

Evaluating Generative AI Technology Choices and Software Frameworks for Developing AI Solutions in Business

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Why Enterprises Need Customized GenAI Solutions

Generic Solutions Limitations

- ❌ Lack of desired accuracy
- 🔒 Lack of Transparency & Control
- 🔧 Limited Use Case Adaptability
- 🔒 Data Privacy Concerns
- 🔌 No Integration with Enterprise Systems
- 🔄 Limited Pipeline & Model Behavior Control

• ChatGPT
• Claude Chat
• Gemini
• MS Copilot
• NotebookLM
• Perplexity AI
• ...

Custom Solutions Advantages

- ✅ High Use-Case Fit & Domain Expertise
- 🔒 Full Data Privacy & Security Control
- ⚙️ High Customization & Fine-tuning
- 🔄 Flexible Scalability & Cost Control
- 🔌 Full Enterprise Integration (CRM, ERP, APIs)
- 🔄 Complete Pipeline & Transparency Control

Real-world Custom GenAI Use Cases from AI Consultancy

Sales Quotation Generation from Multiple Documents

Combining Tacit & Documented Knowledge in AI Assistants

Dynamic Programming Code Generation for New Use-cases

Automatic Customer Complaint Resolution

Matchmaking & Professional Networking

AI Systems that Learn from User Interactions

Enterprise Integration: Generic vs Custom Solutions

❌ Generic Tools: Standalone assistants - Limited integration with CRM, ERP, APIs, or internal systems

✅ Custom Solutions: Built into products & processes - Direct CRM, ERP, API integration + MCP Protocol

Software Frameworks for Developing GenAI Solutions

Choose Your Framework Based on Technical Capacity & Use Case Complexity

Solution Types

Non-agentic

LlamaIndex • LangChain

- ✅ Single task-focused
- ✅ Direct input/output
- ❌ No autonomous planning
- ❌ Predefined workflows

Agentic AI

AutoGen • CrewAI • LangGraph • BeeAI

- ✅ Autonomous task execution
- ✅ Multi-step workflows
- ❌ Complex workflows

Development Frameworks

Low/No-Code (Agentic) Frameworks

- ✅ Fast Deployment
- ✅ Minimal Technical Expertise
- ❌ Limited Customization
- ❌ Vendor Lock-in Risk

n8n

- Visual Workflow Builder
- 400+ integrations
- Cluster-based scaling
- Moderate learning curve
- Use: Automation, Bots

Flowise

- No-Code LLM Builder
- Easy to use
- LangChainJS integration
- Limited enterprise features
- Use: RAG apps, Chatbots

Dify

- Low-Code LLM Platform
- Kubernetes-ready
- Popular on GitHub
- Low ease of use
- Use: Internal tools, SaaS AI

Botpress

- Conversational AI
- Mature, large user base
- Limited templates
- Performance challenges
- Use: Multi-channel bots

Langflow

- Drag-and-Drop Canvas
- Easy to use
- Production instability
- Limited customization
- Use: Q&A bots, Prototyping

Motia

- Code-First Agents
- Modular, Cloud-ready
- Steep learning curve
- Use: Custom AI automation

Code-Based (Agentic) Frameworks

- ✅ Autonomous Task Execution
- ✅ Multi-step Workflows
- ✅ Higher flexibility, more control
- ❌ Complex Setup
- ❌ Higher Technical Requirements

LangGraph

- Graph-based open-source
- Production-ready
- Large ecosystem
- Steep learning curve
- Complex setup
- Use: Enterprise AI apps

AutoGen

- Microsoft-backed open-source
- Very high scalability
- Strong enterprise support
- Steep learning curve
- Technical overhead
- Use: Multi-agent operations

CrewAI

- Lightweight & Open-source
- Very easy setup
- Limited model support
- Scalability challenges
- Use: SMB workflows

BeeAI

- Open-source Multi-agent
- Modular, Scalable
- Framework agnostic
- New technology (limited adoption)
- Use: IT ops, Internal tools

LLM Customization Methods

Fine-tuning

- Training on domain-specific datasets
- Higher accuracy for specialized tasks
- Enhanced domain expertise
- Requires large datasets
- Expensive training process
- Example: Domain-specific translations

RAG

- External knowledge retrieval
- Reduces hallucinations
- Real-time information access
- No model retraining needed
- Depends on retrieval quality
- Frameworks: LangChain, LlamaIndex

Knowledge Graphs Integration

- Structured, verified knowledge
- Consistent & factual outputs
- Interpretable knowledge source
- Reduces complex reasoning errors
- Complex setup & maintenance
- Use: Fact verification, reasoning tasks

MCP

- Model Context Protocol
- Universal data source connection
- Secure client-server architecture
- Enhanced enterprise integration
- New technology (limited adoption)
- Future: Next-gen agent applications

Data & Integration

Model Context Protocol

- Anthropic's MCP • Client-Server Architecture
- Universal data connections
- Secure integration

Organization-Specific Data

- Proprietary Content • Tacit Knowledge
- Competitive advantage
- Domain expertise

API & System Integration

- Business Systems • Workflow Integration
- Seamless operations
- Automated processes

LLM Selection Strategy

Proprietary LLMs

- GPT-4.1/5, Claude-4-sonnet, Gemini 2.5 Pro
- Strong capabilities & performance
- Regular updates & support
- Vendor dependency
- Higher costs
- Limited control

Open-source LLMs

- DeepSeek-V3, LLaMA 4, Qwen 3, Mistral
- Full control & customization
- No vendor lock-in
- Cost-effective
- Requires infrastructure
- Self-maintenance
- Technical expertise

Hybrid Approach (Recommended)

- Start: Proprietary models in secure cloud (AWS, Azure)
- Transition: Open-source models as expertise grows
- Best of both worlds
- Risk mitigation
- Gradual transition

Key Selection Criteria

- Accuracy & Performance
- Context Length Requirements
- Multimodality Needs
- Latency Requirements
- Compute & Infrastructure
- Pricing
- API & Tooling Ecosystem
- Security & Compliance
- Scalability Needs
- In-house AI expertise

GenAI Solutions: Strategic Evolution

Key Success Factors

- Strategic business-AI alignment
- Cross-functional AI literacy building
- Technical capability assessment
- AI roadmap design
- Research network collaboration
- Regulatory compliance framework
- Phased implementation approach
- Continuous learning & adaptation

Strategic Implementation Roadmap

Phase 1: Explore

Commercial Tools, use cases, PoCs, PoV

Phase 2: Identify

Organizational Gaps & Needs Assessment

Phase 3: Evaluate

Framework & Technology Stack Selection

Phase 4: Develop

Custom Solution Co-development

Phase 5: Deploy & Scale

Implementation & Optimization

Key Knowledge Processes & Technologies

Knowledge Capture

Knowledge Access

Knowledge Generation

PE RAG Agents Fine-tune KG MCP

Our Ongoing Development

A GenAI Toolkit for Knowledge Management

A GenAI toolkit that enables businesses to create their own use cases spanning one or more knowledge management processes: Knowledge capture, Knowledge Access, Knowledge Generation

Additional Information

- Our related ECKM 2025 paper - **Building a Generative AI Toolkit for Leveraging Knowledge Processes: the GAIK Project Report**
- For more details about the toolkit, see our paper for the EDOC-CBI 2025 conference **"Reuse and guidance for generative AI solution development and implementation: knowledge management perspective"**
- Join our event on Sept 17: <https://gaik.ai/>

