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Proceedings of the 21st European Conference on Knowledge Management

A Virtual Conference hosted by Coventry University, UK

2–4 December 2020

Edited by
Professor Alexeis Garcia-Perez
Professor Lyndon Simkin

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Proceedings of the

21st European Conference on Knowledge Management ECKM 2020

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ECKM Preface

These proceedings represent the work of contributors to the 21st European Conference on Knowledge Management (ECKM 2020), hosted by Coventry University, UK on 2–4 December 2020. The Conference Chair is Professor Alexeis Garcia-Perez from Coventry University, UK and the Programme Chair is Professor Lyndon Simkin, from Henley Business School (University of Reading), UK.

ECKM is now a well-established event on the academic research calendar and now in its 21st year the key aim remains the opportunity for participants to share ideas and meet the people who hold them. The conference was due to be held at by Coventry University, UK but due to the global Covid-19 pandemic it was moved online to be held as a virtual event. The scope of papers will ensure an interesting two days. The subjects covered illustrate the wide range of topics that fall into this important and ever-growing area of research.

The opening keynote presentation is given by Donald Hislop, Professor in the Sociology of Work and Technology, University of Aberdeen, UK, on the topic of *The Future of Knowledge Management in an uncertain world.* There will be an afternoon Keynote presentation given by Constantin Bratianu, Bucharest University of Economic Studies, Romania on the topic of *Knowledge Strategies.*

The second day of the conference will open with an address by Klaus North, Professor of International Management at Wiesbaden Business School, Germany, who will talk about *The future of knowledge work in the digital economy.*

With an initial submission of 259 abstracts, after the double blind, peer review process there are 101 Academic research papers, 6 PhD research papers, 2 Masters Research papers and 5 work-in-progress papers published in these Conference Proceedings. These papers represent research from Australia; Austria; Bahrain; Brazil; Bulgaria; Canada; China; Colombia; Cyprus; Czech Republic; Ecuador; Egypt; France; Germany; Hungary; Ireland; Israel; Italy; Latvia; Lithuania; Macedonia; Malaysia; Morocco; Netherlands; Northern Cyprus; Northern Ireland; Norway; Poland; Portugal; Romania; Russia; Russian Federation; Saudi Arabia; Slovakia; South Africa; Spain; Sultanate of Oman; Switzerland; Uganda; UK; USA and Vietnam.

We hope you enjoy the conference.

Professor Alexeis Garcia-Perez
Coventry University, UK
December, 2020

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Prof. Dr. Sebastian Saniuk, University of Zielona Gora, Poland; Dr. Anna Saniuk, University of Zielona Gora, Poland; Prof. Helena Santos-rodrigues, IPVC, Portugal; Prof. Dan Savescu, Transilvania University of Brasov, Romania; Dr. Ousanee Sawagvudcharee, Liverpool John Moores University, Thailand; Dr. Golestan Hashemi Sayed Mahdi, Iranian Research Center for Creanovatology, TRIZ & Innovation Science, Iran; Enrico Scarso , Università Degli Studi Di Padova, Italy; Prof. Jurgita Sekliuckiene, Kaunas University of Technology , Lithuania; Dr Ana María Serrano-Bedia, University of Cantabria, Spain; Dr. Mehdi Shami Zanjani, University of Tehran, Iran; Dr Armin Shams, Sharif University of Technology, Iran; Peter Sharp, Regent's University London, UK; Dave Snowden, Cognitive Edge, Singapore; Dr. Siva Sockalingam, Glasgow School for Business and Society, UK; Dr Lew Sook Ling , Multimedia University , Malaysia; Dr Maria Jose Sousa, ISCTE-IUL, Portugal; Dr. Inga Stankevice, Kaunas University of Technology, Lithuania; Dr. Trine Marie Stene, SINTEF, Norway; Prof. Dr. Marta-Christina Suciu, Bucharest University of Economic Studies, Bucharest, Romania; Dr Sanath Sukumaran, Taylor's University, Malaysia; Dr. Ann Svensson, University West, Sweden; Clare Thornley, ,; Dr. Eduardo Tomé, Universidade Europeia, Lisbon; Prof Maria Tsakalerou, Nazarbayev University, Kazakhstan; Dr. Geoff Turner, Park Advisory LLP, UK; Dr. Anna Ujwary-Gil, IInstitute of Economics, Polish Academy of Sciences, Warsaw, Poland; Prof Tuna Uslu, Istanbul Gedik University, Occupational Health and Safety Program, Türkiye; Dr. Abel Usoro, University of the West of Scotland, UK; Prof José Vale, School of Accounting and Administration of Porto, Portugal; Dr. Changiz Valmohammadi, Islamic Azad University-South Tehran Branch, Iran; Prof Jose Maria Viedma, Polytechnic University of Catalonia, Spain; Vilma Vuori, Ramboll Finland, Finland; Christine Welch, University of Portsmouth, UK; Dr. Malgorzata Zieba, Gdansk University of Technology, Poland;

