Appendix A

Table 1. Functional suitability criteria

	Criteria	Description	References
C1. Stakeholders and participants	C1.1 Multiple participants	Different entities or stakeholders participate in a blockchain business network.	[20] [23] [24] [26] [27] [28] [29] [1] [64] [34]
	C1.2 Trust issues	Use cases with conflicts of interest or trust issues between participants in a business network require a trustworthy solution, such as blockchain.	[20] [23] [24] [26] [28] [29] [2] [22] [1] [64] [31] [33] [34] [12]
	C1.3 Eliminate a trusted third party (TTP)	Business participants rely on a third party for trust in validity, where trusted authority elimination is desired for more efficient and cost-effective business processes.	[27] [28] [29] [2] [22] [1] [64] [32]
C2. Data and assets	C2.1 Needs a single source of information	Historical data on records and transactions should be stored in a single source and made available in distributed data stores to facilitate traceability.	[20] [23] [24] [27] [29] [2] [22] [1] [31] [32] [33] [65] [35] [48]
	C2.2 Data integrity	The original state of transaction data is required to ensure that information is protected from unauthorized modifications.	[20] [23] [24] [27] [29] [2] [22] [1] [31] [32] [33] [65] [44]
	C2.3 Data immutability	Being tamper-proof is an essential requirement for the use case, where the blockchain feature of immutability offers verifiability and ensures that data or objects are not modified after their creation.	[24] [27] [28] [29] [2] [22] [64] [31] [32] [66] [44] [67]
	C2.4 Decentralized shared database	Distribution is essential for the use case, where multiple copies of the use case records can be shared in a decentralized system.	[68] [26] [28] [10] [64] [32] [31] [20] [66] [67]
	C2.5 Data privacy	Assurance of data privacy is desirable where there are personal data protection requirements.	[20] [24] [26] [65] [34] [35]
	C2.6 Data transparency	Use cases require confidentiality to improve discoverability and minimize the risk of corruption and fraud.	[27] [2] [22] [31] [32] [33] [65] [34] [66] [67] [69]
	C2.7 Data governance	The use case seeks data governance mechanisms that permit rule standardization and allow data owners to control and track their data through consent management mechanisms.	[28] [22] [34] [1] [70]
	C2.8 Asset valuation	The use case requires the digitization of real-world assets to provide data-driven business models, manage assets, and utilize tokens in the business.	[22] [68][72]

C3. Transactions and process criteria	C3.1 Automation	There is a need to digitize processes and transactions between independent companies. Therefore, a smart contract should be automatically processed when the transaction history is recorded in the block.	[8] [71] [66] [31] [48] [67]
	C3.2 Access control	The use case seeks access control mechanisms with business partners to control transaction processing and management.	[20] [26] [28] [2] [31] [33] [35]
	C3.3 Traceability and Auditing	An audit can apply to an entire organization's business function where the use cases will be implemented, which implies that verification activities will be involved in a process or in system transactions to ensure compliance with requirements.	[65] [48] [66] [44]
	C3.4 Interoperability	The use case interacts and exchanges data with other systems and entities, which requires a system with supported mechanisms.	[33] [65] [64] [29] [66] [44] [67]
	C3.5 Transaction dependency	Use case transactions depend on other transactions for greater business efficiency.	[64] [66] [35]
	C3.6 Scalability and performance	Use cases seek to improve efficiency with acceptable scalability levels and good performance levels.	[27] [29] [2] [22] [31] [65] [66]
	C3.7 Rewards and incentives	Use case participation yields incentives or generates rewards that require a system with supported mechanisms.	[71] [22] [70] [1]
	C3.8 Transaction costs	The use cases should utilize blockchain for cost reduction, as involvement in blockchain business networks reduces operating costs to approximately 80%.	[44] [65] [66]

Table 2. Organizational applicability indicators

	Indicators	Description	References
IN 1. Managerial characteristics	IN 1.1: Top management support	Top management understands the strategic importance of blockchain and is involved in adoption activities.	[37] [46] [4]
	IN1.2: Control and monitoring	Organization management seeks to control business functionality and improve visibility and traceability through reliable solutions.	[10] [32] [15]
	IN 1.3: Enhanced audibility	The organization needs to improve audibility due to compliance requirements in the industry.	[15] [73] [37]
	IN 1.4: Relative advantages	Management perceives that blockchain offers better information accessibility, process efficiency, and transaction traceability.	[1] [31] [37] [15] [33] [4]
	IN 1.5: Competitive pressure	The organization's fear of missing out in the market is the main driver of blockchain adoption. The organization believes its competitiveness will increase by implementing innovative technology, such as blockchain.	[73] [37] [44] [74]
	IN 1.6: Competitive performance	The organization believes its competitiveness will increase by implementing innovative technology, such as blockchain, which could create new business models.	[32] [73] [37] [44] [74]
IN 2. Financial characteristics	IN 2.1 Proportion of digital assets	An organization has digital assets or plans to acquire digital assets in the future. Asset tokenization is the process by which an issuer creates digital tokens on a distributed ledger or blockchain, which represent either digital or physical assets.	[1] [32] [46]
	IN 2.2 Cryptocurrency creation	To ensure efficient operations, organizations can create or plan to initiate their cryptocurrency, which is structured as an exchange tool (token) with its own cryptography.	[13], [42]
	IN 2.3 Perceived financial benefits	The organization looks for the potential to increase revenue, yield a high return on investment, and reduce costs or achieve a significant growth rate.	[15] [37]
	IN 2.4 Budget availability	The organization can afford the cost of implementation.	[10] [32] [46] [75]
	IN 2.5 Financial risk and uncertainty	This factor measures the organization's ability to conduct feasibility assessments and anticipate various financial risks.	[76] [37] [77]

