

# Quantifying the High Quality of IBM Cloud Pak for Integration

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## High quality integration crucial for digital transformation...

Companies are still allocating 60%-70% of their information technology (IT) spend<sup>1</sup> to "run the business" with the remaining 30%-40% to "transform the business." Hence, they must deploy IT solutions such as hybrid clouds that protect their existing investments and allow them to get higher return on investment (ROI) from newer digital transformation solutions. However, about 70% of digital transformations fall short of their objectives<sup>2, 3</sup>. One culprit? Poor integration quality.

As systems get more complex, application development and response times are slowing down because of integration challenges at 85% of IT organizations surveyed<sup>4</sup>. A high-quality integration based on a hybrid cloud architecture overcomes these challenges and allows organizations to leverage their existing processes, people, technology, and information to stay ahead of the competition. It provides seamless, unified, and automated communication between a company's disconnected data, applications, business units, and partners.

### ...But how to measure the quality of integration?

The first step is to develop an Integration Maturity Model (IMM) framework for both the organization and the practitioner (Figure 1). A mature (high quality) integration solution based on a hybrid cloud can significantly

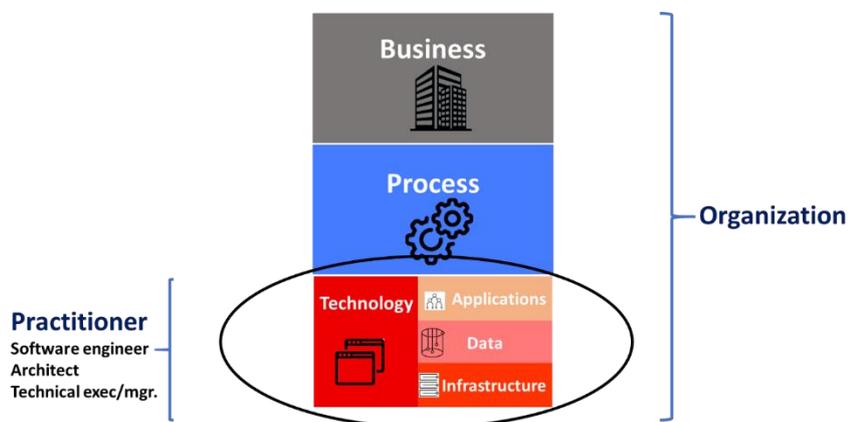


Figure 1: Integration Maturity Model framework for practitioner and organization

improve an organization's operational efficiency and innovation capabilities. It also improves the practitioner's productivity. Next, customer-centric [ISO9001 Quality Management Principles](#) are used in tandem with the IMM to develop a quantitative integration quality model for the organization using recent [McKinsey survey data](#) on the effectiveness of digital transformations. Finally, this quantitative model is extended to practitioners.

### Integration Maturity Model detailed

An organization's integration maturity level is assessed by considering three key factors:

**Business** factors include buy-in on the integration strategy and approach from employees ranging from senior management to rank-and-file, budgets, performance metrics, impact to the bottom line, and others.

**Process** factors include the level of automation, standardization, governance, and the use of AI.

<sup>1</sup> [Mindtree's Automation Maturity Model | Measure your automation](#)

<sup>2</sup> <https://www.bcg.com/publications/2020/increasing-odds-of-success-in-digital-transformation>

<sup>3</sup> <https://www.mckinsey.com/business-functions/organization/our-insights/unlocking-success-in-digital-transformations>

<sup>4</sup> <https://resources.mulesoft.com/ty-report-connectivity-benchmark.html#loaded>

70% of digital transformations fail

Integration challenges at 85% of IT organizations

Build an Integration Maturity Model for the organization and practitioner

Use ISO9001 Quality Management Principles

Integration Maturity Model considers Business, Process and Technology factors

Technology factors – detailed later – relate to applications, data, and infrastructure.

