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Usage of Blockchain Technology for the Improvement of Industry and the training of future talents

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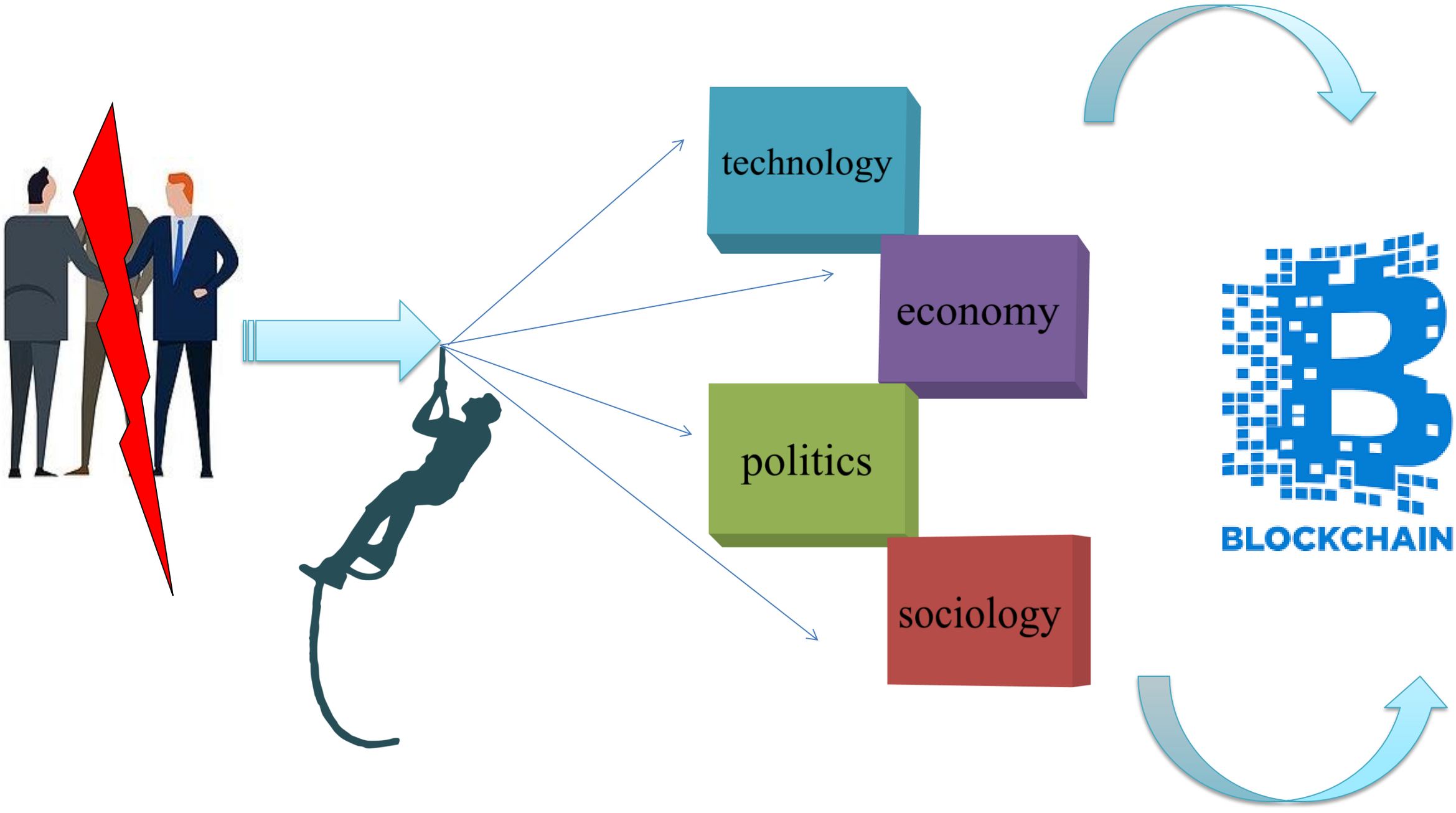
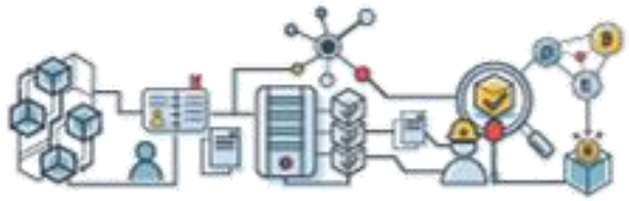
Introduction

The lack of confidence and dissatisfaction with third parties and traditional mediators, institutions, banks and States, Led to the creation of many research challenges in different fields : technology, economy, politics and sociology.