IN 3. Technical characteristics	IN 3.1 Quality of services	The organization promotes performance excellence in terms of processing speed, concurrent capacity, reduced real-time processing transaction delays, and space recovery.	[27] [37] [44] [74]
	IN 3.2 Infrastructure availability and compatibility	The organization has a sufficient and integrated infrastructure in which the blockchain system can integrate seamlessly with existing legacy systems. In addition, the robustness of an organization's security infrastructure, cloud infrastructure, and internet connection bandwidth contribute to the technical applicability of an organization.	[32] [46] [75]
	IN 3.3 Technical know-how availability	The organization has or can acquire technically skilled experts and consultants to guide blockchain implementation and operations.	[37] [4] [75]
	IN 3.4 Enhanced security and data integrity	The organization works to enhance security and data integrity, where there is a need to refine attack resistance and reduce fraud and fault tolerance.	[15] [59]
IN 4. Organizational culture characteristics	IN 4.1 Riskiness level	This indicator refers to the risk and uncertainty consideration, which is the willingness to forecast potential risks associated with adopting new technology, including financial, technical, and environmental risks.	[66] [72]
	IN 4.2 Trust and transparency	The organization's norms in sharing information, accepting transparency, and maintaining flexibility in business contracting.	[15] [78]
	IN 4.3 Innovation propensity	An innovation culture is critical for widespread blockchain adoption. This indicator refers to the degree to which an organization is inclined to achieve a state of innovativeness by exploring, accepting, and adopting innovative ideas—such as blockchain—to take risks without fear in areas beyond the organization's core business.	[33] [37] [4]
	IN 4.4 Motivational readiness	This refers to a recognized need for change in which an existing service or circumstance does not meet expectations or there is dissatisfaction with practices or services presently offered.	[4] [78]
IN 5. Legislation and regulation characteristics	IN 5.1 Regulation compliance	Understanding the regulations associated with blockchain technology is essential to satisfying the compliance aspect.	[35] [46]
	IN 5.2 Organizational governance	Availability of an appropriate governance framework between organizations and external partners.	[10] [32] [46]
	IN 5.3 Incentive structure	The organization's ability to work with partners and government officials to design technical, financial, and business incentive structures.	[22] [1] [33] [35] [46] [77]
	IN 5.4 Values and rights	The organization's flexibility to adapt to and address new changes in the regulatory landscape by reflecting on its own policies regarding employee and participant rights.	[17] [79]

Table 3. Ecosystem readiness factors

	Factors	Description	References
F1. Governments	F1.1 Existence of regulations	Governments that provide related regulations and develop required policies will pave the way for a consortium blockchain ecosystem and accelerate business collaboration and consortium establishments.	[14] [73]
	F1.2 Definition of governance structure	An ecosystem will be ready for blockchain when an agreed-upon governance structure exists. This includes defining the rules of access control, data privacy, data ownership, funding, and participation. There should also be a legal adaptation for consensus mechanisms and smart contracts.	[52] [56]
	F1.3 Government entity leadership	The ecosystem will be ready for blockchain solutions if government entities take the lead in establishing blockchain business consortia.	[22] [56] [75] [81]
F2. Business entities	F2.1 The richness of business entities	A large ecosystem scope with multiple participants will increase the potential of creating sufficient blockchain networks in a particular industry.	[15] [79]
	F2.2 Enthusiastic participation	There must be at least one powerful organization leading the ecosystem. This organization makes blockchain benefits observable to others and puts pressure on other ecosystem participants.	[22] [4] [79]
	F2.3 Competitive pressure	The fear of missing out in the market is the main driver of adopting blockchain among ecosystem business entities that believe their competitiveness will increase by implementing such innovative technology.	[74] [77] [46] [78]
	F2.4 Engagement readiness	Participants' readiness refers to their willingness and cooperation in the onboarding preparation. This process involves knowledge and awareness of new initiatives and a clear understanding of the required engagement steps and expected benefits versus potential challenges.	[74] [79]
F3. Solution providers	F3.1 Technology provider availability	The readiness of an ecosystem can be measured by the number of technology vendors who can satisfy the launch, implementation, and onboarding of a blockchain solution.	[22] [56] [75] [81]
	F3.2 Service competitiveness	Healthy competition among solution corporations facilitates faster adoption of blockchain solutions and contributes to ecosystem readiness.	[52] [53] [54] [55] [56] [79]
	F3.3 Promoting activities	When many leading global enterprise information technology (IT) and business consulting firms are actively involved in blockchain promotion activities, the ecosystem will be more ready to develop blockchain solutions. These activities include developing case studies and proofs of concept for customer-centric blockchain solutions and preparing business profiles for various industries.	[4] [79]

F4. End users (customers/citizens)	F4.1 Aligned values and rights	End users will be ready to participate in the blockchain ecosystem if they encounter a data-sharing and voluntary information disclosure culture that aligns with their rights to participate and increases transparency.	[74] [77] [46] [78]
	F4.2 Ecosystem value proposition	End users understand the value of the new blockchain system so that they know what problems will be addressed and can expect the new system to have an impact.	[52] [56] [27] [46] [77]
	F4.3 Availability of incentives	End users are ready to participate in a blockchain ecosystem if the new system has an incentive structure that encourages engagement and participation.	[22] [77] [53] [54] [55] [56] [79]