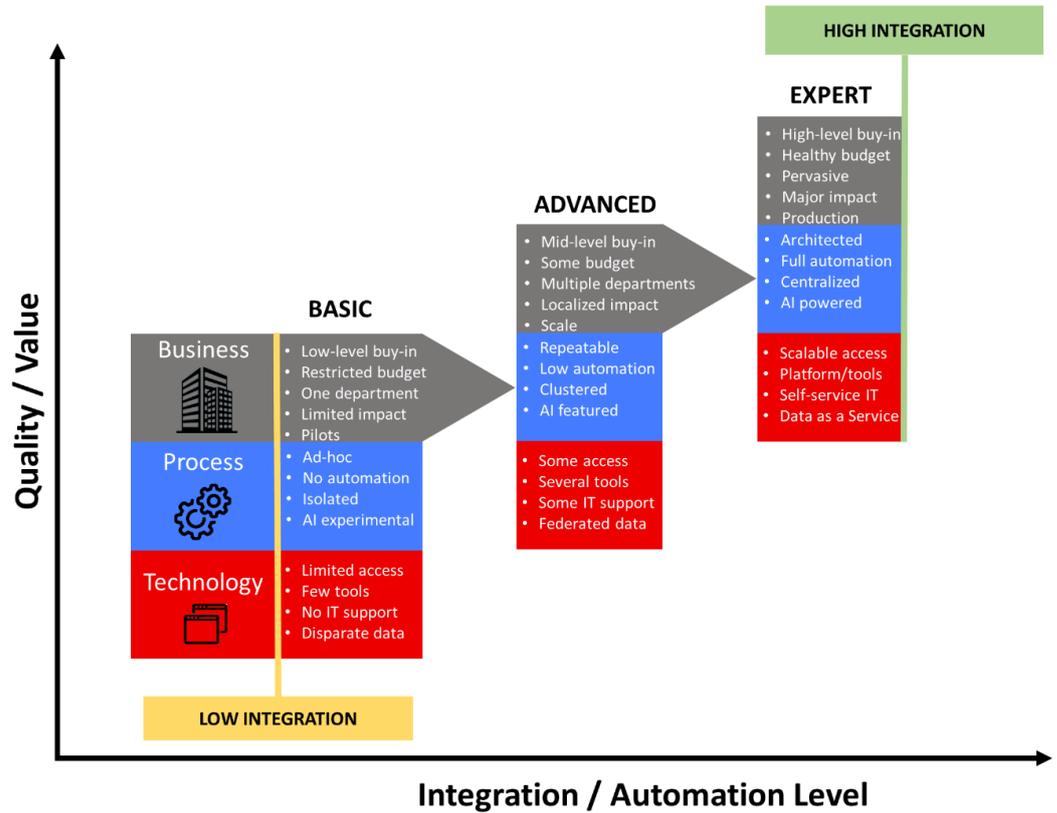


Figure 2: Organization maturity model for integration

 **Business**

Basic	Advanced	Expert
Lower level management buy-in	Mid level management buy-in usually driven by interest generated at lower level	Senior management buy-in, well defined strategy
Minimal budget - enough for one project. Has no significant effect on company's financials	Sufficient funding for the project with additional funding to promote the findings	Significant multi-year budget
Confined to one department or few small departments	Participation by multiple large departments	Scaled across the institution
Has limited impact at enterprise level. More of a Proof of Concept (PoC)	Moderate effect at enterprise level, or significant effect if the project affects an entire product line	Significant impact at enterprise level
Basically, a pilot project to create interest in the C-suite	Expert driven with few senior managers aware of the project	Multi-year roadmap approved - reviewed in a timely fashion
Success is at micro level - no significant margin improvement	Margin improvement at task level - has no major effect at company level	Margin improvement at enterprise level

Table 1: Business factors in an organization's IMM

Integration Maturity Model for Basic, Advanced and Expert organizations

Business factors for Basic, Advanced and Expert organizations

# Process

Basic	Advanced	Expert
Ad hoc processes, learn as you go	Repeatable processes with continuous improvement	Well architected. Reviewed and signed off by all affected parties.
Automation is a novelty	Automation is accepted but not fully in place	Automation and continuous development accepted
Intelligent automation activities isolated and not organized	Wide range of clustered local intelligent automation options but with minimal central oversight	Well established centralized COE for automation/ integration with established processes and technology governance
Low integration with minimal company operational data to leverage AI technology to identify issues	Developing processes for closed loop integration lifecycle that uses company specific operational data to leverage AI	Closed-loop integration lifecycle that uses real-world, company specific, operational data using AI to identify issues and recommendations
No significant improvement in quality	Measurable improvement in quality in the tasks that were automated	Quality improvement across the board