Biographies

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Prof Lyndon Simkin is Executive Director of the Centre for Business in Society, before which he was Professor of Strategic Marketing and Head of School at Henley Business School (University of Reading), having been Research Lead at Oxford Brookes and previously Director of the Warwick MBA at Warwick Business School. He is an acknowledged expert in strategy creation, planning processes and implementation management, guiding practitioners with their execution and mentoring COEs and leadership teams. Lyndon is a member of the Academy of Marketing's research Committee, Associate Editor of the Journal of Marketing Management and co-chair of the Academy's special interest groups in CRM and Market Segmentation and Strategy.

Keynote Speakers

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Professor Donald Hislop, is Professor in the Sociology of Work and Technology in the Management Studies Discipline Group, University of Aberdeen, UK. He has been working in Aberdeen Since January 2019. Prior to this he worked in the School of Business and Economics at Loughborough University (2007-2018). Donald's research interests cover two broad areas. Firstly, he is interested in the relationship between technology and work and how worker's use of new technologies shapes the character of their work and how artificial intelligence and robots are shaping managerial, professional and service work. His second key area of research interest is into the social-cultural aspects of knowledge management, being concerned with the factors shaping worker's willingness to engage in knowledge management activities

Professor Klaus North is Professor of International Management at Wiesbaden Business School, Germany. His current research covers knowledge and innovation management, particularly in digital transformation contexts. He was founding president of the German Knowledge Management Association and scientific director of the German Knowledge Management Award. He has published 12 books and numerous papers. He frequently consults with major firms, governments and international organisations and teaches regularly in business programmes internationally. In the last 20 years he has contributed to more than 200 knowledge management initiatives around the world.

Knowledge Café Facilitator

David Gurteen is a writer, speaker, and conversational facilitator. The focus of his work is Conversational Leadership – a style of working where we appreciate the power of conversation and take a conversational approach to the way that we connect, relate, learn and work with each other. He is the creator of the Knowledge Café – a conversational process to bring a group of people together to learn from each other, build relationships and make a better sense of a rapidly changing, complex, less predictable world. He has facilitated hundreds of Knowledge Cafés and workshops in over 30 countries around the world over the past 20 years. He is also the founder of the Gurteen Knowledge Community – a global network of over 20,000 people in 160 countries. Currently, he is writing an online book on Conversational Leadership.

Mini Track Chairs

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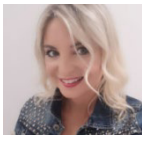
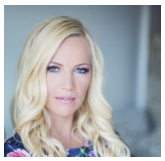


Dr Francesca Dal Mas is a Lecturer in Strategy and Enterprise at the Lincoln International Business School, UK. She has a Master's Degree in Business Administration from Udine University and she got her Ph.D. in Managerial and Actuarial Sciences from Udine University. Her research interests include strategy, knowledge management, and intellectual capital.



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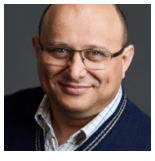
Nkechi Omeife is a Phd student in Knowledge Management at the Technological University Dublin. Her PhD focuses on academic-industry engagements with a specific focus on the paradoxes, contradictions and tensions inherent in those relationships.



