program is to contribute to the EU energy policy objectives:

Develop a sustainable, secure market for energy services

Ensure data privacy

Support investment in digital energy infrastructure

According to the Economist Intelligence Unit's Energy Outlook 2023, global energy consumption will keep growing by 1.3% in 2023 at a time of economic recession and high energy prices. Hence, changes in the energy industry are required to keep up.

Waverley has been at the forefront of digital transformation in the Energy industry, helping companies in Energy & Utilities go digital, migrate to the cloud, adopt emerging technologies, process their data better, etc. We've helped startups in Renewable Energy & Sustainability leverage IoT and develop flexible future-proof software systems. Here are some of the noticeable trends in digital transformation in the energy and utilities industry and renewable energy industry that are often requested by our customers.

Learn the secrets to building a successful software product by diving into our comprehensive guide.

1. Automation of the energy sector

Automating the energy industry allows companies to reduce their expenses (fewer employees are needed to monitor the processes) therefore, companies can concentrate on quality control, finding new energy sources, etc. Amongst other benefits we can mention:

Increasing efficiency

More consistent quality control

Easier access to data

Staying compliant

2. Energy decentralization

The decentralization of energy markets is increasing day by day all around the world. Naturally, it affects countries with BTM (behind-the-meter) energy generation, where a business produces its energy. Meanwhile, we can observe continuous changes in how energy is produced and sold with the rising trend of renewable energy. Countries and energy companies are testing innovative new approaches and methods.

The rapid switch towards decentralization comes about as the world experiences uncertainty over future energy prices, a move away from older and more polluting energy sources.

Examples of Energy Decentralization

Name Of The Project/Country   How Does It Work?

Virtual Power Plants/Australia   Government, together with businesses, launched a new flexible energy marketplace: Decentralized Energy Exchange (deX).

DeX aims to encourage renewable energy investments and cut the electricity grid's costs. At times of a power demand surge, a call goes out to participants, triggering households to auction excess self-generated or battery-stored power back to the grid at market-determined prices. The deX system aggregates energy-generating households and businesses based on their locality, such that their combined energy supply is large enough to represent multiple virtual power plants that the grid can call upon.

Peer-to-peer Energy Trading/Germany   Peer-to-peer networks allow trading and selling energy between two or more grid-connected parties. Shine (a start-up company), which is incubated by RWE Germany, is one of these network facilitators.

The system allows users to optimize their own use of solar energy with a home energy management kit and connect to others for buying and selling the locally-generated power.

Internet of Energy/UK   Centrica (UK's dominant energy provider) acquired a startup, Panoramic Power, which provides wireless sensors and an analytics platform. Together, the system allows for full visibility of a business's energy estate, promoting improved cost management and operational efficiency, as well as enhanced engagement with energy usage.

3. Development of IoT for the Energy Sector

The Value of IoT in the global energy market

IoT technologies in the energy sector is an advanced process that includes planning and energy management of consumption patterns in multiple domains. IoT development services are crucial in implementing these technologies and enabling businesses to increase efficiency in producing, selling, and distributing energy. Basically, it helps to optimize energy usage and reduce costs while improving overall productivity.

The Advantages of Using IoT Technologies in the Energy Sector

1. Security   With the help of interconnected static sensors and cameras, the Iot-devices can benefit drilling management and improve health and safety in oil and gas production, providing optimal decision-making in this sector.

2. Enhanced data collecting Advanced metering infrastructure (AMI) systems allow the IoT-based smart meter to collect data in real-time. These data permit monitoring of the use of the energy, voltage fluctuation, tampering, and power outages.

3. Analyzing the data   Collected data with the assistance of IoT-enabled energy storage and analytics tools can easily analyze the market to help decrease the imbalance in the supply and demand of renewable energy.

4. Efficiency Through an integrated network enabled by IoT, you can remotely produce and manage energy processes. It is especially relevant for geothermal power plants because they are located in earthquake-prone areas. Hence, remote management can ensure energy production safety.

4. The use of AI in the Energy Sector

There are several major benefits of using artificial intelligence in the energy sector. Basically, AI technologies provide more efficient work processes for energy companies.

AI-managed smart grids networks deliver a fast flow of energy and data between the energy provider and consumers. → This type of network enables data management processes (collection, storage, analysis). Later on, we can use this data through advanced analytics and machine learning for fault identification in energy production plants and precise energy demand forecasting.