**Table 2: Process factors in an organization's IMM**

# Technology

Basic	Advanced	Expert
Access to technology limited just to the PoC team and the department - departmental systems	Access to technology available to multiple departments and broader audience	Technology is scalable ( e.g., Cloud) and access to the entire organization
Few tools deployed	Platforms and tools evaluated and adopted	Platform and tools tested and in place
IT support - self supported, skunk works	IT support - centralized	IT support - streamlined, self-service, problem resolution through centralized IT
Disjointed data in silos	Data integrated in islands through warehouses or federation	Data as a Service, Data Fabric

**Table 3: Technology factors in an organization's IMM**

**Practitioner maturity model:** More than ever before, technical practitioners (software engineers, software/system architects, data scientists, data engineers, system engineers and administrators, and other IT professionals) play a vital role in an organization's success.

Figure 3 and Table 4 detail the Technology factors that determine integration quality.

- **Application** factors such as architecture, governance, and the nature of application programming interfaces (APIs). APIs allow companies to improve flexibility and

Process factors for Basic, Advanced and Expert organizations

Technology factors for Basic, Advanced and Expert organizations

Practitioner maturity model considers Application, Data and Infrastructure factors

operations, support advanced functions, socialize/publicize data, forge profitable partnerships, and open new avenues for innovation and growth.

- **Data** factors include the ease of moving data from where it is generated to where it is consumed and data integration to generate new insights with AI – a critical need for over 80% of businesses<sup>5</sup>.
- **Infrastructure:** factors include support for cloud or hybrid architectures – a preference of 65% of organizations<sup>5</sup>.

