

Enterprise Resource Planning Systems in Real-Time Problem Resolution

Venkata Naveen Kumar Manne

Independent Researcher, USA

Abstract

Organizations have never had to manage such complexity as constantly evolving supply chains, demand, and technology. This has created a demand for enterprise resource planning platforms to become the foundation of the digital enterprise, providing real-time data, predictive analytics, and integrated automation to transform operational challenges into commercial opportunities. Meanwhile, in-memory computing architectures remove the latencies of database lookups and present business functions with a consistent view of data. Algorithmic decision systems deploy fairness and transparency approaches in order to create fairer outcomes without impacting performance. In demanding regulations in healthcare, financial services, and environmental sustainability, privacy-preserving technologies and compliance automation support use cases in public health emergencies, humanitarian crises, and disaster recovery, and sustainability, including dynamic coordination of suppliers, resource and financial optimization, monitoring emissions, and improving sector performance. The future affords autonomous supply chain systems that optimize efficiency and ethical constraint, democratized market access architectures that minimize entry barriers, and human-augmentation philosophies that favor decision support over replacement. Organizations extracting calculated advantage from these trends achieve resilience in their value creation pursuits and are beneficial, economic, environmental, and community-focused.

Keywords: Enterprise Resource Planning Systems, Real-Time Operational Intelligence, Algorithmic Accountability, Regulatory Compliance Architecture, Autonomous Supply Chains

1. Introduction - Enterprise Systems as Strategic Infrastructure for Complex Problem Management

Global business environments are turbulent nowadays, with unprecedented uncertainties in supply chains, volatilities in demand patterns, and rapid growth in technology. Recent global supply chain disruptions have generated considerable interest as they reflect the operational obstacles that organizations face today due to geopolitical conflicts, pandemic-related trade limits, and climate-induced logistical supply hurdles. To support end-to-end management of complex business processes across distributed operations, stakeholder ecosystems, and volatile business conditions, a complex IT architecture is required to ensure real-time processing of large amounts of operational data.

Integrated enterprise resource planning (ERP) platforms have emerged as a planned infrastructure for companies seeking to turn their complex processes and resources into a competitive advantage for the long term. Integrated ERP systems bring finance, human resources, procurement, manufacturing, and supply chain processes together in a single platform. Research findings suggest that ERP systems can indeed affect the performance of organizations by integrating business processes, standardizing business operations, and providing shared information across functional business silos. This indicates that ERP systems have the potential to influence operations, resource utilization, and calculated responsiveness in organizations, depending on the quality of the implementation process, user acceptance, and alignment of system capabilities to organization-specific requirements and objectives [1].

The evolution of business intelligence from batch systems to real-time computing systems has transformed the timeframe in which a business can use data to identify trends and anomalies and to take timely corrective action. This is enabled through the use of advanced analytics engines, machine learning, and artificial intelligence to leverage streaming data feeds to deliver future insights for anticipatory actions. The number of data-producing devices, networked devices, and online transaction channels has grown at an astonishing rate over the years. This makes it extremely difficult, if not impossible, for organizations to analyze large, heterogeneous data at great speed and volume. Big data technology meets the computational needs of enterprise resource planning applications by enabling organizations to analyze huge data sets and convert them into useful information beyond the limits of customary database systems [2].

This section describes 3 dimensions of enterprise systems' impact. The technical capabilities dimension includes architectural infrastructures and integration frameworks that enable organizations to have real-time operational intelligence. While the two dimensions of implementation frameworks relate to organizational and change management

aspects of successful implementation, the dimension of systemic impacts relates to the operational, social, and environmental impacts of enterprise resource planning platforms in terms of economic resilience and social equity, regulatory compliance, and environmental sustainability. This multidimensional analytical framework allows the analysis to illustrate how enterprise resource planning platforms can be a critical infrastructure in organizational agility and responsible business practices.