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The use of Blockchain-supported Reward Systems for Knowledge Transfer between Generations

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Abstract: An important aspect of knowledge management is the transfer of know-how between generations. This raises the question of how new employees, especially young professionals, can acquire this knowledge from older generations in an efficient and sustainable way. This can potentially necessitate the creation of incentives for both sides. For the older generation, the rewards must be of such a high quality that they are willing to pass on their expertise without seeing the younger generation as a threat. For the younger generation, ways must be created to accept the knowledge of the older generation as being of great value. In this paper, the authors discuss two methods that can facilitate this process. Gamification, to make the reward systems visible, and nudging, to trigger the benefits of these reward systems. Furthermore, by developing a working prototype, the authors describe how the actual rewards can be stored on Blockchain-based tokens in order to be represented in a permanent and provable way. This system can be supported by machine learning and the long-term preparation of adaptive learning systems, so that the knowledge of the older generation is ultimately made available to a broad group of people. The theoretical foundations are complemented by an online survey and a focus group with experts from the various fields in order to further corroborate the arguments made.

Keywords: Gamification, Nudging, Blockchain, AI, Adaptive Learning, Intergenerational Knowledge Management

1. Introduction

"Old guns leave and all knowledge is gone"

Knowledge transfer, or the sharing and/or dissemination of knowledge between individuals and/or organisations in order to ensure its longevity through time and consequently its availability for future users, is a major field in organizational theory. This paper focusses on intragenerational knowledge transfer or the transfer of knowledge between generations, more specifically on the:

- initiation of knowledge transfer through an increased motivation using methods, such as gamification and nudging;
- storage of the knowledge itself, including the documentation of knowledge transfer, using systems, such as decentralized structures, in particular Blockchain technologies.

While the individual aspects, i.e. intergenerational knowledge transfer, gamification, artificial intelligence (AI) and more recently Blockchain technologies in knowledge management are already researched, their combination presents the novelty underpinning this academic contribution. And in this sense, the critical analysis presented in this paper, is to be understood as an explorative approach.

2. Methodology

To achieve our research goal, we conducted a focus group discussion with 6 participants. Table 1 details the gender and respective background of each participant.

Table 1: Gender and Background of Focus Group Participants

Person ID	Gender	Background
P1	female	Knowledge manager at a university. Her task is to administer the confluence system.
P2	male	Knowledge researcher at a university. He is senior research at the center for knowledge management at his department.
P3	male	Retired former knowledge management consultant.
P4	female	Expert in gamification and game systems.
P5	male	Blockchain and AI specialist.
P6	male	Senior HR manager.

In preparation for this discussion three steps were carried out:

1. literature review
2. the creation of an online questionnaire
3. and the development of an early stage demonstrator how Blockchain technologies can be used in knowledge management.

During the literature review, we examined existing solutions and discussions on the topics of gamification; AI, Blockchain in knowledge management and intergenerational knowledge transfer (see related work). The online questionnaire (n=69) was aimed at obtaining an estimation regarding the value of knowledge management in different companies, especially in the area of knowledge transfer over generations. Furthermore, data was collected on whether it is important to the survey respondents that their knowledge transfer is appreciated and if there are reward systems in place. With less than 70 participants, the result is of course not representative, but fulfils the purpose of the basis for discussion and future research. For the demonstrator, a narrative element was used instead of a working prototype with frontend. The moderator of the focus group orally explained the processes of the case study step by step, while executing the respective Blockchain transfers using the Ignis childchain of the Ardor Network (Mainnet).

3. Research Questions

The authors pursue the following research questions:
How can Blockchain technologies be applied in the field of knowledge management and in particular in the area of knowledge transfer between generations, especially

- as evidence of knowledge transfer
- to represent symbolic rewards as part of a gamification
- to handle reward systems that go beyond a symbolic one (for example by issuing vouchers or receiving bonus payments)
- as storage medium for (sensitive) knowledge.

For this particular purpose a demonstrator has been created and showcased to the group of experts.

In order to be able to answer this question, the following sub questions have to be addressed first:

- What role does knowledge management, especially intergenerational one, play in the companies of the surveyed persons?
- How important is it to the interviewees that they receive acknowledgement when they pass on their knowledge within the company?
- What reward systems for knowledge management exist, which of them are already in use and what kind of reward is important to the employees?

The discussion of these sub questions is based on the results of the online questionnaire presented to the group of experts.

