**UNIVERSITY OF ENERGY AND NATURAL RESOURCES**



ERP GROUP SIX WORK

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**AN ERP SYSTEM FOR TROYES’ COMPANY. GROUP 6**

**Overview**

Troyes, a mini company specializing in manufacturing toys and kids' playing tools, requires an ERP system that integrates various business processes to enhance operational efficiency, streamline workflows, and support informed decision-making.

**MODULES**

The following module descriptions provide a comprehensive overview of the core financial and operational functions of the ERP system for Troyes. The integration between these modules will ensure smooth data flow and provide real-time insights for decision-making.

**Inventory Management Module**

1. Real-time tracking
   * Continuous updating of inventory levels as items moves through the supply chain
   * Dashboard displaying current stock levels, reorder points, and stock turnover rates
   * Alerts for low stock, overstock, and slow-moving items
2. Automated reorder points and alerts
   * Configurable reorder points based on historical data and lead times
   * Automatic generation of purchase requisitions when stock reaches reorder point
   * Email or SMS notifications to relevant personnel for critical stock levels
3. Barcode/RFID integration
   * Support for barcode scanners and RFID readers
   * Mobile app for scanning and updating inventory on the go
   * Automatic update of inventory levels upon scanning
4. Batch and serial number tracking
   * Unique identifiers for each batch or individual item
   * Traceability of materials from receipt to finished product
   * Expiration date tracking and first-in-first-out (FIFO) management
5. Multi-location management
   * Support for multiple warehouses or storage locations
   * Inter-location transfers and tracking
   * Optimized picking and put-away processes
6. Demand forecasting
   * Historical data analysis for demand prediction
   * Seasonal trend identification
   * Integration with sales forecasts for accurate inventory planning
7. Inventory valuation
   * Support for various valuation methods (FIFO, LIFO, weighted average)
   * Automatic cost updates based on latest purchase prices
   * Regular inventory reconciliation reports

**Production Planning and Control Module**

1. Bill of Materials (BOM) management
   * Multi-level BOM creation and management
   * Version control for BOMs
   * What-if analysis for BOM changes and cost impacts
   * Integration with CAD systems for automatic BOM generation
2. Production scheduling and capacity planning
   * Visual production schedule with drag-and-drop functionality
   * Resource capacity planning (machines, personnel, tools)
   * Finite and infinite capacity scheduling options
   * Integration with sales orders for demand-driven scheduling
   * Scenario planning for optimizing production schedules
3. Work order management
   * Automated work order generation based on production schedule
   * Real-time work order status tracking
   * Material reservation and allocation to work orders
   * Labor and machine time tracking against work orders
   * Variance analysis (planned vs. actual)
4. Quality control and inspection processes
   * Definition of quality parameters and acceptable ranges
   * In-process quality checks and final product inspections
   * Non-conformance reporting and corrective action tracking
   * Integration with inventory management for quarantine of defective items
   * Statistical process control (SPC) charts and analysis
5. Machine maintenance scheduling
   * Preventive maintenance scheduling based on usage or time intervals
   * Integration with production schedule to minimize disruptions
   * Maintenance history tracking for each machine
   * Spare parts inventory management
6. Shop floor control
   * Real-time production monitoring and data collection
   * Touch-screen interfaces for operators to report production status
   * Visual dashboards showing production progress, bottlenecks, and issues
7. Material Requirements Planning (MRP)
   * Automatic calculation of material requirements based on production schedule
   * Suggestion for purchase orders or production orders for components
   * Consideration of lead times, safety stock, and minimum order quantities
8. Cost tracking and analysis
   * Real-time calculation of production costs
   * Variance analysis between standard and actual costs
   * Cost breakdown by labor, material, and overhead
9. Production reporting
   * Customizable production reports (efficiency, yield, downtime, etc.)
   * Trend analysis for continuous improvement
   * Export capabilities for further analysis in external tools
10. Integration with other modules
    * Inventory Management Real-time updates of stock levels
    * Sales and Order Processing Production planning based on customer orders
    * Purchasing Automated generation of purchase requisitions for materials
    * Human Resources Labor scheduling and time tracking
    * Finance Cost accounting and production variance analysis