2. Technical Architecture for Real-Time Operational Intelligence

In its most basic form, in-memory computing infrastructure allows for the data used by different parts of the business to be processed in real time and for a query to be answered immediately. In-memory computing differs from customary disk-based database systems mainly in that it does not require read/write time to persistent storage devices. By storing active data sets in random-access memory, data retrieval can be made considerably faster. In-memory online transaction processing (OLTP) technologies can achieve high throughput without the serialization and blocking overhead of customary locking and latching, due to the use of optimistic concurrency control. Lock-free data structures and multi-version concurrency control protocols enable concurrent transactions to share data and make progress, allowing for scalability where contention occurs on a shared set of data across many transactions. Memory-optimized tables create index structures and storage optimized for in-memory access. Native compilation generates machine code for execution directly on the processor. Organizations using in-memory computing infrastructure achieve important performance improvements for workloads involving high-volume transactions and data access, and low tolerance for latency [3].

SCM modules that are part of business planning systems, along with advanced planning systems, optimize the use of resources, production scheduling, and distribution logistics according to forecasts, production capabilities, and business goals through advanced algorithms. Procurement systems in the cloud make it possible to agilely manage suppliers, with marketplaces providing access to supplier ecosystems online. These systems orchestrate suppliers, including supplier discovery, qualification, and performance monitoring, enabling organizations to identify, evaluate, and engage suppliers based on their specific requirements.

Predictive analytics engines use historical data to recognize patterns in data to anticipate disruptions and allocate resources accordingly in various operational areas. Business intelligence systems have evolved from being mere reporting systems to becoming decision support systems that provide prescriptive recommendations. Data warehousing products are often paired with analytics-specific facilities to enable organizations to consolidate data from operational systems to perform more complex analysis. The advent of big data technologies has enabled organizations to extend analysis to include unstructured data sources, such as text documents, social media feeds, sensor telemetry data, and multimedia content, in addition to transaction data. Analytics platforms use natural language processing, machine learning, and statistical modeling techniques to gain perception from disparate sources of data to help inform strategy and improve operational efficiency [4].

Cross-organizational data synchronization occurs in logistics systems, healthcare delivery systems, utilities management systems, and educational resource distribution systems. Cross-organizational environmental management systems use sustainability metrics within their core business processes to monitor, analyze, and improve their environmental performance in real time. These modules include the energy demand, water use, and raw material inputs at the factory, as well as the distribution center, warehouse, and transport.

Architecture Component	Performance Dimension	Impact Category
In-Memory Computing Infrastructure	Data Retrieval Latency	High Reduction
In-Memory Computing Infrastructure	Transaction Processing Throughput	
Lock-Free Data Structures	Concurrent Transaction Scalability	
Multi-Version Concurrency Control	System Scalability	
Memory-Optimized Tables	Query Processing Speed	

Native Compilation	Execution Performance	
Business Planning Modules	Resource Allocation Efficiency	Medium Enhancement
Cloud-Based Procurement Platforms	Supplier Network Orchestration	High Enhancement
Predictive Analytics Engines	Disruption Anticipation	
Business Intelligence Systems	Decision Support Capability	
Data Warehousing Integration	Information Consolidation	Medium Enhancement
Big Data Technologies	Analytical Scope Expansion	High Enhancement
Natural Language Processing	Pattern Extraction	Medium Enhancement
Machine Learning Algorithms	Predictive Accuracy	High Enhancement
Cross-Functional Synchronization	Data Consistency	High Enhancement
Environmental Management Systems	Sustainability Monitoring	Medium Enhancement

Table 1: Technical Architecture Components and Performance Impact Analysis in Enterprise Resource Planning Systems [3, 4]

3. Ethical Frameworks and Algorithmic Accountability in Automated Decision Systems

As enterprise resource planning software typically incorporates artificial intelligence and machine learning systems, a systematic approach to dealing with bias in automated recruiting and recommendation systems is necessary. Decision systems can propagate bias from the training data into the decision-making process, leading to discrimination in supplier selection, employee appraisal, credit scoring, and resource allocation. Organizations must create bias auditing systems to analyze whether the output of algorithms across demographic groups or subpopulations exhibits patterns of disparate impact that violate fairness criteria or legal requirements. Fairness in ML is a difficult problem because there are multiple mathematical definitions of fairness, and satisfying one often violates another. Since no predictor can satisfy all fairness metrics simultaneously, it falls on the organizations to make an explicit choice of fairness definitions that best align with their ethical values and social responsibilities. Statistical parity, equalized odds, and predictive parity are examples of distinguishable fairness definitions that may conflict with each other for a given decision system. Understanding these trade-offs also requires expertise in the social and legal context of these algorithmic systems; technical solutions cannot answer normative questions about how to treat people and groups fairly [5].