To deal with this problem, research is moving towards blockchain technology

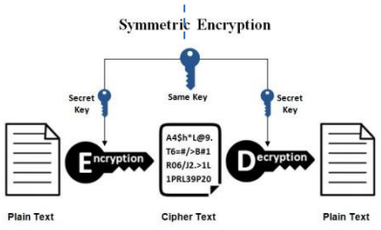
Advantages of the blockchain



BLOCKCHAIN

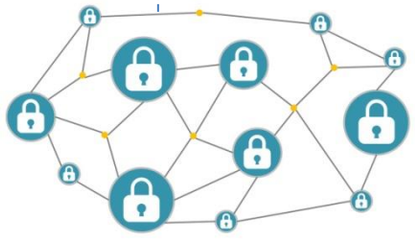
Storing Information & Backup

storing and transmitting information



encryption methods and transmission protocols

structured by blocks linked to each other by cryptography



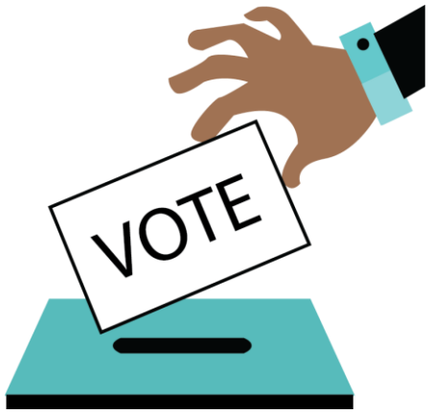
high degree of security

Distributed Ledger

replicated and distributed ledger

Applications of blockchain technoloty

Heath care



Voting

Banking

Payment and Transfers

Digital ID

Real estate

Law enforcement

Online music

Internet of Things

Bitcoin

Systematic review, Kitchenham method

15 articles

The need to train Blockchain technology talents

1 article

EXCLUDED

Education and training face the blockchain technology

9 articles

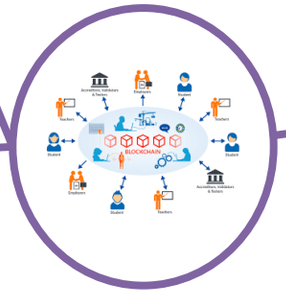
6 articles

3 articles

3 articles

Improvement of the education system by Blockchain technology

3 articles



2 articles

1 article

Opportunities to improve the industry through blockchain technology

5 articles

2 articles

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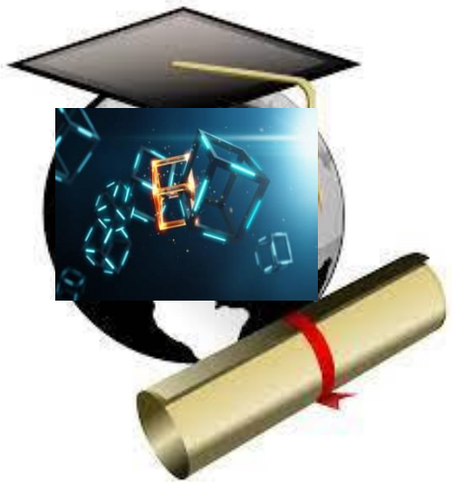
Part II

Education and Training

Face the Blockchain Technology

A. The need to train blockchain technology talents

How to get real "relevant skills" of blockchain projects if there is no comprehensive and practical training on the subject?



Blockchain and Its Security: Ignore or Insert into Academic Training?," [3]

authors of [3] analyze an inventory of current training in the BCT (BlockCahin Technology) around the world, through a global survey, and sought to a training courses to get BCT skills after mastering a full-time BCT course with exemplary course structure.

1.Introduction: Blockchain Technologies in Modern Business Environment and Technologies used by the BCT
2. BC foundation: Basics of the BCT and BC Characteristics and Architecture
3. How the BC works: Planning the BC, BC protocols, Maintaining the history of transactions, Hashes and cryptography in the BC, Transactions and data storage in the BC, **4. BC vulnerabilities and limitations and how to overcome them:** BC vulnerabilities and limitations, How to overcome some BC limitations and Redactable BC by Accenture
5. Using the BC: Specific BC use cases, BC research and further development,
6. BC Project: Choose a BC topic from the given content for its detailed discussion or Create a BC business plan for the application area selected or Create a BC for the application area selected