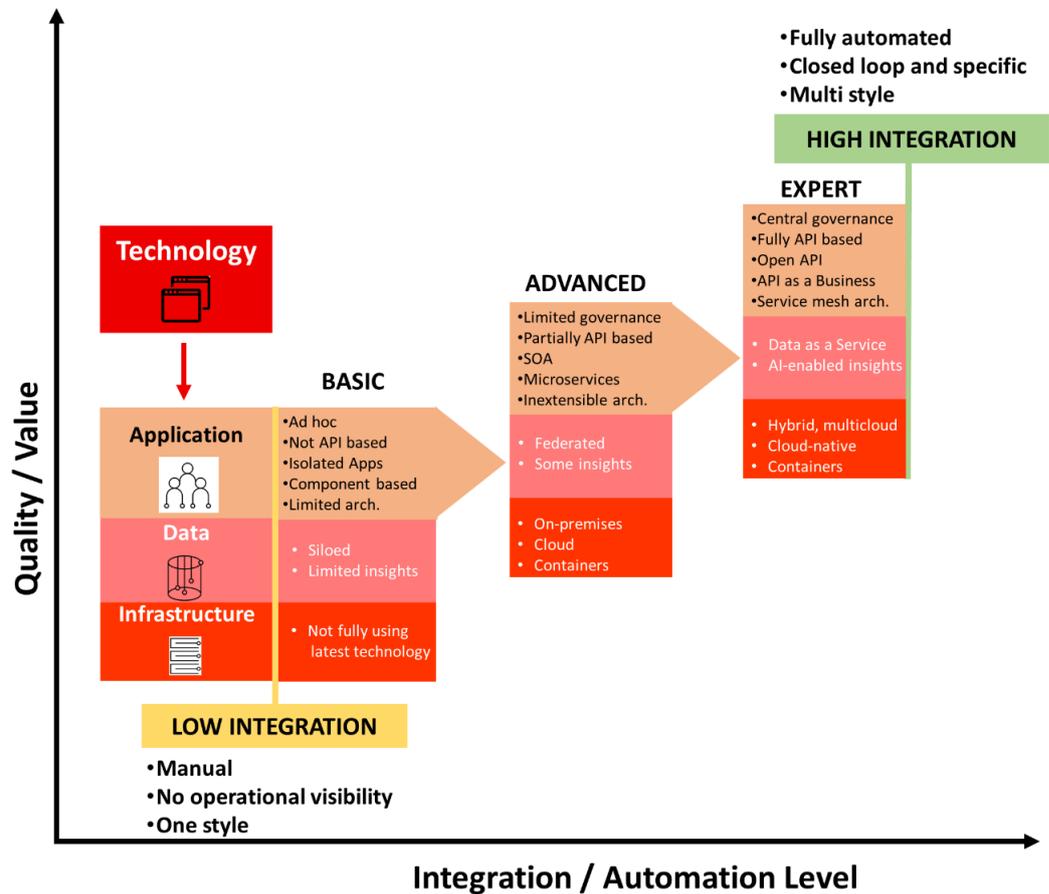


Figure 3: Practitioner maturity model for integration

To improve the success rate of their technology-enabled business transformation, organizations must partner with a reliable provider of high quality, fully automated, multi-style, and closed-loop integration solutions. IBM is such a partner.

### IBM automates integrations to improve application speed and quality

[IBM Cloud Pak for Integration](#) is built on IBM's Automation foundation (Figure 4) and optimized on Red Hat OpenShift to support edge, on-premises, and multi-cloud deployments. It is:

- **Automated** – Uses AI, repeatable formats, and low-code tooling to develop integrations faster

<sup>5</sup> [https://www.forbes.com/sites/louiscolombus/2020/03/29/the-state-of-enterprise-data-integration-2020/?sh=3adcd480c466&mkt\\_tok=MDU1LUZZSi05MTYAAAF9\\_UTliO-ShZHx63v7-q-gilymtT\\_L92naoCN4dmHmC\\_p2WX5KVWWROc3yTzao4n6ok9ZBBdwV\\_DuclxB8hLVL4ebhGEzRaOyIV-KUYivdXglAeg](https://www.forbes.com/sites/louiscolombus/2020/03/29/the-state-of-enterprise-data-integration-2020/?sh=3adcd480c466&mkt_tok=MDU1LUZZSi05MTYAAAF9_UTliO-ShZHx63v7-q-gilymtT_L92naoCN4dmHmC_p2WX5KVWWROc3yTzao4n6ok9ZBBdwV_DuclxB8hLVL4ebhGEzRaOyIV-KUYivdXglAeg)

IBM Cloud Pak for Integration supports automated, closed loop, and multi-style integrations

- **Closed-loop** - Applies company-specific operational and other data to get deeper insights and continuously improve integration quality
- **Multi-Style**- Employs various integration styles (from APIs to Kafka to messaging to iPaaS) to increase efficiency and reduce costs.

	Basic	Advanced	Expert
<b>Application</b> 	Ad hoc use of technology - lack of technical architectural standards	Technical/Application standards in place but not rigorously adhered to. Communication is point to point without central governance.	Centralized governance. Common technical/application standards across the enterprise
	No usage of API and Microservices architecture	No separation concerns between service and API layers. Only service layer and parts of API incorporated.	API part of company business. Creating partner ecosystem and open innovation environment. Mature microservice architecture using Service Mesh.
	Lack of system and integration architecture; Isolated applications, unstructured integration and component- based architecture	Service oriented architecture and API based microservices	System and integration architecture in place. Open API and API as business
<b>Data</b> 	Data resides in silos - with no opportunity to get useful insight	Federated/Warehouse - not very effective in getting deep insights especially real-time	Data migration - data assets that are similar are closer to obtain combined useful insights. Data transformation - Deployment of process to transform data as needed with consistent processes and deployment of ETL tools Data governance and management - ability to audit, control access, profile, govern and monitor data
<b>Infrastructure</b> 	On-premises or cloud ( not deriving technological benefits of cloud and container)	On-premise or cloud ( usage of containers)	Primarily Hybrid cloud or Cloud native architecture. Leveraging all benefits of cloud.

Table 4: Practitioner IMM detailed

Integration Maturity Model for Basic, Advanced and Expert practitioners

High level business, process and technology layers of the IBM integration architecture