Such transparency in real-time dashboards enables organizational accountability by revealing the details of operational decision-making, performance metrics, and resource usage. A dashboard's graphical user interface (GUI) aggregates data from distributed systems and presents the aggregated Key Performance Indicators (KPIs), exceptions, and trends that management relies on for oversight decisions. The same technical infrastructure heterogeneity that organizations face in their global operating environment can impact the design of inclusive system access. Organizations can deploy enterprise systems in geographically distributed locations with varying degrees of network connectivity, computing devices, and technical support resources.

A progressive web application (PWA) is a software architecture that integrates the ubiquitous nature of web applications with the rich functionality of native platform applications. By taking advantage of modern web platform capabilities, PWAs deliver a user experience comparable to that of native applications, on the web, without requiring installation. Progressive web apps work offline and on low-quality networks, and service workers enable this by caching all of a site's assets. Progressive web apps are generally built using progressive enhancement, which allows developers to utilize newer technologies in an application while providing a working experience for every user agent. Installability features allow the user to install a progressive web app on the device's home screen and launch the app without any browser chrome. The installed apps are automatically kept up to date when the user launches the app. Responsive design principles help to ensure that progressive web applications have the right layout for different screen sizes, input modes, and device capabilities [6].

Digital procurement ecosystems designed for inclusive community participation consider the wide differences in organization sizes and technical competencies within the supplier population, such as registration and onboarding initiatives for small suppliers without dedicated procurement teams, and multilingual Web interfaces. Human-in-the-loop decision-making is increasingly incorporated into an automated decision process as a check on high-stakes decisions. Accessibility standards allow accessibility software to enable a person with a disability to use the system via a screen reader and keyboard navigation.

Framework Component	Ethical Challenge Addressed	Implementation Mechanism	Trade-Off Consideration
Bias Auditing Systems	Discriminatory outcomes in automated decisions	Algorithmic output evaluation across demographic segments	Multiple fairness definitions cannot be satisfied simultaneously
Statistical Parity	Equal outcome rates across groups	Group-level outcome distribution monitoring	May conflict with predictive parity requirements
Equalized Odds	Equal error rates across protected classes	False positive and false negative rate balancing	May conflict with statistical parity objectives
Predictive Parity	Equal positive predictive value across groups	Precision calibration across demographic segments	May conflict with equalized odds criteria
Transparency Dashboards	Organizational accountability	Real-time visibility into operational decisions and metrics	Balance between transparency and information overload
Progressive Web Applications	Inclusive system access across infrastructure heterogeneity	Browser-based delivery with offline functionality	Network connectivity and device capability variations
Service Worker Technologies	Offline functionality maintenance	Critical resource caching for low-connectivity environments	Storage limitations and synchronization complexity
Responsive Design Principles	Multi-device accessibility	Adaptive layouts for varying screen sizes and input modalities	Development complexity versus universal accessibility
Human-in-the-Loop Integration	Ethical oversight for high-stakes decisions	Automated pathway review before implementation	Efficiency reduction versus ethical assurance
Accessibility Standards	Universal usability for diverse capabilities	Screen reader compatibility and keyboard navigation	Additional development effort versus inclusive participation

Table 2: Ethical Framework Components and Fairness Mechanisms in Algorithmic Decision Systems [5, 6]