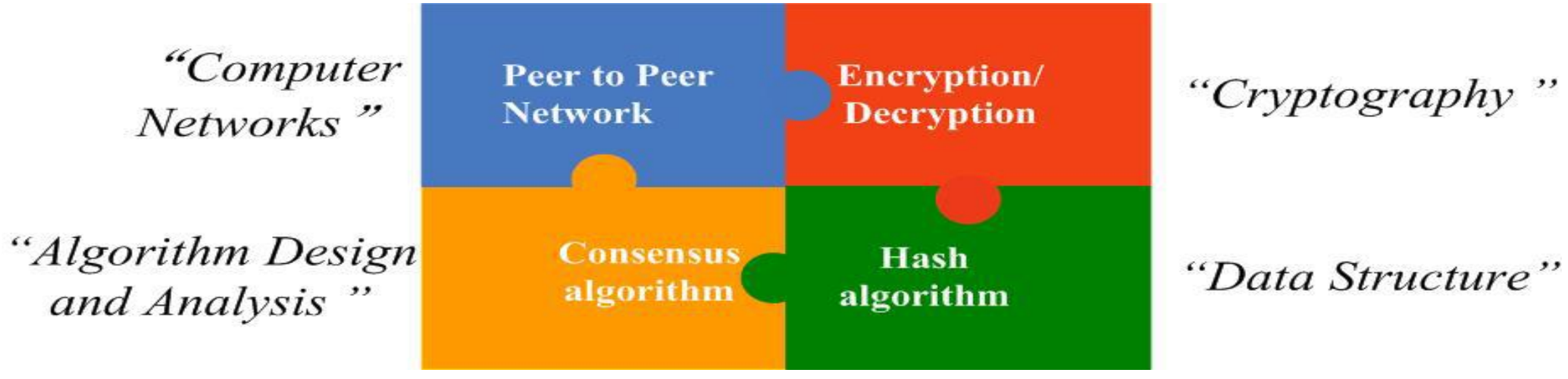
Business education: training in the use of blockchain technology for business development [12]

has analyzed the possibilities of business education in teaching the use of blockchain technology for business development. Based on an expert survey, the main provisions of the business training course "Blockchain: Basic Principles and Application Examples" have been developed, the skills and learning outcomes for this course have been determined, and the sample business program “Blockchain: Fundamentals and Application Examples” were presented.

No.	Competencies	Learning outcomes	%*
1	Ability to use ICT to search for new information, create databases, analyze distributed speakers, communication channels, process control systems, databases, operational planning of systems based on the analysis of information flows and their optimization	Design future professional activities considering their significance for the citizen and the state, as well as the directions of development of information and cybersecurity	90%
		Carry out professional activities based on knowledge of modern ICT	85%
		Apply software tools, work skills in telecommunications and computer networks	80%
		Use specialized computer programs in professional activities	80%
		Select the appropriate programming technology and perform task specification analysis	75%
		Perform software analysis to find, identify, detect, and resolve programming errors	70%
2	Ability to solve specialized tasks and practical problems of using blockchain technology in various sectors of the economy	Have a comprehensive understanding of what blockchain technology is and how it works; identify key roles and players affected by this technology	85%
		Take part in the development and implementation of information systems, databases, data warehouses, and data spaces based on blockchain technology	80%
		Be able to use various platforms based on blockchain technology in business processes	75%
		Use smart contracts and track their execution	70%
		Plan and forecast the use of blockchain technologies in various spheres of life	70%
		Use cryptocurrency within the current legal framework	65%

Strategy of Training Blockchain Talents in Application-oriented Universities: A Case Study [7]

the authors analyzed the technical requirements of a local company in the city of Weifang, they came up with a task-oriented strategy, to train blockchain talents in application-oriented universities. They adopt the concept of "collaborative industry-university education", a strategy that takes into account the real knowledge levels of students in applied universities and sets a reasonable degree of learning difficulty. The strategy has been applied to the School of Computer Engineering of Weifang University and some positive effects have been achieved.



Blockchain and Regional Workforce Development: Identifying Opportunities and Training Needs [13]