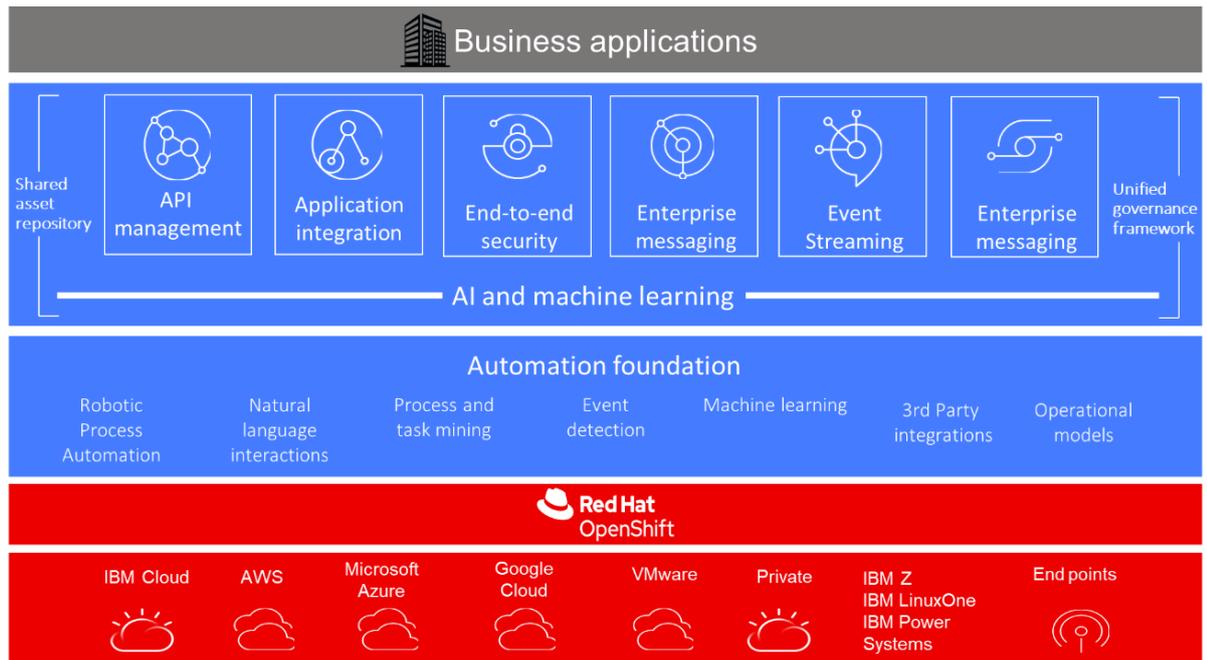


Figure 4: High level architecture of IBM integration

Key differentiators are Event Endpoint Management, Mapping Assist, Automated Test Generation and Adaptive Load Balancing

Increase adoption by 50%, reduce development time by 75%, speed integration by 300% and reduce costs by 33%

Seven ISO 9001 Quality Principles: Customer focus, Leadership, Employee Engagement, Process Approach, Continuous Improvement, Relationship Management and Technology-enabled Decisions/Operations

Some key differentiators of Cloud Pak for Integration to deliver high quality integrations include:

- **Event Endpoint Management** – Describe and catalog the APIs of Kafka event sources and socialize those APIs with application developers.
- **Mapping Assist** – Provides data mapping suggestions using AI and based on semantics, and this gets better by learning from similar mappings in past integrations.
- **Automated Test Generation** – Make recommendations for additional tests based on the behavioral usage of the APIs in production.
- **Adaptive Load Balancing** – Enable dynamic rebalancing of both synchronous and asynchronous workloads based on real-time data.

Companies can unlock business data and assets as APIs; connect edge, cloud, and on-premises applications; reliably move data across any cloud with enterprise messaging; examine real-time event interactions; and deploy and scale with a cloud-native architecture – all with end-to-end enterprise-grade security and encryption. These features can increase adoption by 50%, reduce development time by 75%<sup>6</sup>, speed integration development by 300%, reduce costs by more than 33%, maintain enhanced security, governance, and availability<sup>7</sup>, and improve integration quality.

## Detailing seven ISO 9001 principles

Figure 5 depicts the quality principles that should be a top priority for the organization<sup>8</sup>:

**Customer focus** to proactively meet and exceed customer expectations, and deliver more value in every interaction, to increase repeat business, revenue, and brand equity.

**Leadership** to unify the purpose and direction and drive better alignment of the entire workforce to create productive environments for all employees to pursue quality goals.

**Employee Engagement** to foster deep trust and respect so that employees and stakeholders will maximize their attention to a quality culture and improve professional development.

**Process Approach** to produce consistent and predictable results, optimize cross-functional performance, convey confidence to all stakeholders, and consistently drive better quality.