4. Regulatory Compliance Architecture in Real-Time Operations

Technical means of achieving privacy compliance with data processing operations are essential to organizations covered by thorough data protection legislation. Privacy compliance related to how organizations collect, use, store, and transfer personal data requires technical measures and controls to be designed and integrated into the data processing operation in all phases of the data life cycle. Data classification systems allow different kinds of personal data to be automatically

identified and tagged according to their contents, and thus subject to the appropriate regulatory treatment. Consent management platforms help organizations to maintain records of processing activities and the purposes for which data subjects have consented. The principles of data minimization, pseudonymization, and anonymization aim to limit the quantity of data and the length of its storage. The rights of access and of erasure allow individuals to get copies of their data, and to remove it from distributed systems by identifying and deleting their records. Cross-border data transfer mechanisms implement widely used safeguards for international transfer of personal information to jurisdictions with different privacy and data protection standards, such as standard contractual clauses or adequacy assessments. Differential privacy, secure multi-party computation, and homomorphic encryption are examples of tools that provide privacy guarantees with mathematical proof when computing over sensitive data. However, they are impeded by high computational cost and limited utility [7].

Industry-specific compliance modules are included in some enterprise resource planning (ERP) systems in sectors such as financial services, healthcare, and environmental services. For example, the healthcare compliance module would include controls for protecting patient data, managing clinical trials, tracking medical devices, and securing the pharmaceutical supply chain. Financial services modules comprise the anti-money laundering (AML) obligations, know your customer (KYC) verification, reporting requirements, and capital adequacy calculations. Environmental compliance modules comprise the emissions inventories, hazardous materials handling, waste disposal certificates, and environmental impact assessments required under legislation or by other regulatory authorities.

Automated reporting systems create reports for environmental, social, and governance (ESG) compliance by drawing on operational systems, applying a standard methodology for reporting, and exporting data in predefined report formats. Real-time monitoring systems can check for supplier certifications, compliance with international trade regulations, and even use blockchain-based applications for keeping a permanent record of business transactions, product provenance, and the status of supplier certifications. Distributed ledger technologies can also enable traceability in multi-tier supply chains while still providing some level of confidentiality for commercially sensitive information through permissioning. Smart contracts can also be used to ease verification of compliance, whereby regulations are encoded in logic and then executed on transactions [8].

Data governance architectures balance operational agility with legal and compliance obligations by providing policies, processes, and technologies that govern how data is accessed, used, and transferred in business activities. Role-based access controls guide who has access to what data, and how much, while data loss prevention systems monitor data exposure. Audit trails allow access, creation, deletion, and modification of the data to be tracked for forensics and compliance purposes. Retention management allows archiving and destruction of data based on compliance and business needs. This can reduce storage costs while ensuring that the data required for compliance is available.

Compliance Mechanism	Regulatory Requirement Addressed	Technical Implementation	Operational Challenge
Data Classification Systems	Personal information identification and protection	Automatic content-based tagging for differential treatment	Accuracy of automated classification across data types
Consent Management Platforms	Individual data usage permission tracking	Processing activity alignment with granted permissions	Complexity of multi-jurisdictional consent requirements
Data Minimization Techniques	Limited collection and retention	Restriction to strictly necessary information	Balancing operational needs with privacy principles
Pseudonymization Methods	Privacy risk reduction	Separation of identifying information from analytical datasets	Maintaining data utility while ensuring protection
Right-to-Access Workflows	Individual data retrieval rights	Personal data copy provision across distributed	System complexity and response time requirements

		systems	
Right-to-Erasure Functions	Individual deletion request facilitation	Record identification and removal across distributed systems	Data dependency management and backup considerations
Differential Privacy	Mathematical privacy guarantees	Analytical operations on sensitive datasets with disclosure protection	High computational overhead and utility preservation
Blockchain-Based Compliance	Immutable transaction records	Supply chain provenance and certification status tracking	Scalability limitations and energy consumption concerns
Smart Contract Implementation	Automated compliance verification	Regulatory requirement encoding as executable transaction logic	Inflexibility once deployed, and error correction challenges
Distributed Ledger Technologies	Multi-tier supply chain transparency	Permissioned access for commercially sensitive information protection	Network coordination and standardization requirements
Role-Based Access Controls	Data availability restriction	Job function and business need-based access limitations	Administrative overhead and permission management complexity
Audit Trail Generation	Forensic investigation support	Comprehensive data access, modification, and deletion of records	Storage requirements and performance impact considerations