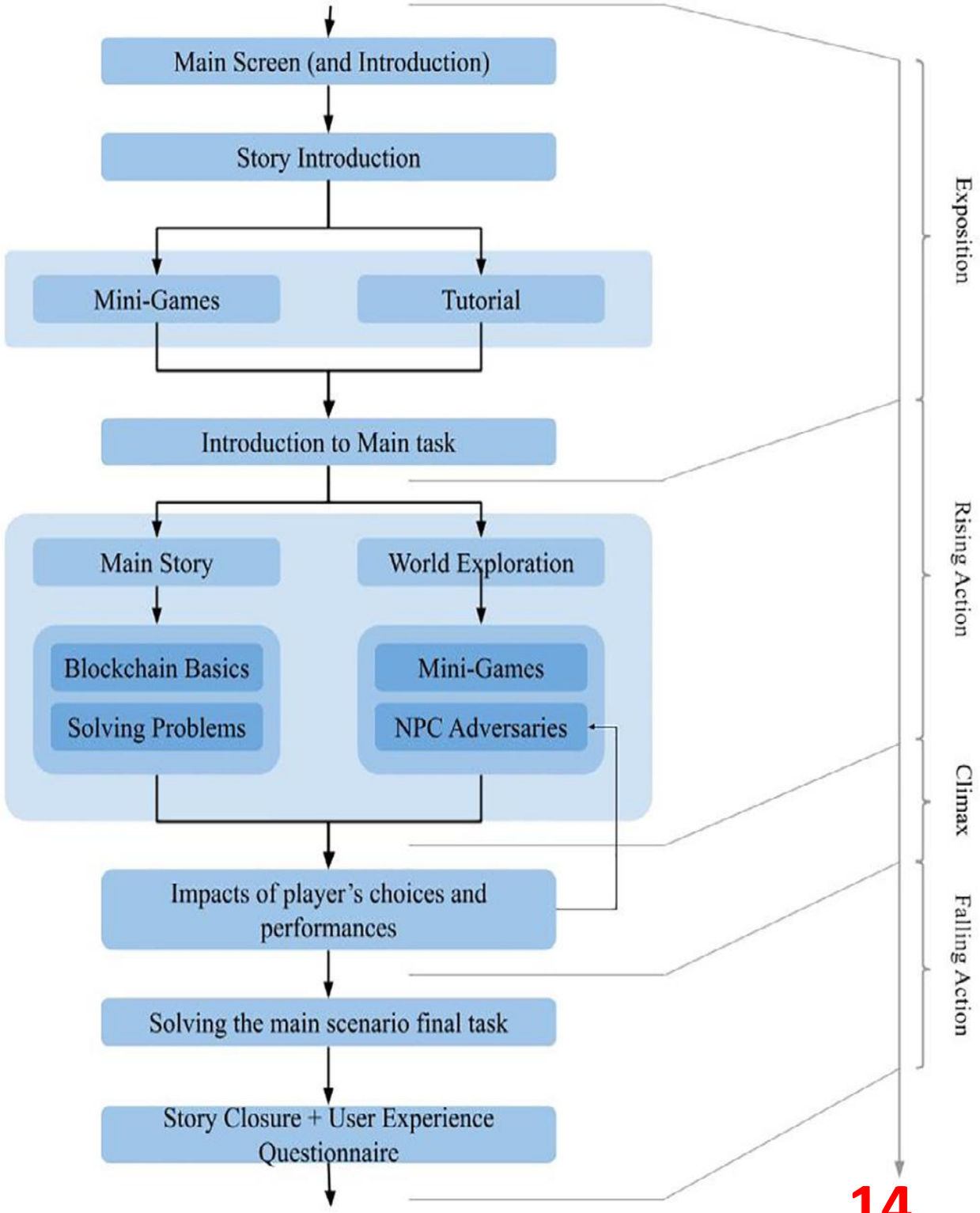
In order to contribute to the economic development of South Bay, authors of [13] relied on a case study informed by interviews with experts in the fields of BCT and the workforce of the industrial sector, as well as through a literature review and analysis of labor force trends for the region, to inform public officials and policy makers working on issues of new technologies, regional economic development, and investment in the workforce. According to this study, answers suggest that those in the majority of industrial sectors see the potential of blockchain as a disruptive and positive force in their workplace. Many answers highlight the potential of blockchain investments to expand their workplaces, whether by increasing operational efficiency, reducing transaction costs, or creating new growth opportunities.

Pedagogy of Blockchain: Training College Students on the Basics of Blockchain [6]

In the same context, the authors in [6] chose to use the mid-sized college classroom in the United States to apply the principles of active learning (a process to involve students in the co-creation of the learning experience by sharing leadership and course design, students will be responsible for their own learning), and gamification leading to blockchain education. The used classroom learning method was the asynchronous learning method, in which concepts were categorically divided into blocks. These elementary principles were built on top of each other, which led to the synergistic knowledge and definition of blockchain for the student. The instructor performed these exercises in Introductory Information Technology (IT) courses, as well as higher level ethics and professionalism courses, with the aim of discerning different levels of knowledge regarding the subject of the blockchain. The content of the article encourages instructors to use their creative talents to produce gamification for blockchain pedagogy.

Cybersecurity Enhancement through Blockchain Training (CEBT)
A serious game approach [14]

In [14], the authors suggest one of the first educational tools for blockchain training using an adversarial adaptive sandbox serious game approach for students and tech professionals, which can improve cybersecurity in management systems information where blockchain technology impregnates the corresponding disciplines. They further suggested the use of artificial intelligence (AI) to improve the interactivity of NPCs (Non-Player Character) based on player responses. This research is essential for the introduction of the first serious online game, which can increase educational skills in blockchain technology for students and industry professionals. The authors plan to rate this serious game on a subjective scale based on the Game Experience Survey.



B. Improvement of the education system by Blockchain technology

Application of blockchain technologies, crowdsourcing and artificial intelligence in student training review [4]

[4] explores the new needs of their system in the context of the global digitization of society and it analyzes the innovative possibilities of merging new social media technologies, blockchain, big data, artificial intelligence, with each other. At the end, all available knowledge and its supports will be brought together in a single system called collective intelligence and most importantly the guarantee of intellectual property of the latest curricula and educational resources. Authors consider Russian projects for their use in practical activities of teachers, on the basis of systems analysis methods, new directions in training of specialists have been identified and characterized: the development of forms of collective creativity the participation in complex projects based on blockchain technologies, the involvement of young initiative in the framework of crowdsourcing technologies, the development of individualized training based on artificial intelligence technologies.