**Continuous Improvement** to streamline root-cause investigations, enhance the drive for innovation and boost the ability to anticipate and react to internal and external opportunities.

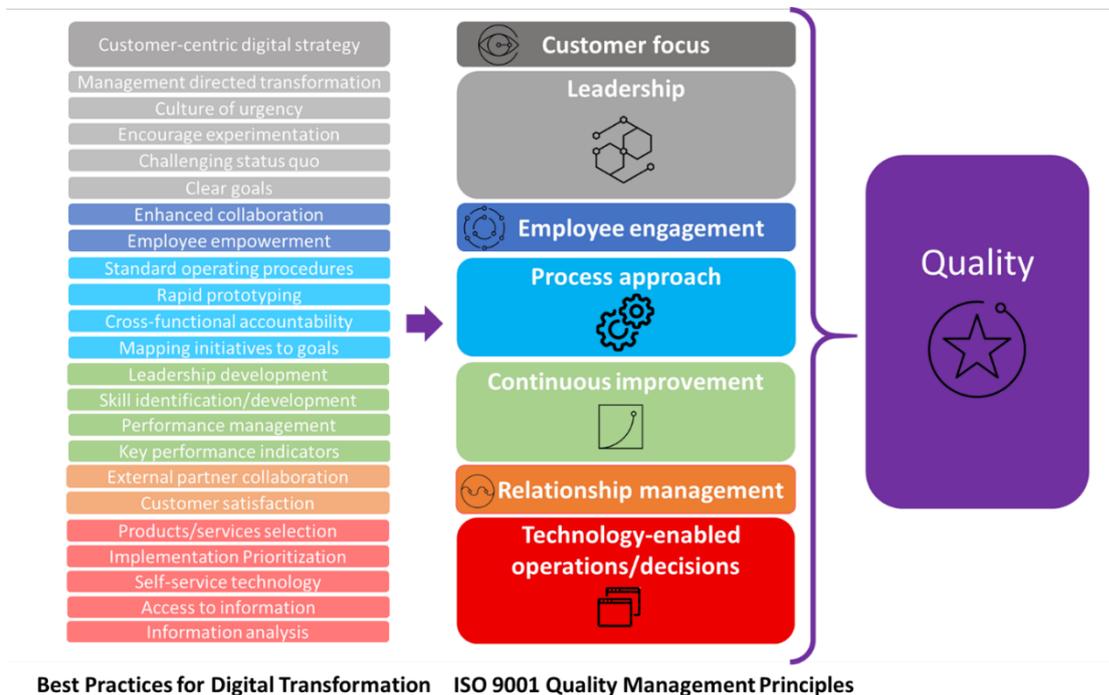
<sup>6</sup> [The seven make-or-break API challenges CIOs need to address | McKinsey](#)

<sup>7</sup> [https://vmark.eu/wp-content/uploads/2019/04/IMPACTSTUDY\\_FORESTER.pdf](https://vmark.eu/wp-content/uploads/2019/04/IMPACTSTUDY_FORESTER.pdf)

<sup>8</sup> <https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100080.pdf>

**Relationship Management** to effectively manage partner relationships to deliver greater value to customers, support an efficient supply chain, and enhance overall performance.

**Technology-enabled Decisions/Operations** to maximize operational efficiency, assess process performance effectively, and gain deeper insights into potential unintended consequences.



**Figure 5: Mapping of ISO 9001 Quality Management Principles to Digital Transformation Best Practices**

Next, these quality principles, maturity models, and best practices data from a recent McKinsey Global Survey<sup>9</sup> of 263 organizations are combined to build an analytical model to quantify integration quality.

### Analytical model for integration quality

There are two steps to quantify integration quality. First, we compute the quality improvement for the organization and second, we do the same for the practitioner.

**Organization quality improvement model:** Figure 5 maps the seven quality principles to 23 digital transformation best practices. The McKinsey survey also quantifies a particular best practice's relative impact on the digital transformation success rate with Expert organizations having the highest positive impact and Basic having the least. By averaging all contributions from the 23 Best Practices or the seven Quality Principles, we find that organizations with an expert-level of integration maturity benefit from an overall **73%** improvement in quality compared to basic maturity.

