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Research on the Path of Business Intelligent Transformation Based on RPA + AIGC

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Abstract: The introduction of AI-generated content (AIGC) influenced by Robotic Process Automation (RPA) is allowing businesses to take advantage of emerging technology. The objective of this study is to determine the extent to which "RPA + AIGC" is transforming fundamental operations in enterprises and providing a comprehensive solution to the hurdles associated with integrating these technologies into business operations and how to monetize the business. Based on the findings from the research, the study has produced a progression transformation framework which includes technology platforms, data engineering and organizational architectures; as well as a blueprint comprised of both theoretical insight and real-world application for companies to utilize in adapting to intelligent transformation, as well as to enhance their competitive position in a rapidly changing marketplace.

Keywords: RPA; AIGC; intelligent transformation; implementation path

1. Introduction

The digital age endows business operations with unprecedented potential for intelligence. However, many times there seems to be a hindrance toward using automated processes which often leads to stagnancy with employing new technologies. The combination of automatic robots and robotic process automation through the creation of AI-based content brings about a paradigm shift from mechanical to cognitive execution but this transformation has been slowed by a lack of proper governance of the data supporting those new technologies and an imbalance in the distribution of talent available for the development of new technology. This article seeks to examine the existing contradictions in this area from both a theoretical and practical perspective by providing direction to organizations on evaluating the credibility of potential technology integration to the successful application of innovative technologies for achieving desired outcomes, as well as to facilitate the full integration of these intelligent transformation solutions as part of the organizational culture or "bloodline."

2. The Theoretical Implications of "RPA + AIGC" Driving Business Intelligence

2.1. Conceptual Definitions and Technical Integration Characteristics of "RPA" and "AIGC"

Robotic Process Automation (RPA) specializes in taking on many repetitive and rule-based functions throughout enterprises. It does this by carrying out many steps automatically; for example, it can verify documents automatically and input data

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automatically. The benefit of using RPA is that it frees up human resources from performing redundant and tedious work. On the other hand, Artificial Intelligence Generated Content (AIGC) has a more sophisticated cognitive capability than RPA; it can perform comprehension and generating functions, such as text analysis, report writing and the process of generating creative ideas. Combining RPA with AIGC creates a greater technological synergy rather than merely stacking technologies together. RPA provides automated processes for AIGC to use [1]. Additionally, AIGC gives RPA an intelligence-based component which can analyses data and make decisions about how to process the information and execute the developed outputs. As a result of the combination of RPA with AIGC, a complete "intelligent closed loop" has been created, which represents a completely new paradigm for automating processes.

2.2. The Essence, Dimensions, and Key Elements of Business Intelligence Transformation

To manage the transformation of business intelligence from a managerial view of decision-making driven by data to the use of automated decision-making based on business process improvement and innovation requires at least three dimensions of this transformation to be integrated within an enterprise's operations: automation of processes, intelligent analysis, and autonomous decision-support capabilities. All three dimensions of this transformation promote the development of the business from one driven primarily by experience to one relying significantly on precise and actionable insights. Supporting these three dimensions of the transformation are structured high-quality data, flexible and scalable technological architectures, and organizational cultures and talent systems that support each dimension of the transformation. If any of these components are lacking, then businesses will only be able to achieve transformation at a local level and will have difficulty getting to core strategies for their business. Therefore, in practice, the development of these transformation components must be conducted collaboratively and through the systematic development of these components [2].

3. Practical Challenges in Business Intelligence Transformation Based on "RPA + AIGC"

3.1. System Silos and Process Fragmentation Caused by Technology Integration Barriers

Many enterprise information systems were developed using technology from a variety of periods, resulting in variations in the data format and interface standardization protocols that exist between them. Robot Process Automation (RPA) and Artificial Intelligence (AI) content generation each require, by design, the ability to connect with and share data/resources with other designated systems. These differences between RPA and AI systems actually impede the ability of either technology to cooperate and leverage its complementary capabilities. Without a standardization protocol, automated (programmatic) scripts cannot schedule AI-generated content resource allocations across various platforms. Frequently, therefore, once the automated script has reached its designated endpoint within one system, it has to pause until a human performs the manual action on the other end of the script, and this often occurs at the boundary of a company's information systems. This fragmentation in processes splits what could be coherent (intelligent) processing tasks into several unconnected pieces, thereby making it impossible for companies to realize the full benefits of improved efficiency and decision-making that should be obtainable through the integration of these two technologies.