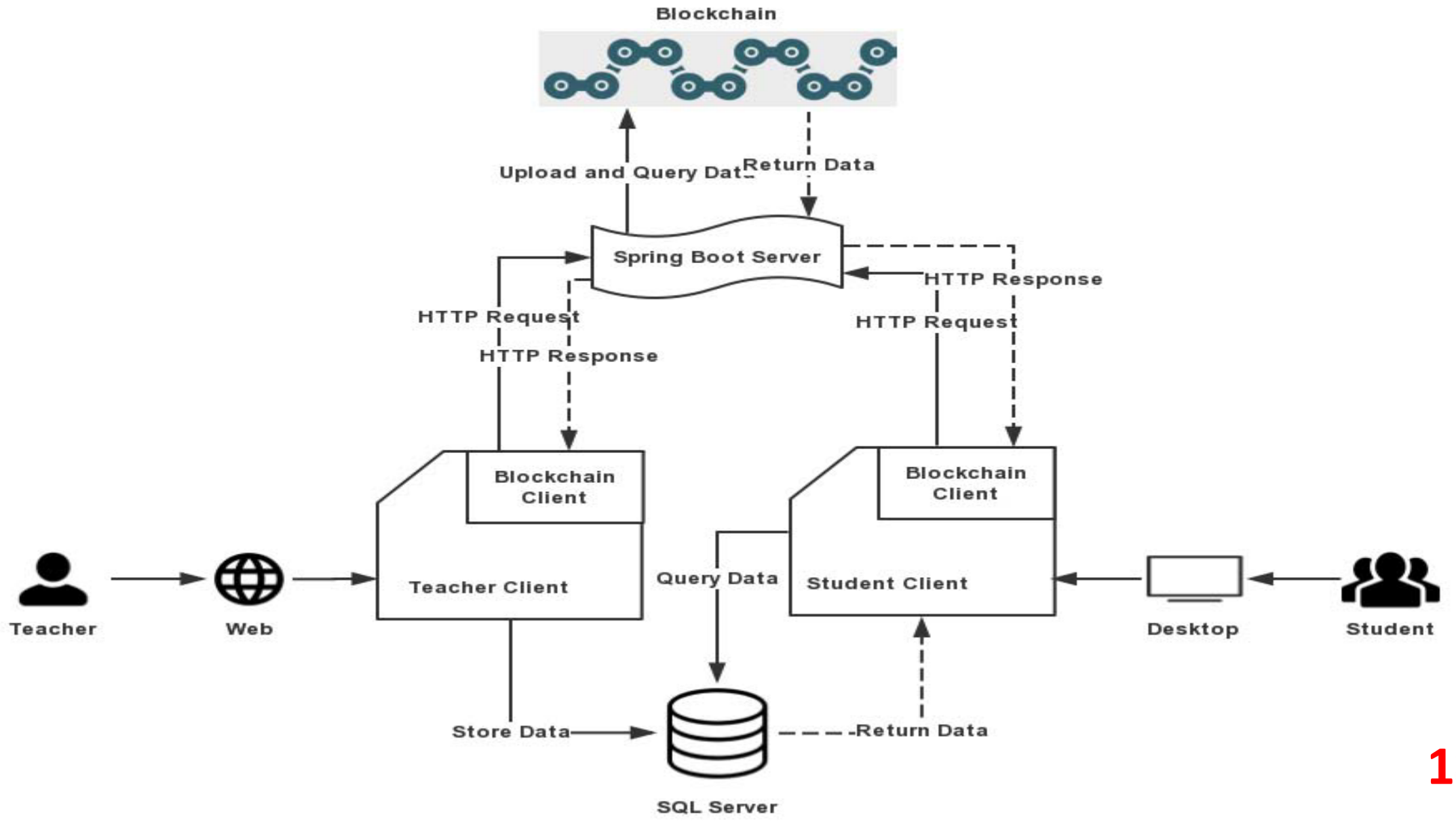
Does competency-based education with blockchain signal a new mission for universities? [8]

The article [8] describes the changing nature of graduate occupations and examines the possible impacts of developments in knowledge-intensive work and AI. It examines the analysis of learning and blockchain technologies to assess their potential to automate the secure recognition of student activities and achievements. It makes an original and timely contribution to higher education literature by considering how a convergence of three technologies (learning analytics, (AI) and blockchain) could lead to radical changes.