**Sales and Order Processing Module**

a) Customer Relationship Management (CRM) Integration

* Customer database with detailed profiles
* Interaction history tracking (calls, emails, meetings)
* Sales pipeline management
* Customer segmentation for targeted marketing

b) Quote Generation and Order Processing

* Customizable quote templates
* Automatic conversion of quotes to orders
* Multi-currency support for international sales
* Bundle and kit product management

c) Order Tracking and Status Updates

* Real-time order status tracking
* Automated customer notifications (order confirmation, shipping updates)
* Integration with shipping carriers for accurate delivery estimates
* Returns and warranty claim processing

d) Pricing and Discount Management

* Flexible pricing models (volume-based, customer-specific)
* Promotional pricing and discount rules engine
* Approval workflows for special pricing requests
* Historical pricing analysis

e) Sales Forecasting and Analysis

* AI-driven sales forecasting based on historical data and trends
* Sales performance dashboards by product, region, and salesperson
* Win/loss analysis for continuous improvement
* Integration with inventory to ensure stock availability

**Purchasing and Supplier Management Module**

a) Supplier Database and Performance Tracking

* Comprehensive supplier profiles with contact information and terms
* Supplier performance metrics (quality, delivery time, pricing)
* Supplier risk assessment and compliance tracking
* Supplier portal for self-service information updates

b) Purchase Order Creation and Management

* Automated PO generation based on inventory levels and production needs
* Approval workflows for purchase orders
* PO change management and version control
* Blanket and recurring purchase order support

c) Automated Procurement

* Integration with inventory management for automated reordering
* Demand forecasting to optimize procurement schedules
* Comparison of supplier quotes for best pricing
* Vendor-managed inventory (VMI) support for key suppliers

d) Supplier Invoice Matching and Payment Processing

* Three-way matching (PO, receipt, invoice) for accuracy
* Exception handling for price or quantity discrepancies
* Integration with accounts payable for streamlined payments
* Early payment discount management

**Finance and Accounting Module**

a) General Ledger, Accounts Payable, and Accounts Receivable

* Multi-dimensional chart of accounts
* Automated journal entries and account reconciliation
* Cash flow management and forecasting
* Credit management and collections tracking

b) Financial Reporting and Statements Generation

* Customizable financial statement templates
* Real-time financial dashboard with key metrics
* Drill-down capabilities for detailed analysis
* Compliance with local and international accounting standards

c) Budget Management and Cost Analysis

* Bottom-up and top-down budgeting processes
* Budget vs. actual comparisons and variance analysis
* Project and department-specific cost tracking
* Activity-based costing for accurate product pricing

d) Tax Compliance and Reporting

* Automated tax calculations for sales and purchases
* Support for multiple tax jurisdictions
* Generation of tax reports and returns
* Integration with local tax authorities for electronic filing

e) Asset Management

* Fixed asset tracking and depreciation calculation
* Maintenance scheduling and cost tracking
* Asset valuation and impairment testing
* Lease management and IFRS 16 compliance

Integration Points

* Sales module integrates with Inventory to check stock levels and Production Planning to schedule manufacturing for custom orders.
* Purchasing module connects with Inventory for reorder points and Finance for budget checks and payment processing.
* Finance module integrates with all other modules to consolidate financial data and provide a complete view of the company's financial health.