4. Relevant Research

A thorough literature review has been conducted by the authors. Table 2 describes the aim and conclusion presented in relevant research on (i) intragenerational knowledge transfer (ii) gamification and nudging in knowledge management (iii) Blockchain in knowledge management (iv) the impact of AI on knowledge management and (v) other basic literature that the authors deem important for the scope of this paper.

Table 2: Relevant Research

Authors	Aim
Research on intragenerational knowledge transfer:	
Sabri, S.; Jamil, N.; Haron, H. et. al. (2014)	The authors reviewed issues that are considered essential in strategizing intergenerational knowledge transfer.
Harvey, J. (2012)	The author provided a systematic analysis of an innovative, intergenerational knowledge transfer strategy in a knowledge-intensive organization.
Geeraerts, K.; Vanhoof, J.; Van den Bossche, P. (2016)	Regarding the perceptions of teachers about colleagues of other generations, the authors distinguished three major themes: knowledge, skills, and attitudes of teachers. According to young participants in this study, the knowledge supplies of older teachers are mainly related to their high level of content knowledge and their classroom management skills. The knowledge supplies of young teachers, perceived by the oldest participants in this study, are related to their creative and innovative teaching methods, and their well-developed ICT skills.
Schmidt, X.; Muehlfeld, K. (2017)	The authors note that little research has been done on the transfer of knowledge between generations inside companies. They have therefore examined what has been written so far and closed the existing gap due to the addition of classical literature on knowledge transfer and literature on age/generational diversity. The authors are highlighting the importance of distinguishing between knowledge sharing and knowledge seeking.
Research on gamification and nudging in knowledge management:	
Spanellis, A.; Dörfler, V. Macbryde, J. (2017)	The authors argue that the use of gamification in knowledge management can go far beyond the motivational aspects.
Spanellis, A.; Dörfler, V.; Macbryde, J. (2016)	The study of the authors demonstrates that gamification can help to identify different types of knowledge workers in the company, visualise their skills and even create requirements for new skills, that the worker are more responsive to. It could also show the dynamics of interactions between the knowledge workers and even influence it.
Swacha, J. (2015)	The paper discusses both the issues of knowledge sharing and the components of gamification, and then describes an implementable solution in a form of a system of gamification rules aimed at motivating employees for various activities related to knowledge sharing.
Schacht, S., Morana, S., Maedche, A. (2014)	The authors implemented a gamification system called "Project World", which does not only promote knowledge documentation but also socialization and collaboration within and between project teams. Hereby, motivation is not only encouraged by extrinsic rewards like badges or leaderboards, but also by intrinsic factors such as collaboration and socialization.
Durinik, M. (2015)	This paper shows evidence that gamified knowledge management systems help employees to enhance their self-esteem and satisfy certain higher needs. In the end, it helps to fulfill the main goal, which is to increase employees' engagement with the knowledge management system. The author notes that gamified knowledge management systems are only a fraction more expensive than systems without game-based incentives. Compared to money as an incentive, however, they are much cheaper and similarly effective.
Naguib, C. (2020)	The author suggests how different nudges can positively influence knowledge management in the company. For example, by communicating in a positive, polite tone or the right use of visuals.
Friedrich, J.; Becker, M.; Kramer, F.; Wirth, M.; Schneider, M. (2020)	The authors conclude that gamification will be successful in the long term only in combination with an appropriate corporate culture and an organizational climate that promote an open exchange of knowledge and rewards knowledge management activities.
Research on Blockchain in knowledge management:	
Nyame, G.; Qin, Z.; Obour Agyekum, K. .-B.; Sifah, E.B. (2020)	The authors use Blockchain technologies in a knowledge management system based on role-based access control (RBAC). The authors state that their system provides a secure mechanism for accessing knowledge by verifying users before the knowledge is shared, transferred or stored in the knowledge repository. Blockchain is used in the work to transparency and