3.2. Constraints on Intelligent Decision-Making Due to Weak Data Quality and Governance

The quality of data directly determines the reliability of the information used by artificial intelligence to analyze and judge generated content. The data accumulated in enterprise operations often has diverse sources, inconsistent standards, or delayed updates, which makes it difficult for intelligent models to capture accurate business patterns. Low quality data input may lead to biases in the content generated by artificial

intelligence when processing customer service requests or market analysis, resulting in flawed decision-making criteria. The lack of effective governance in the data environment makes it necessary for robotic process automation to frequently handle outliers and conflicting information when executing tasks involving data flow, which not only increases process complexity but also slows down overall response speed. The weak data foundation ultimately constrains the precision and timeliness that intelligent decision-making should possess, making it difficult for technological investment to translate into expected management effectiveness [3].

3.3. Shortage of Multidisciplinary Talent and Resistance from Traditional Organizational Structures

When enterprises are promoting intelligent transformation, their existing technology teams are often composed of engineers familiar with traditional information systems and data scientists focused on algorithm research and development. There are significant differences in the knowledge background and work mode between these two types of personnel. The scarcity of cross disciplinary talents makes it difficult to effectively integrate the process understanding ability required for robot process automation and the model optimization skills that rely on artificial intelligence to generate content within the same project team [4]. The strict departmental division in traditional organizational structures further deepens the difficulty of technical collaboration, and the power and responsibility barriers between business departments, information technology departments, and data analysis departments hinder cross functional collaboration centered on scenario value. The deficiencies in talent structure and organizational inertia have led to many intelligent projects remaining in the experimental or local pilot stage, and their results cannot be smoothly integrated into core business processes to support continuous optimization.

3.4. Ambiguous Application Scenario Value and Unclear Return on Investment (ROI)

The management usually recognizes the technological potential of "RPA + AIGC", but it is difficult to accurately determine which business scenarios can bring measurable substantive improvements when planning specific projects. The ambiguity of value makes it difficult to prioritize many potential application directions, from process optimization to intelligent customer service, and this selection dilemma directly leads to the lack of a recognized benefit evaluation framework before project initiation. The lack of a targeted evaluation framework often leads finance and business departments to rely on rough estimates when predicting project returns, making it difficult to accurately separate the combined impact of technical contributions and other operational factors from their conclusions. The uncertainty of investment returns further affects the sustained investment of subsequent resources. After experiencing initial attempts, enterprises may turn to conservative strategies due to the inability to demonstrate explicit financial benefits, ultimately resulting in technology applications remaining at the level of scattered pilot projects [5].

3.5. Algorithmic Bias, Data Security, and Ethical Compliance Risks

The training of algorithm models relies on a specific range of historical business data, which may contain unnoticed biases in past decisions, leading to biased recommendations generated by artificial intelligence in assisting recruitment or credit approval. Once such biased decisions are made in automated processes, their impact can quickly spread, potentially raising questions about fairness and damaging the reputation of the enterprise. Dealing with sensitive information such as customer privacy and trade secrets is an inherent part of many intelligent scenarios, and the flow of data in robot process automation scheduling and artificial intelligence generated content processing increases the possibility of unauthorized access or leakage. The increasingly sophisticated laws and

regulations have put forward clear requirements for the interpretability of automated decision-making and personal information protection. If enterprises fail to embed compliance review into the entire lifecycle of technology applications, they may face operational risks. These potential risks consume the trust of management in the application of technology and to some extent delay its promotion in core business.

4. Implementation Pathways for "RPA + AIGC"-Driven Business Intelligence Transformation

4.1. Building a Collaborative, Integrated "RPA + AIGC" Technology Middle Platform

The information technology department needs to lead the formation of a specialized joint working group, including representatives from key business lines, data administrators, and architects, to initiate the construction process of the technology center. The first step of this working group is to conduct a comprehensive interface capability and data format survey of all core business systems within the enterprise, such as customer relationship management software, enterprise resource planning system, and financial software. Based on the census results, the working group needs to jointly draft and publish an enterprise level system integration specification white paper, which will clearly define the data structures, authentication methods, and application programming interface protocols that must be followed for all cross system communications. The lack of unified standards will result in repeated adaptation and development work for each subsequent integration project, significantly increasing complexity and maintenance costs. After the standard is established, the development team of the enterprise can use it as a basis to design and build a middleware platform with centralized task scheduling and resource management capabilities [6].