**Human Resources Management Module**

The HR Management module help streamline personnel management processes

1. Employee Database and Profile Management

* Comprehensive employee profiles with personal and professional information
* Document management for contracts, certifications, and performance reviews
* Skills matrix and competency tracking
* Organizational chart generation and management
* Self-service portal for employees to update personal information

1. Time and Attendance Tracking

* Integration with biometric or card-based time clock systems
* Flexible shift scheduling and rotation management
* Overtime calculation and approval workflows
* Leave management (vacation, sick days, personal time)
* Time-off request and approval system
* Project-based time tracking for accurate cost allocation

1. Payroll Processing

* Integration with time and attendance data for accurate wage calculation
* Support for multiple pay structures (hourly, salary, piece-rate for production)
* Automatic tax and deduction calculations
* Direct deposit and check generation
* Year-end tax form generation (W-2, 1099)
* Compliance with local labor laws and regulations

1. Performance Management and Appraisals

* Customizable performance review templates
* Goal setting and tracking aligned with company objectives
* 360-degree feedback system
* Performance improvement plan (PIP) management
* Automated review cycle reminders and workflows

1. Training and Development Tracking

* Learning management system (LMS) integration
* Skills gap analysis based on job requirements
* Training course catalog and enrollment management
* Certification tracking and renewal reminders
* Training effectiveness evaluation and reporting

1. Recruitment and Onboarding

* Job requisition and approval process
* Applicant tracking system (ATS) integration
* Interview scheduling and feedback collection
* Onboarding checklist and task assignment
* New hire orientation process management

1. Employee Relations and Compliance

* Incident reporting and investigation tracking
* Health and safety compliance management
* Employee grievance and dispute resolution process
* EEOC and affirmative action reporting
* Labor union contract management (if applicable)

**Reporting and Analytics Module**

The Reporting and Analytics module will enable data-driven decision-making across all aspects of the business.

1. Customizable Dashboards

* Role-based dashboards for different user types (executives, managers, employees)
* Drag-and-drop interface for dashboard customization
* Real-time data updates and refresh options
* Interactive charts, graphs, and data visualizations
* Ability to drill down from high-level metrics to detailed data points

1. Real-time KPI Tracking and Visualization

* Predefined KPI templates for each department (sales, production, finance, HR)
* Custom KPI creation tools
* Threshold alerts for KPI deviations
* Trend analysis and forecasting based on historical KPI data
* Benchmarking against industry standards or internal targets

1. Ad-hoc Report Generation

* User-friendly report builder with drag-and-drop functionality
* Wide range of chart and table options for data presentation
* Ability to combine data from multiple modules in a single report
* Scheduling options for automatic report generation and distribution
* Report templates library for quick access to common reports

1. Data Export Capabilities

* Export reports in various formats (PDF, Excel, CSV, HTML)
* API access for integration with external business intelligence tools
* Automated data extracts for third-party analysis or auditing purposes
* Secure file transfer protocols for sensitive data exports

1. Predictive Analytics

* Demand forecasting for production planning
* Sales trend analysis for inventory optimization
* Employee attrition prediction for proactive retention strategies
* Cash flow projections based on historical patterns and upcoming transactions
* Quality control predictive modeling to identify potential issues in production

1. Advanced Analytics Features

* What-if scenario modeling for decision support
* Machine learning algorithms for pattern recognition and anomaly detection
* Natural language query capabilities for non-technical users
* Geospatial analysis for sales and distribution optimization
* Social network analysis for understanding internal collaboration patterns

1. Data Governance and Quality

* Data lineage tracking to understand the source and transformations of data
* Data quality scorecards and cleansing recommendations
* Metadata management for consistent definitions across the organization
* Access controls to ensure data security and privacy compliance

1. Collaboration and Sharing

* In-system commenting and discussion threads on reports and dashboards
* Ability to share reports and insights with role-based permissions
* Collaborative report development with version control
* Integration with communication tools for seamless sharing of insights

**SYSTEM REQUIREMENTS**

The following system requirements ensure that Troyes' ERP system will be user-friendly, integrable with existing systems, scalable for future growth, and highly secure. The focus on these aspects will contribute to a smooth implementation and adoption process, while also providing the flexibility to adapt to changing business needs and technological advancements in the toy manufacturing industry.