Authors	Aim
	immutability of knowledge. And smart contracts can extend the possible functions of the system.
Akhavan, P.; Rajab, L.; Namvar, M; et. al. (2018)	The aim of the authors is to conquer the problems of traditional centralized knowledge management models through developing the primary process of knowledge management, based on Blockchain concepts.
Research on the impact of AI to knowledge management:	
Zbuchea, A. Vidu, C. M.; Pinzaru, F. (2019)	The authors have conducted an intensive literature review regarding AI in knowledge management. More than 30 papers from 2000 - 2019 were analyzed. According to the authors, AI already plays a role in data management, data storage and data organization. AI is not suitable in the area of creativity and not yet in the area of strategy development.
Basic literature:	
Nakamoto, S. (2008)	The anonymous person Satoshi Nakamoto suggested a currency without centralized trust center based on a Blockchain in his famous whitepaper "Bitcoin: a peer-to-peer electronic cash system" in 2008.
Tobin, A.; Reed, D. (2016)	The authors present the concept of Self-Souvereign Identity. The connection between digital identity and Blockchain without reference to centralized trust centers.
Grech, A.; Camilleri, A. F. (2017)	With their EU report on Blockchain in Education they have created a fundamental reference document on the use of Blockchain technologies beyond the purpose of cryptocurrencies. In particular, they describe different types of networks, such as private, consortium-led or public Blockchains work. But also the functionality of Smart Contracts and the concept of Utility Tokens.
Deterding, S., Miguel S., Nacke, L. (2011)	Deterding is considered the founding father of gamification. The classical gamification definition was coined by him and his co-authors: *"Gamification is an informal umbrella term for the use of video game elements in non-gaming systems to improve user experience (UX) and user engagement."* (Deterding, 2011)
Thaler, R. H.; Sunstein, C. R. (2008)	Thaler and Sunstein are considered the founders of the behavioral economic intervention of "nudges". Positive hints to guide decisions. As a note: The team of authors sees especially the gamification element of the "Achievements" as nudges within gamification. And this can help to initiate knowledge management in addition to the classical way of nudges described by Thaler and Sunstein.

5. Findings

5.1 Analysis and discussion of the online survey

The survey participants could choose from different industries or enter their own specific sector. Of the 69 survey participants, most were employed in education (19), with other respondents choosing public service (16), industry (10) and service (10). Six participants were from the retail and tourism industry and one participant is in a Handicraft business. One participant chose the “other” option and said he/she is technician. No further demographic data was requested, as the online survey was primarily intended as a basis for discussion for the focus group.

The survey participants came primarily from large companies - 35 said they work in companies which employ more than 201 employees. Twelve respondents stated that the company they work for consists of between 51 and 200 employees, while 21 participants work in companies which employ less than 50 employees.

Table 3: Current Knowledge Database

What form of knowledge database does the company currently use?		
Answer Choices	**Responses**	
Wiki / Confluence	38,81%	26
Structured online file storage	32,84%	22
E-mails	32,84%	22
Tools from external service providers	28,36%	19
I do not know if we have any knowledge management in the company.	13,43%	9
Online-Spreadsheets	7,46%	5

What form of knowledge database does the company currently use?		
Answer Choices	**Responses**	
Other (please specify)	1,49%	1
N = 69		

For the question of how knowledge is represented, different answers could be chosen at the same time. Table 3 shows the different possible options, together with the respective response rates. Wiki systems or confluence are dominant. Structured online filing systems are also widely used to store documents. The focus group commented on the fact that e-mails also serve as a knowledge repository as *"somewhat frightening"* (P1) but *"not unusual."* (P2) It is also well reflected that companies display their knowledge management or display it in conjunction with external service providers and consultants and their systems. The experts in the focus group see this as a *"logical step"* (P6), because *"external consultants and tools can of course be useful"* (P4). However, *"particular attention must be paid to data sovereignty"* (P5) (where the data is located, who has access to it) and data protection.

For the next question, respondents were able to rate on a scale from 1-5 how important knowledge management is in their company. This resulted in a weighted average of 3,08 and therefore only slightly above average. On the one hand, this *shows "that knowledge management is certainly present and is part of the corporate culture"* (P2), but on the other hand *"that knowledge management still needs to be promoted further in the companies but above all in the minds of the employees" (P6),* according to statements by the experts from the focus group.