Stage 1	Students' online activity in on-campus tasks or work placement projects is captured and stored in large datasets on university-hosted or external secure network servers.
Stage 2	Second generation learning analytics systems supported by AI, on either university-managed or secure external platforms, are used to assess each student's level of engagement in: collaborative networking; discourse analysis; learner-generated content; disposition analytics, intrinsic motivations; and context analytics (Buckingham Shum & Deakin Crick, 2012).
Stage 3	Analytics outcomes are matched to student success algorithms; these include the validation of individual and collaborative achievements. Those meeting the defined criteria of (preselected) smart contracts are prepared for transmission.
Stage 4	Triggering, either automatically or manually by student / university / work placement supervisor, of smart contracts and the transmission of input data to blockchain ledgers.
Stage 5	Certification (for example, by Blockcerts) of the students' individual and collaborative achievements are made publicly available via blockchain. Cryptocurrency payments are made to service providers as required.

Design of Evaluation System for Digital Education Operational Skill Competition Based on Blockchain [9]

To go further than the current mode of application of the blockchain which is limited to recording the educational experience of students, the author of [9] offers a competition mode of application of blockchain technology based on the e-commerce sandbox of digital education operation, to help teachers to test students' knowledge and their ability to use the knowledge. This mode applies blockchain technology to effectively simplify the competition process and improve competition efficiency.



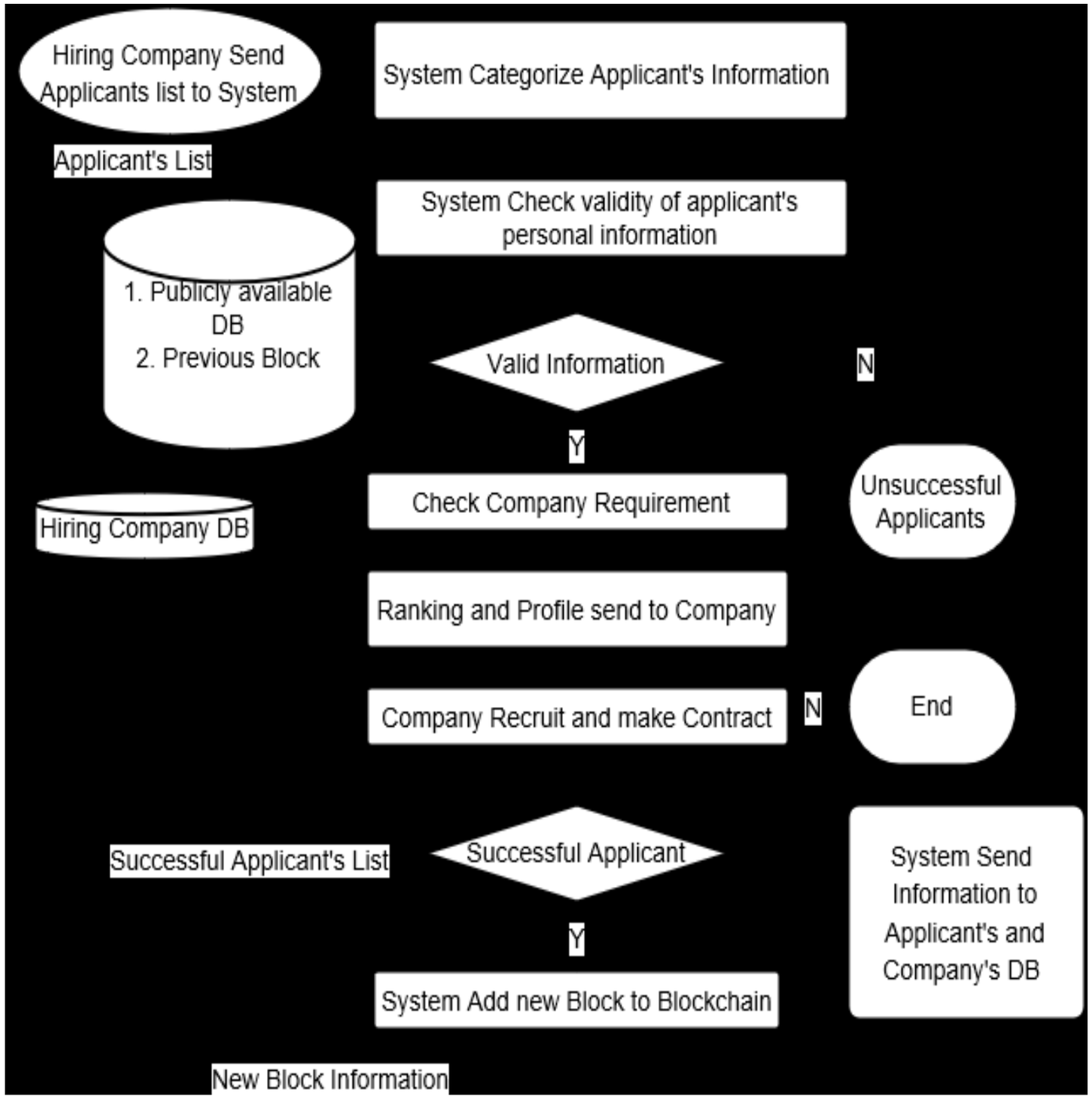
Part III

Digitizing the Human Resources Area in Industry

Thanks to Blockchain Technology

A Recruitment and Human Resource Management Technique Using Blockchain Technology for Industry 4.0 [5]

[5] proposed a blockchain-based on the recruitment management system (BcRMS) as well as a blockchain-based human resources management system (BcHRMS) algorithm. It is a fast efficient and transparent system using blockchain to reduce the risk to the human resources authority. The proposed system thus provides authentic and effective decision support information for the management of the human resources of an organization. This research reveals that the proposed models can be more efficient than the existing HRM systems in terms of safety, cost, time and quality of work. Thus, the proposed system will have significant effects on the construction of smart cities as well as smart industries in the era of existing industry 4.0 and future industry 5.0.