The development team needs to use modular technologies such as containerization during the platform construction process to encapsulate the general web data crawling and desktop software operation capabilities in robot process automation, as well as the text summarization and information classification services involved in artificial intelligence generated content, into independent micro service components for deployment and management. Each component needs to provide clear input-output definitions and performance documentation, and be uniformly registered in the service center directory of the middleware. The platform must provide an intuitive graphical process designer for business users, enabling supply chain planners to assemble an end-to-end intelligent order verification process by dragging and dropping component modules such as "Order Data Acquisition", "Inventory Intelligent Comparison", and "Abnormal Warning Generation". After the platform goes online, a dedicated middle platform operation and maintenance team is responsible for monitoring the running status, resource consumption, and transaction logs of all components. They issue warnings based on preset performance thresholds and collaborate with the development team to flexibly expand or upgrade high-frequency calling components, thereby ensuring the stable and efficient operation of the technical middle platform as the "central kitchen" of enterprise intelligence.

4.2. Implementing Data Governance and Quality Enhancement Initiatives for Intelligence

In order to develop a collaborative and integrated technical middle office within an organization, IT departments of an organization must first collaborate with various business units to determine and create standards for cross-system data exchanges and interfaces that will be used in their organization. This will be accomplished by defining the format standards, security protocols, and response mechanisms for transmitting data between software programs clearly. The defined standards will eliminate the barriers that must be overcome for subsequent technical integrations to take place. After the standards have been created, development teams will be able to develop middleware platforms that allow centralized scheduling of activities. Middleware platforms will provide a

mechanism for creating a protocol for executing both RPA capabilities as well as the capability to generate AI-based content through analytics separately, providing them as shared resources that are available to be easily retrieved and invoked [7].

The encapsulated shared components need to be organized and managed through an intuitive visual interface, so the platform should be equipped with process design modules and model management modules. Business personnel can use process design modules to graphically arrange task sequences, connect the links that require manual judgment to appropriate AI generated content services, and assemble them into a complete automated intelligent process. The model management module is responsible for monitoring the operational status, version iteration, and performance indicators of various artificial intelligence generated content services. The continuous and stable operation of the entire middle platform relies on the maintenance of a dedicated team, which is responsible for handling daily faults, optimizing component performance, and expanding functions based on business feedback, ultimately making the technical middle platform a reliable foundation for supporting intelligent operation of the enterprise.

4.3. Establishing Cross-Domain Talent Pipelines and Agile Organizational Structures

In order to establish a cross-domain talent pipeline, human resources will need to work with multiple areas of the business to develop a systematic process for recruiting, selecting and training talent. This begins with the identification of key employees that have experience in core business processes as well as the potential to learn new skills; these individuals will receive comprehensive training that incorporates an understanding of business processes, data analysis and the use of intelligent tools. In addition to developing their own internal expertise, it is important for the company to introduce external subject matter experts as soon as possible after establishing a relationship with them, as these individuals have the practical application experience required to effectively support the internal leaders who will need to be transformed. The internal and external experts will make up a high-level empowerment team responsible for validating the technical feasibility of the company's information technology solutions; they will also provide support in designing the business solution for the specific work process being improved.

Based on the professional support of the core empowerment team, enterprises can begin constructing an agile organizational structure oriented toward value output. The new structure establishes cross-functional teams around specific intelligent projects, which directly integrate business, technical, and data analysis roles and possess full autonomy from demand definition to outcome delivery. Management's responsibilities in this model shift to goal setting, resource coordination, and obstacle removal, while performance evaluations must also transition from measuring departmental activities to focusing on the overall delivery value of teams. As shown in Figure 1, this model forms a continuous cycle from talent development to value realization, then through feedback optimization to talent composition improvement [8].