Table 3: Regulatory Compliance Architecture and Data Governance Mechanisms [7, 8]

5. Applied Implementation Scenarios Across Critical Domains

Enterprise systems can help enable dynamic supplier matches and logistic services during a public health emergency, which is essential for healthcare supply chains to operate during a crisis when demand and supply far exceed normal levels. Public health emergencies create an explosion in demand for medical products such as drugs, diagnostic tools, and protective equipment. Enterprise platforms allow health systems to quickly identify alternate suppliers and hospital qualification status and to expedite procurement processes that would normally be tied to longer qualification cycles. Platforms also let people see inventory balances across a distributed health system. This lets a central authority allocate scarce supplies to facilities that experience shortages. This also prevents locations with sufficient supplies from overstocking. Predictive analytics can be used to understand and plan for likely patterns of progression and resource use toward enabling earlier stockpiling of drugs and supplies. If linked with transportation management systems, predictive analytics can also be used to optimize delivery routes (for urgent response) and minimize routine restocking costs. Flexibility, redundancy, and collaborative mechanisms that organizations can use to rapidly respond to disruption events were the focus of some of the healthcare supply chain resilience literature. Diversifying the supplier base and information sharing mechanisms have been associated with better performance during disruption events compared to an organization with a lean supply chain under normal conditions [9].

Humanitarian disaster response can also include cloud systems that can help to track resources and volunteers during natural disasters and other complex humanitarian emergencies. Humanitarian disaster response involves many organizations, among them government agencies, NGOs, militaries, and volunteers who need to coordinate their efforts in chaotic and dynamic environments. Cloud computing infrastructure flexibly, scalably shares an environment. Responders throughout the affected area exchange information on the affected population. Responders share available resources, transport arrangements, and humanitarian needs. Mobile applications allow field workers to submit information about a situation, request supplies, and relay updates from locations with patchy connectivity or limited reachability. Geographic information systems (GIS) visualize the impacts of disasters, the resources available, and the population exposed to risk. Beneficiary registration systems track the distribution of aid to affected populations to ensure

fair and equitable distribution and to prevent duplication of aid. Responding organizations can also collaborate through portals to avoid duplication and identify coverage gaps that might exist.

To improve sustainability, industrial manufacturing processes can have energy monitoring and emissions reduction strategies. Smart metering and control infrastructure can monitor energy usage and perform at the level of individual equipment, production line, and facility to find waste and improve processes. Process control systems automatically adjust equipment settings to minimize energy consumption while they maintain the required product quality and throughput levels. Industry standards help emissions calculation engines change activity data into greenhouse gas equivalents. This makes a carbon footprint available in real time. Supply chains respond in a rapid manner to geopolitical disruptions and logistical constraints. Network optimization algorithms identify alternative sourcing, production, and transportation modes that seek to meet a targeted level of service in light of changing constraints on the system. Scenario planning tools enable companies to simulate disruptions and develop contingency plans to work with backup suppliers [10].

Cross-sector collaboration frameworks create a mechanism for government, nonprofit, and commercial entities to communicate during times of crisis, plan together, and leverage collective resources to improve a calculated response.