Developing Global Qualification-Competencies, Ledger on Blockchain Platform [1]

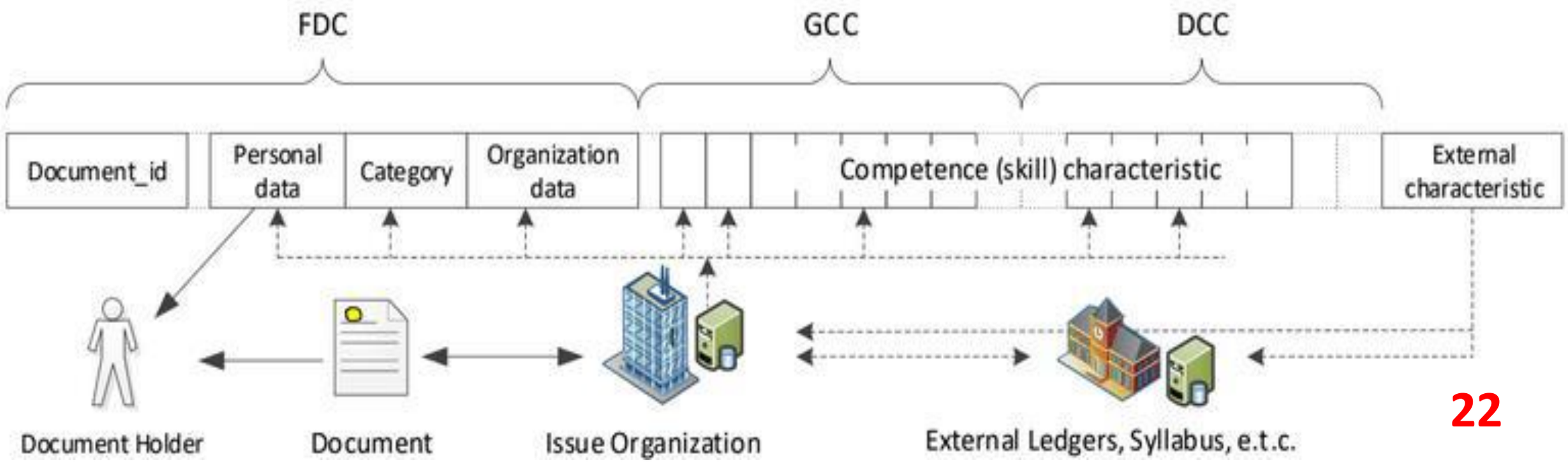
In [1], it uses blockchain technology to build a global register of certificates of qualification and evaluation of skills, to face the central issue of research in the field of training and professional integration of highly qualified specialties. The register content includes two main characteristics which are requested by the employer and offered by an individual as a potential employee:

- Qualifying characteristics are reflected, as a rule, in educational documents and in professional standards of an industry;
- Competency parameters are presented in the functional description of the vacant positions of the company and in the resumes and portfolios of candidates listing the functional tasks that have been performed in their previous jobs, qualifying characteristics of a person are reflected in a variety of certificates.

Source	Content and document for the ledger		
	Parameter	Qualifications	Competencies
Indivi-duals	Knowledge	Diploma, certificates	Portfolio, curriculum vitae recommendations
	Competence	Rank, degree Skills	Experience of successful fulfillment of tasks in the post of the previous job
Companies	Knowledge	Regulations, laws, legislative requirements Industry standards	Functional responsibilities
	Competence	Position, labor contract, Working process instructions	Description of job requirements