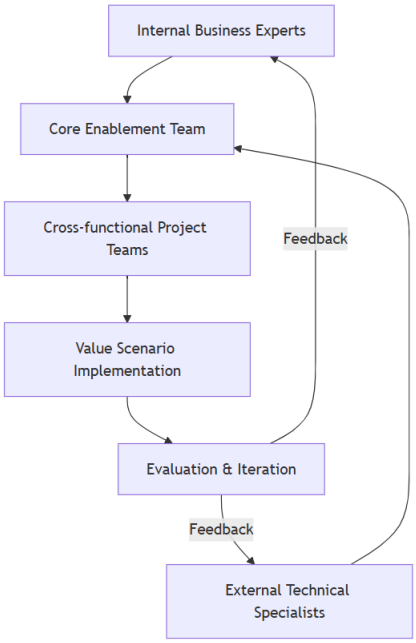

Figure 1. Cross disciplinary talent and agile organization collaboration process diagram.

4.4. Planning Value-Driven, Incremental Scenario Deployment and Evaluation Systems

Upon starting new tasks by a project management team, a separate review board consisting of users of the operating system, financial entity representatives, and any technical experts should be created. The function of this review board is to select the initial scenario(s) that will provide demonstrable benefit from all the requirements and determine the impact of this process on the business bottom-line, review frequency and relevant data quality associated with this process. Invoices being reviewed 100's of times per day with relatively clear set business rules are often good candidates for initial review; in addition, it is important that the project teams track and record the current speed of the invoice's manual processing, common error types, and average input before any technical solution is considered. This information and data will serve as an objective set of benchmarks against which to evaluate the success of subsequent enhancements to the invoice processing. Afterward, the team developed a minimum viable product version of the intelligent process within a controlled business division and performed multiple weeks of closed beta testing prior to release to full production mode.

As part of the closed operations, the evaluation team, which is made up of members from various teams, will be using a systematic approach to monitor the status of the closed operation process. The evaluation team is monitoring such factors as speed of task processing, accuracy of results processed, number of times that a system anomaly has been triggered, and collecting subjective feedback from workers in the closed operation. Every month the evaluation team analyses the quantitative data against the qualitative data to compare and evaluate the amount of decrease in mechanised workload of staff members, and the level of improvement that has been produced by the independent automated report creation function on the level of management information that is being provided to aid in making decisions. The results of this analysis will inform the immediate optimisation of current processes, for example, by changing the rule logic that the robots use to process orders, or modifying the settings of the machine learning models. The results will also be used to provide a priority ranking for future expansion of more complex scenarios, such as the verification and validation of supply chain orders. This process of pilot evaluation, feedback, and optimisation continually validates that the investment being made by a business in the use of artificial intelligence is tied to an ongoing measurable, and verified, value creation in the business.

4.5. Developing Comprehensive Security, Compliance, and Ethical Risk Management Mechanisms

Enterprises should establish a risk management mechanism that runs through the entire project lifecycle before applying technology. This mechanism needs to clarify the collaborative responsibilities of the legal department, information technology department, and business department. This control mechanism intervenes from the project initiation stage, conducting preliminary compliance and ethical assessments for the data types and algorithm models to be used, and identifying potential risk points based on the framework shown in Table 1. The core of the mechanism lies in embedding risk control measures into the design and operation of intelligent processes, rather than post remediation.

Table 1. Framework for Safety, Compliance, and Ethical Risk Management.

Risk dimension	Main control measures	responsible entity
Data security	Data classification and grading, access control, transmission and storage encryption	Information Technology Department
Algorithmic ethics	Training data bias review, model fairness audit, decision logic interpretability design	Technical team and business department
Operational compliance	Personal information protection impact assessment, automated decision-making compliance recording, regular legal review	Legal department and project team

At the operational level, the project team needs to configure data anonymization and access logging functions for operations involving personal information processing during the process development phase. Algorithm models must undergo specialized audits for bias and fairness before deployment, and key decision nodes during their operation should retain traceable logical clues. Regular compliance reviews require reviewing whether all automated operations still comply with the latest legal and regulatory requirements, and using the review results as important inputs for process optimization iterations, thus forming a continuous cycle of risk management and improvement loop.

5. Conclusion

The transformation journey discussed in the article shows a clear relationship between the combination of technology, data and organisation within the business intelligence process and the development of valuable strategies to help businesses to move past integration challenges. This path outlines the value scenario as the primary motivation for business value creation, building on this to create an agile, intelligent system over time that not only provides opportunities to improve current processes but also encourages new business models. As technology continues to improve and industries become increasingly aware of the potential value from technology, this framework will continue to grow and assist businesses on their path to harnessing their intelligent capabilities in an evolving environment and will create a much stronger and more resilient and innovative future for businesses.

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