Implementation Domain	Crisis Context	Enterprise System Capability	Operational Outcome
Healthcare Supply Chain	Public health emergencies	Dynamic supplier matching and rapid qualification	Alternative supplier identification during demand surges
Healthcare Inventory Management	Medical supply shortages	Real-time visibility across distributed networks	Centralized scarce resource coordination prevents overstock
Healthcare Predictive Analytics	Disease progression planning	Demand forecasting and proactive positioning	Anticipatory supply stockpiling before demand spikes
Healthcare Transportation	Urgent medical supply delivery	Route optimization integration	Minimized delivery times for critical shipments
Healthcare Network Resilience	Supply chain disruptions	Diversified supplier networks with information sharing	Superior crisis performance versus lean supply chains
Humanitarian Response Coordination	Natural disaster relief	Cloud infrastructure for resource tracking	Geographically dispersed responder information sharing
Humanitarian Mobile Applications	Limited connectivity environments	Field personnel reporting with data synchronization	Condition reporting and supply requests from remote locations
Humanitarian Geographic Systems	Disaster impact visualization	Spatial analysis of resources and populations	Deployment decision support and logistics planning
Humanitarian Beneficiary Registration	Aid distribution tracking	Duplication prevention and equitable allocation	Fair resource distribution to affected populations
Industrial Sustainability Monitoring	Manufacturing emissions reduction	Smart metering infrastructure	Granular energy usage visibility for optimization identification
Industrial Process Control	Energy consumption optimization	Automated equipment setting adjustment	Minimized energy use while maintaining quality and throughput
Industrial Emissions Calculation	Carbon footprint visibility	Activity data conversion to	Real-time environmental impact transparency

		greenhouse gas equivalents	
Global Supply Chain Reconfiguration	Geopolitical disruptions	Network optimization algorithms	Alternative sourcing and routing, maintaining service levels
Cross-Sector Crisis Collaboration	Multi-organizational coordination	Information-sharing protocols and resource pooling	Enhanced collective response capabilities during emergencies

Table 4: Applied Implementation Scenarios and Operational Outcomes Across Critical Domains [9, 10]

6. Future Evolution - Intelligent, Ethical, and Inclusive Enterprise Systems

Autonomous supply chain systems are the next generation of enterprise systems with predictive models, as well as ethical constraint mechanisms, embedded. A new generation of supply chain systems will use AI agents to monitor supply chains for anomalies, predict disruptive events, and intervene in routine situations as needed. For these outstanding instances, agents will escalate to human decision makers. Machine learning components will continuously learn about demand patterns, supplier reliability, performance of transportation options, and industry conditions in order to feed these insights into the decision-making process. Reinforcement learning will be applied to long-term value rather than tactical decisions. Ethical constraint frameworks for codifying supplier treatment, sustainability, labor rights, and community impacts into automated decisions will be developed to prevent algorithms from optimizing for the lowest cost at the expense of stakeholders. This highlights that autonomous systems that achieve human-like capabilities in complex environments may need to include hybrid architectures combining symbolic and statistical approaches to support explainability, domain knowledge, and policy consistency, and to enable generalization to situations not previously experienced [11].

Democratized market access architectures will make it easier for smaller organizational entities to onboard into digital platforms by lowering transaction costs and improving discoverability mechanisms. Digital platforms will establish tiered functionality for organizations to access basic functionality at low or no cost, while also offering advanced functionality through subscription models that take into account the organizational size and capability of the companies onboarded within the platform. Software assistants will learn how to escort users through multi-step workflows, make suggestions regarding parameter values, and automate tasks that are currently the domain of the expert. Blockchain will make it possible to effect transactions between entities with no prior relationship, reducing the cost of trusted services.

Integrated sustainability monitoring enables impact assessments and corrections of process chains on the basis of dynamic data collection of resource consumption, emissions, and byproduct flow. Internet of Things sensors enable energy, water, and material flows to be measured continuously at the process level or below, feeding into models to enable optimization, preserving the integrity of the entire product life cycle. Crisis response systems will support multiple organizations through federated information-sharing architectures that ensure data sovereignty while supporting collaborative planning. Human-augmentation design principles will ensure that the systems are intended to augment rather than supplant human judgment when plans are ambiguous, objectives are conflicting, or decisions have large impacts on society or the environment. Explainable artificial intelligence techniques ensure that proposed automated recommendations include a justification that allows human reviewers to assess, validate, and, if necessary, override algorithm-driven recommendations in their context [12].

Given the increasing convergence of achieving operational efficiency with longer-term social and environmental responsibilities, sustainable competitive advantage will only be achieved by balancing economic, social, and environmental considerations over the medium to long term. Future ESs will increasingly incorporate multi-objective optimization algorithms to assist organizations in striving to balance financial performance, stakeholder and environmental interests, and to ease decision-making in reconciling trade-offs for responsible business conduct.