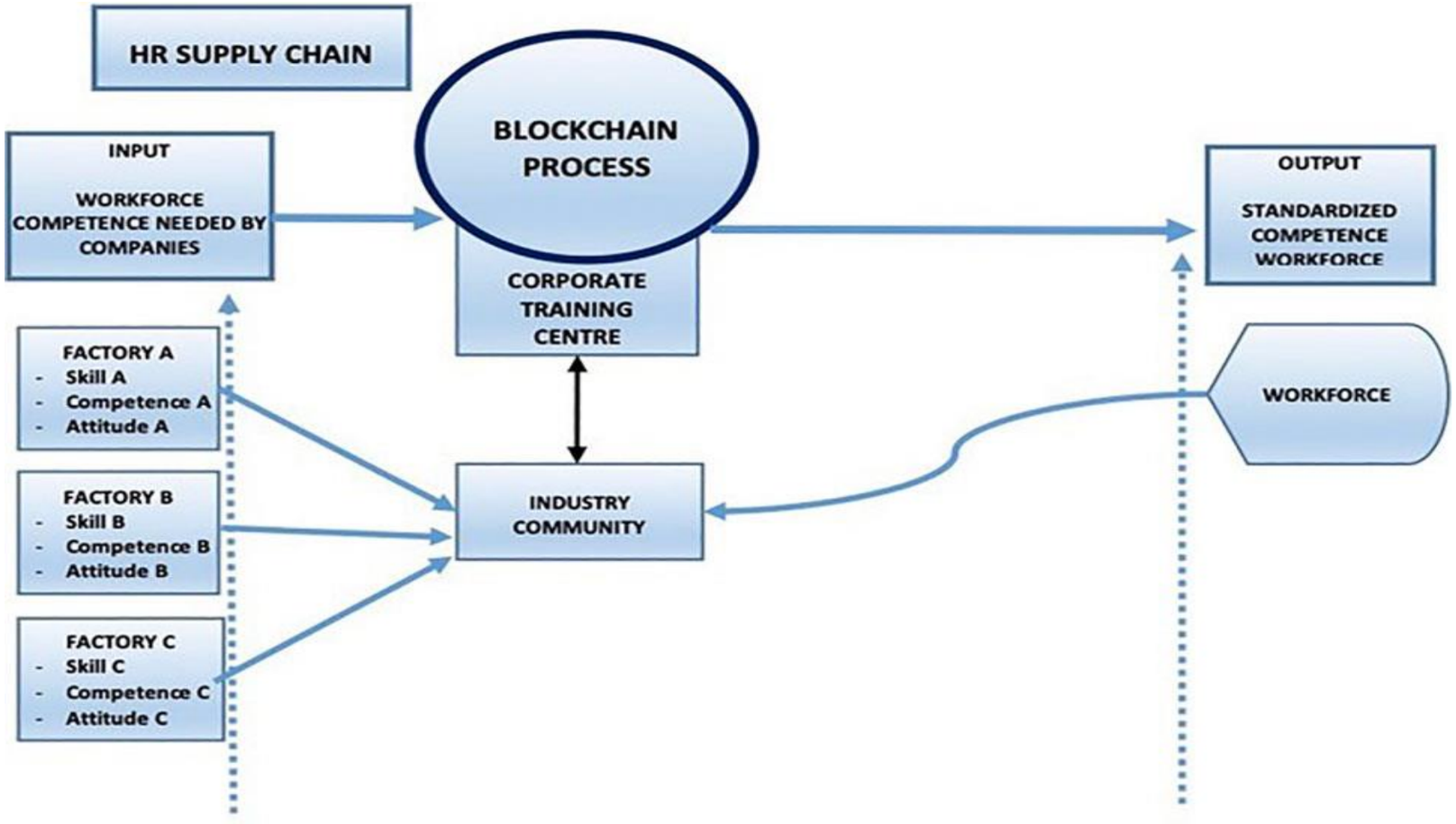
Conceptual Model of Personal Competence Integrator Based on Blockchain Technology [10]

For their part, the authors of [10] carry out an in-depth analysis of laws, professional regulations and government reports, a conceptual model has been developed which integrates the description of competences and aptitudes, documents and all other forms of confirmation of skills acquisition. The application of blockchain technology allows all data to be integrated into an autonomous system while using existing skills registers. The computer conceptual model developed by a qualitative research approach meets the requirements of all interested parties: employees, employers and organizations issuing such documents. Based on the model developed for document representation, as an integrator of personal skills, the authors propose an Integrated Personal Competence Ledger (IPeCoL) to collect and provide access to information certifying the possession of specific skills. The proposed model ensures the unification of the way in which documents confirming the qualifications possessed are represented and can thus form the basis for the construction of a system intended to verify their credibility.



Blockchain-based human resource management practices for mitigating skills and competencies gap in workforce [11]

In order to obtain information on the skills required by the industry, the authors of [11] use technological applications: in particular AI and blockchain. By integrating the above two technologies, the blockchain - IoT application is formulated to meet practical skills gap mitigation needs. For proof of concept and validation, the authors are developing a prototype system using the Ethereum blockchain to meet the needs of industry and education as a competent source of skilled labor. The proposed system not only enables holistic HR training content, but also dynamic workforce skills according to business needs. The result of the validation with the prototyping blockchain shows that the blockchain is able to generate information on the skills required by the industry.



Conclusion

. The blockchain can become a pillar for the innovations of tomorrow. Its open and decentralized character is attractive

. The blockchain remains a relatively new technology and its multiple applications remain to be discovered and verified. The blockchain continues to evolve, its future remains particularly promising and open to reflection.

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Thank You