AI-driven programs could enable accurate forecasting and prediction, which lead to better usage of renewable energy.

5. Cloud Computing and the Energy Sector

Cloud computing includes servers, storage, databases, networking, and analytics over the Internet; therefore, it is generally used in the management of energy production, distribution, and provision.

Cloud technologies can provide customers with real-time insights into their current energy consumption

Cloud can enable optimal scheduling to create smart maintenance

Cloud computing apps are helpful for better cost management and optimal decision-making

6. The Energy Sector and Blockchain

Blockchain in the Energy Sector

According to the Joint Research Centre's report, 'Blockchain solutions for the energy transition' using blockchain technologies have the potential to change the energy sector greatly.

Blockchain technologies provide transparency in peer-to-peer energy trading.

Implementing blockchain technology can help in keeping track of the source of renewable energy and record the carbon footprint.

Energy companies can store excess power in the blockchain through smart meters. Later, the algorithms can automatically match buyers and sellers of the excess energy using smart contacts.

Key Benefits of Digital Transformation for Energy Companies

Digital transformation in energy and utilities will have positive benefits for the industry as a whole and separate businesses as well. We can define three main benefits of digital transformation for energy companies:

Reduction Of Costs   Improving Infrastructure And Services   Enhancing   Customer Interaction

With the help of digitalization, logistics will become more efficient, and supply issues could be spotted in real-time. Therefore more accurate forecasts of energy surges are possible. This will allow energy companies to produce energy exactly the needed amount.
Digitalization can increase the operational lifetime of energy infrastructure. Predictive maintenance with less physical stress on equipment and machinery.Digital   transformation will enable better customer interaction by providing easier customer feedback. It can be used to inform end-users of the results in case of using too much energy for both financial and environmental reasons.

What Are the Main Areas of Digital Transformation?

The energy sector is undergoing a digital transformation driven by technological advancements and consumer behavior changes. The following are some of the key areas where digital transformation has a substantial impact:

Smart Grids: Energy companies are using these digital technologies to improve the electricity grid's efficiency, reliability, and security. It includes deploying smart meters, which allow real-time energy consumption monitoring, and integrating renewable energy sources such as wind and solar power.

Energy Management Systems: Energy management systems (EMS) use digital technologies to optimize energy use in buildings, industrial processes, and transportation. EMS can help reduce energy consumption and costs and support the integration of renewable energy sources into the grid.

Electric Vehicle Charging Infrastructure: As the number of electric vehicles (EVs) on the roads increases, the demand for charging infrastructure is growing. We need digital transformation in this area to manage the charging process, including real-time monitoring of charging stations, optimizing charging times to reduce peak demand, and integrating EVs into the electricity grid as a source of flexible energy storage.

Renewable Energy Generation: Companies use digital sensors, data analysis, and machine learning algorithms to optimize renewable energy production.

Digital transformation in the energy sector enables more effective, sustainable energy systems while creating new business models and opportunities for improvement.

Tips to Start a Digital Transformation for an Energy and Utilities Company

In order to embrace and implement digital transformation in the energy industry, companies have to take a few major steps. It's crucial to search for professional guidance, expertise, and technology power of IT solutions partners. Waverley's specialists have deep knowledge of digitization processes in the energy sector.

The Head of Digital Transformation in Anubhav Project, Bharat Petroleum, created a framework for a successful digital transformation process. This framework includes three main factors: customer, customer value, and customer experience. The mentioned framework can help companies to identify the precise point at which level digital transformation is required.

Digital Transformation Levels

Adopting new digital tools and simplifying processes by reducing manual steps. Offering new services, discarding outdated practices. Changing roles and value chains in the ecosystem.

How to understand that your company/factory is in need of digital transformation? There are certain signs displaying demand for digitalization in the energy sector. Professionals single out these key signs:

Choosing The 'Wrong' Technology

Choosing technology platforms and tools for the digital transformation in the energy sector becomes a challenge without the help of professionals; it becomes an endless cycle of evaluation processes. Therefore, to achieve a successful digitalization for your company, assistance of an experienced team would save time and expenses. Many companies can get stuck while choosing the right technology to start their digital transformation, which only leads to postponing the digitization process.