1. User-Friendly Interface

a) Intuitive, role-based dashboards

* Customized views for different roles (e.g., production manager, sales representative, HR specialist)
* Key information and actions prominently displayed
* Quick access to frequently used functions

b) Consistent design across all modules

* Uniform color scheme, icons, and navigation elements
* Standardized terminology across modules
* Consistent layout and interaction patterns

c) Customizable layouts and shortcuts

* Drag-and-drop interface elements
* User-defined quick access buttons
* Ability to save and share custom layouts

d) Mobile responsiveness for on-the-go access

* Responsive design that adapts to various screen sizes
* Native mobile apps for iOS and Android
* Offline mode for basic functionality without internet connection

e) Contextual help and tooltips

* In-line help text for form fields
* Pop-up explanations for complex features
* Guided tours for new users
* Searchable knowledge base integrated into the interface

1. Integration Capabilities

a) API-based architecture for easy integration

* RESTful API for data exchange
* Webhook support for real-time event notifications
* OAuth 2.0 for secure authentication
* Comprehensive API documentation and developer portal

b) Support for common data formats

* Import/export capabilities for CSV, XML, and JSON
* EDI (Electronic Data Interchange) support for B2B transactions
* Support for industry-specific formats (e.g., toy industry standards)

c) Pre-built connectors for popular third-party applications

* Integration with accounting software (e.g., QuickBooks, Xero)
* CRM integration (e.g., Salesforce, HubSpot)
* E-commerce platform connectors (e.g., Shopify, WooCommerce)
* Shipping and logistics integrations (e.g., FedEx, UPS)

d) Custom integration options for legacy systems

* Middleware support for connecting to older systems
* Data mapping tools for aligning different data structures
* Batch processing capabilities for large-scale data transfers

1. Scalability

a) Cloud-based architecture for easy scaling

* Microservices architecture for independent scaling of components
* Auto-scaling capabilities to handle peak loads
* Multi-tenant design for efficient resource utilization
* Distributed database design for high availability and performance

b) Modular design allowing for future feature additions

* Plug-in architecture for adding new functionalities
* Feature flags for gradual rollout of new capabilities
* Sandboxed environments for testing new modules

c) Support for multi-site and multi-company operations

* Multi-currency and multi-language support
* Centralized management with site-specific configurations
* Inter-company transaction handling
* Consolidated reporting across multiple entities

d) Ability to handle increasing data volumes and user counts

* Efficient data indexing and query optimization
* Caching mechanisms for frequently accessed data
* Data archiving strategies for historical information
* Load balancing to distribute user traffic

1. Security

a) Role-based access control (RBAC)

* Granular permission settings for different user roles
* Hierarchical role structure for easier management
* Audit trails for all access and changes to permissions

b) Data encryption at rest and in transit

* AES-256 encryption for stored data
* TLS 1.3 for all network communications
* Key management system for secure handling of encryption keys

c) Multi-factor authentication

* Support for various second factors (SMS, email, authenticator apps)
* Biometric authentication options for mobile access
* Single sign-on (SSO) integration for enterprise environments

d) Regular security audits and penetration testing

* Scheduled vulnerability scans
* Annual third-party penetration testing
* Continuous monitoring for suspicious activities
* Bug bounty program for identifying security issues

e) Compliance with data protection regulations

* GDPR compliance features (data portability, right to be forgotten)
* CCPA (California Consumer Privacy Act) compliance
* Data residency options for storing data in specific geographic regions
* Privacy impact assessment tools

Additional Security Considerations

f) Secure development practices

* Regular code reviews and static code analysis
* Dependency scanning for vulnerabilities in third-party libraries
* Secure coding guidelines and developer training

g) Incident response and disaster recovery

* Documented incident response procedures
* Regular backup and recovery testing
* Redundant systems and failover capabilities
* Business continuity planning

h) Vendor security management

* Security assessments for third-party integrations
* Contractual security requirements for service providers
* Regular review of vendor security practices