When asked how important it is to preserve the knowledge of employees who have left the company, the answer of 2.55 on a 5-digit scale was below average (Table 5). According to the experts, one can see *"that in some companies it is already important to practice cross-generational knowledge management - as shown by some of the detailed answers"* (P2), but especially in this area there is still *"a massive lack of educational and implementation work"* (P1), because for many companies it should *be "essential and not a marginal topic to tap into this enormous wealth of knowledge and experience of their own employees."* (P3)

The following statements from the final question of the online questionnaire (open field) deal specifically with this topic:

> *"Our knowledge management department is responsible for knowledge management including interviews with retired staff. We don't have specific awards - however sometimes a deal inclusive extra paid holidays or to call it another way some weeks earlier retirement."* Education sector, 500+ employees

Another positive examples:

> *"I work in a large manufacturing company - we started a program for transferring knowledge from pre-stage retirement employees in 'lead' positions as well as 'long term workers on the machines' 15 years ago. Taking part in the Program Leads to an additional monthly salary one time at drop out."* Industry sector, 500+ employees

> *"In the field we have senior technicians that train new technicians. They are paid more money per hour and have more responsibilities."* Service, 500+ employees

> *"We are a small handicraft business working on small scale products for tourists and locals - being unique and working on high class products is our USP for generations. Therefore, if anyone has new ideas how to shape things, which tools to use etc we keep it in the family in protocoled safe storage".* Handicraft, 1-10 employees

An explanation of a main issue regarding intragenerational knowledge management comes from a survey participant working in the public sector:

"People fear that they will be replaced by their (younger) colleagues, if they pass on their knowledge and therefore only share a bare minimum. even before retiring, they often tend to keep quite a lot of knowledge to themselves, which then leads to a loss of knowledge within the company." Public sector, 500+ employees

A strong negative statement comes from a survey participant working in the public sector:

"As near gov entity knowledge management always depends on politics. If the color of the ruling party changes, we go the opposite way of KM and start to be knowledge destroyers shredding hard discs" Public Service, 201-500 employees.

Those point were also discussed at length by the experts in the focus group. Knowledge transfer, "apart from when one retires for pension reasons, is always associated with thinking competitively." (P2) Particularly in the case of political institutions such as ministries or service centers of the public sector, "it is then no longer a question of one's own well-being, but one thinks in the colour of one's party. Under no circumstances should the party you lost to be helped, quite the contrary. The motto here is "to put as many stones as possible in the way."" (P6)

Table 4: Reward System in Knowledge Management

Does your company have a reward system in the area of knowledge management?		
Answer Choices	**Responses**	
No, where I work there are no rewards for (successful) knowledge management.	83,33%	55
Yes, there are incentives in the form of monetary payments for those who pass on knowledge.	6,06%	4
We have rewards in the form of gamification, that means in a playful way. The rewards are purely symbolic in character.	3,03%	2
We have rewards in the form of gamification, that means in a playful way. The rewards are non-cash prizes, such as vouchers.	3,03%	2
Yes, there are incentives in the form of monetary payments for those who pass on knowledge and for those who receive it.	1,52%	1
We have rewards in the form of gamification, that means in a playful way. But the rewards are ultimately cash prizes.	1,52%	1
Other (please specify)	1,52%	1
N = 66 | Skipped = 3		

When asked whether there are special rewards for knowledge management, 83,33% of respondents said that this was not yet the case. Approximately 6% of respondents said that there are rewards in the form of cash grants for the person who passes on the knowledge. One person or 1,52% of the respondents, stated that there is money for both sides - the knowledge taker and the knowledge provider. Two respondents (representing 3,03% of responses) each stated that there is gamification, in which the knowledge has a purely symbolic value, or that there is a prize to be won in the form of vouchers. One person or 1,52% of the respondents, stated that there is a gamification system, but in the end, it is all about money grants.

Three interesting statements regarding the use of gamification were made in the open fields of the last question, however, in this case by employees from small companies:

"We are a media / advertising agency - we are an organization were peer2peer knowledge management is of utmost importance. We have a fun gamification System - the clue is that we - all together - developed it, the rules, the rewards as a company, as a big family! We plan to use Blockchain in the future it's a playground for us to learn develop BC based apps" Service, 11-50 employees

"I am part of a small IT company - we have built our own gamification system and each month one of us is the game master. Trying out Blockchain Tech for gamification would be nice. Thanks for the idea." Service, 1-10 employees.