<sup>9</sup><https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Organization/Our%20Insights/Unlocking%20success%20in%20digital%20transformations/Unlocking-success-in-digital-transformations.ashx>

**Practitioner quality improvement model:** As the pace, scale, and impact of digital technologies grow, practitioners play a very significant role in an organization's success. High-quality integration provides practitioners several benefits and allows them to: enrich usability/developer experience; increase performance; improve uptime/availability; incorporate features from external products; extend the functionality of products and services; reduce development cost/time; enhance collaboration between internal systems and tools; and partner with external organizations.

These practitioner benefits are mapped to the relevant subset of ISO 9001 quality improvement drivers/best practices for digital transformation to create the benefits matrix (Figure 6).

Practitioner Organization	Enrich experience	Increase performance	Improve availability	Incorporate new features	Extend functionality	Reduce development cost	Enhance collaboration	Partner externally
Enhance collaboration							0.40	0.40
Employee empowerment							0.30	0.30
Standard operating procedures	0.11	0.11	0.11	0.11	0.11	0.11	0.11	
Rapid prototyping	0.17	0.17	0.17	0.17		0.17	0.17	0.17
Cross-functional accountability				0.55			0.55	0.55
Mapping initiatives to goals	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Performance management	0.12	0.12	0.12	0.12			0.12	0.12
External partner collaboration				0.10			0.10	0.10
Products/services selection				0.10			0.10	0.10
Implementation prioritization	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Self-service technology	0.33						0.33	0.33
Access to information							0.55	0.55
Information analysis	0.32	0.32	0.32	0.32			0.32	

**Figure 6: Map of practitioner benefits to key relevant drivers of organization quality**

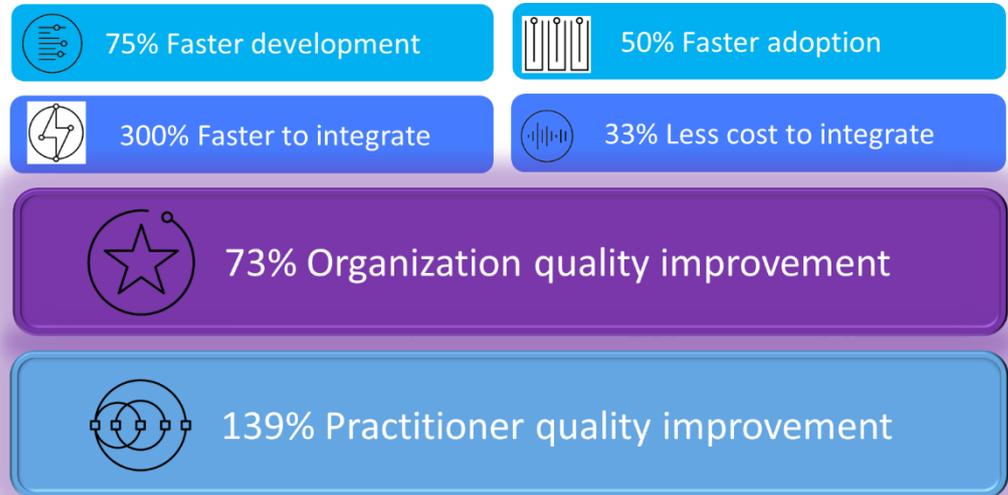
The non-blank entries depicted as colored numbers in the benefits matrix correspond to practitioner benefits (columns) that directly contribute to the corresponding best practices (rows) from the McKinsey Global Survey. The best practices Quality improvement scores (Expert over Basic) from the survey are divided equally across all the non-blank entries. Then, each column is aggregated to yield a score for the corresponding practitioner benefit. These scores are averaged across all practitioner benefits to generate the overall practitioner Quality improvement score of **139%**. This score is almost twice the organization's quality improvement score – highlighting the critical role practitioners and technology play in digital transformation.

Map practitioner benefits to organization quality drivers

Practitioner quality improvement by 139%

## Conclusions

IBM Cloud Pak for Integration **can deliver 73% improvement in an organization's quality and a 139% quality improvement for practitioners** – underscoring the strategic importance of high-value integration technologies.



**Figure 7: Benefits of integration and automation**

Finally, IBM's recent acquisitions such as Turbonomic and Instana together with other related IBM Cloud, Automation and AI offerings and services can be used to further increase value and lower operational cost of integrations.

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