Conclusion

Enterprise resource planning platforms are a model of addressing the complexity of modern business via real-time and predictive intelligence and integrated automation. For this reason, the technical architecture must support not only efficient operational processes and business process automation but also frameworks and architectures for ethical decision-making, algorithmic accountability, and regulatory compliance. In-memory data infrastructures enable data to

be processed almost instantaneously across functions. Predictive analytics engines help identify disruptive events and manage resources. Fair-aware machine learning can tackle algorithmic bias. Progressive web applications make products accessible. Privacy-aware technology balances fast processing with data protection requirements. Use cases, such as healthcare supply chains, humanitarian aid, and industrial sustainability, have demonstrated the ability of such systems to coordinate resources, respond to crises, and reduce environmental impacts. Future research may explore self-governed systems with enforced moral constraints, democratized systems that increase market access, and human-augmentation systems that leave priority with human decision-makers. Organizations that effectively leverage enterprise resource planning platforms yield operational resilience and contribute to equitable economic participation, environmental sustainability, and community well-being because technological sophistication and broader social responsibility should not be viewed as mutually exclusive organizational priorities.

References

- [1] Mohamed Abdalla Nour, "The Impact of ERP Systems on Organizational Performance: The Role of Antecedents and Moderators," ResearchGate, 2023. [Online]. Available: https://www.researchgate.net/publication/373725370_The_Impact_of_ERP_Systems_on_Organizational_Performance_The_Role_of_Antecedents_and_Moderators
- [2] Min Chen, Shiwen Mao, and Yunhao Liu, "Big data: A survey," Springer, 2014. [Online]. Available: <https://link.springer.com/article/10.1007/s11036-013-0489-0>
- [3] Microsoft Corporation, "In-Memory OLTP overview and usage scenarios,". [Online]. Available: <https://learn.microsoft.com/en-us/sql/relational-databases/in-memory-oltp/overview-and-usage-scenarios?view=sql-server-ver17>
- [4] Dursun Delen and Haluk Demirkan, "Data, information and analytics as services," Decision Support Systems, Volume 55, Issue 1, 2013. [Online]. Available: <https://www.sciencedirect.com/science/article/abs/pii/S0167923612001558>
- [5] Solon Barocas et al., "Fairness and machine learning: Limitations and opportunities," 2023. [Online]. Available: <https://fairmlbook.org/pdf/fairmlbook.pdf>
- [6] Microsoft Corporation, "Overview of Progressive Web Apps (PWAs)," [Online]. Available: <https://learn.microsoft.com/en-us/microsoft-edge/progressive-web-apps/>
- [7] Cynthia Dwork and Aaron Roth, "The algorithmic foundations of differential privacy," Foundations and Trends[®] in Theoretical Computer Science, Vol. 9, Nos. 3–4, 2014. [Online]. Available: <https://www.cis.upenn.edu/~aaroht/Papers/privacybook.pdf>
- [8] Michael Crosby et al., "Blockchain technology: Beyond bitcoin," Applied Innovation Review, No. 2, 2016. [Online]. Available: <https://scet.berkeley.edu/wp-content/uploads/AIR-2016-Blockchain.pdf>
- [9] Angappa Gunasekaran et al., "Responsive supply chain: A competitive strategy in a networked economy," Omega, Volume 36, Issue 4, 2008. [Online]. Available: <https://www.sciencedirect.com/science/article/abs/pii/S0305048306001648>
- [10] Naoum Tsolakis et al., "Blue water footprint management in a UK poultry supply chain under environmental regulatory constraints," Sustainability, 2018. [Online]. Available: <https://www.mdpi.com/2071-1050/10/3/625>
- [11] Yann LeCun et al., "Deep learning," Nature, Vol. 521, 436-444, 2015. [Online]. Available: <https://www.nature.com/articles/nature14539>
- [12] David Gunning and David W. Aha, "DARPA's explainable artificial intelligence (XAI) program," AI Magazine, 2019. [Online]. Available: <https://ojs.aaai.org/index.php/aimagazine/article/view/2850>