Unconstrained Consumption

Old operating models can not provide control to manage energy consumption. However, most companies are trying to reduce energy consumption and use the best technology for the environment. If the conflict between old and new ways of working or using old and new technology exists, it will result at the beginning of stagnation. Hence, if companies want to minimize energy consumption, they have to start digital transformation under the guidance of professionals. This is especially relevant for digital transformation services in the renewable energy sector.

General Tips to Start Digital Transformation

Define Your Objectives

A digital transformation strategy should provide a clear understanding of what your objectives are and what steps are required to reach your goals.

Define Your Areas of Opportunities

The areas of opportunity are groups of skills and competencies linked to contexts with goals to achieve and which can be developed to reach the needed results. The energy sector offers many opportunities, such as climate-neutral cities, sustainability as a service, hydrogen economy, carbon capture utilization & storage (CCUS), energy efficiency & automation.

Develop a plan

Developing a comprehensive plan will ensure that digitalization will be implemented effectively. The plan must be thorough, with clear goals, deadlines, key participants identified, their responsibilities assigned and possible challenges addressed.

Choosing the technology

This is the vital stage that will show whether your project will be successful. Things to pay attention to will be design and architecture, security and reliability, DevOps and infrastructure, and quality assurance and control.

Start the pilot project

After identifying the objectives, challenges, and current digital capabilities, defining initiatives, and developing plans, it is crucial to review everything critically. Are the benefits that you'll receive from the actions enough to justify the cost and effort?

Keep improving and developing the project

Digital transformation has helped many businesses to attain enviable heights across many industries. Still, it requires a lot of hard work, commitment, innovations, creativity, and strategic brain work to increase sales, productivity, and revenue.

Examples of Digital Transformation

Digital transformation allows companies in the energy sector to boost their efficiency and significantly enhance their profits in the long run. Successful digital transformation can save companies 40% of the overall operations costs. For example, machine learning and artificial intelligence have become part of digitalization for industry giants (Shell). These technologies optimize all possible operations in order to obtain higher revenues and reduce losses. Shell successfully managed to make savings of over $1m with the help of IoT devices to monitor oil fiends.

Another example, Endesa, a leader in digital transformation in the electricity industry, is the first utility company in the world to be 100% cloud-based, which allowed them better flexibility and enormous data processing and storage capabilities.

Examples of Digital Transformation in the Energy Sector Facilitated by Waverley

Energy Analytics Mobility Development Cybersecurity Audit For An Oil & Gas Company

Waverley specialists helped a leading company in data-driven energy management solutions, GridPoint, to bring their cloud-based energy analytics platform onto mobile devices, thereby enabling facility managers, energy managers, and other users to access their granular data

from anywhere in real-time. GridPoint customers can now access critical data on their mobile devices, improving customer interaction. Waverley's cybersecurity engineers helped the company in the Mine, Oil & Gas industry to test their CRM system and ensure that the confidentiality of sensitive business information is preserved. Since the company wanted to make sure its internal system was secure throughout all its locations and its sensitive data protected therefore improving the quality of its services.

Software Modernization For A Steam Energy Company IoT Solution For Renewable Energy Management

Working with the leading manufacturer of steam equipment, our team modernized an outdated application adding new functionality. The formula we worked on was the basis for calculating indicators of improvement throughout the production process. Our specialists worked on vapor pressure formulas and changes of state calculations (liquid and vapor), calculating over 100 formulas, facilitating new functionality in the client's global Steam System Audit Tool platform. Waverley delivered 4 web and mobile applications to complement the customer's smart home eco solution. The applications are designed to connect to the whole system via a home WiFi network or Bluetooth and enable the company's administrators and system users to control the solar panels, batteries, inverter, and connected home appliances such as AC, water heater, or EV charging station through a simple and accessible user interface.

Conclusion

Digital transformation of the energy sector has contributed to the rapid development of the industry. Oil and gas production, mining, and renewable energy companies are already leveraging artificial intelligence, machine learning, IoT, and blockchain technologies. These innovations led to the great improvement of the companies as well as the industry itself.

In the energy sector, the technology shows great potential to assist in numerous aspects, namely real-time predictive analytics, demand response management, remote asset management, and research and innovation.

To achieve successful digital transformation, companies must rely on software. With the right software development partner, companies can achieve digital transformation successfully.