> *"I work in a service-related company, for us it is very important to hold knowledge-gained within the company. We have a symbolic reward system only; however, I would be happy if at the end the rewards are worth something in real life."* Service, 11-50

For the experts in the focus group this part of the online survey was very fascinating. *"Somehow you can see that gamification in knowledge management is currently only gaining ground with smaller companies."* (P1) *"We scientists are sometimes too much in our ivory tower and work on our pilot projects, but we need to pay more attention to raising awareness among decision makers."* (P2) *"I particularly liked the approach of the small company, where the role of the gamemaster changes and the rules are made by the employees themselves and not top-down. That sounds like a very exciting idea."* (P6) *"Another interesting thing is that much of it ultimately comes down to money rewards, although in gamification research we often call this a no-go."* (P4)

Table 5: Knowledge Transfer Process

How is the knowledge transfer process (contribution from a person) protocolled?		
Answer Choices	**Responses**	
In a company-wide database.	36,36%	24
Only verbal (e.g. meetings), no protocols.	22,73%	15
We have no transfer of knowledge, or it is not recorded whether and how it is carried out.	22,73%	15
Handwritten and filed in folders.	12,12%	8
We use external cloud services.	10,61%	7
In a database that is stored locally.	9,09%	6
We use Blockchain based solutions.	1,52%	1
N = 66 | Skipped = 3		

To the question whether the knowledge transfer of persons is also logged (multiple answers were possible) the following picture emerged. Approximately twenty-two percent of respondents stated that there is no knowledge transfer at all, or at least no recording if it is conducted. The same number of participants (22,73%) stated that they have a verbal knowledge transfer (like meetings), but no protocols. Where there is a protocol, storage on company-wide databases (22,73%) or cloud-based services (10,61%) are dominant. According to the results of the survey, one respondent's company opts for Blockchain, while 12,12 % (or 8 persons) recall that the knowledge protocols are stored in offline-folders as handwritten protocols.

In the focus group, the result was accepted relatively without further ado. *"It shows here the different stages of development of the companies. But these are certainly also due to the size of the company, the sector and the division."* (P6). *"What is exciting is that a company is already trying something with Blockchain in knowledge management. It is a pity that we cannot follow up here due to the anonymous nature of the data."* (P5). When asked about the rewards systems, *"it is interesting to note that almost 40% of those surveyed want rewards in the form of money."* (P4). Nevertheless, 30% of those interviewed were satisfied with purely symbolic values. Ten percent of those surveyed would be happy with vouchers for something of monetary value.

In response to an additional question about how important recognition from the company is for someone who acts as a knowledge mentor, a weighted average of 3.98 / 5 points was reported. So, one can deduct that (regardless of the preferred reward) the survey participants wish to have an appreciation of their workplace in regards to their very own knowledge contribution. This discrepancy was discussed at length in the group of experts without reaching a clear conclusion. The factors could be that *"in the end, money can buy the things you want to buy yourself*" (P3). *"Because with vouchers you are forced to take what the company gives you. These can be really cool things but of course they can also be a flop."* (P6) *"It's interesting to see that there are some people who are happy about the recognition in the non-monetary area, simply because they do something positive. But you would have to look at this in further studies to see if the people who are happy without bonus money are maybe the people who don't have money worries."* (P4)

"But the final question shows one thing clearly, there must be some form of recognition and motivation." (P2) *"As a gamification expert, I have to say that companies should perhaps try out very good game mechanics and possibly vouchers, because money as a reward can backfire quickly, because you have to raise the pots year after*

year." (P4) *"That's true and as we know from the first experiments, Blockchain can provide trust here in the gamification part."* (P5)

5.2 Presentation and discussion of the Blockchain use case

In the second part of the discussion, it was demonstrated how Blockchain technologies can be implemented in future knowledge management. Based on a narration the appropriate Blockchain transactions were triggered and the corresponding utility tokens created. Here, utility token means that the tokens act as pure information carriers and technical appliances are used to ensure that they cannot be transferred to unauthorized accounts (wallets).The use case story-line was as follows: A company encourages employees outside the core knowledge management team to write contributions for the confluence wiki or take other knowledge measures, such as holding knowledge meetings with colleagues from other departments. A secure link between the IDs of the persons involved and Blockchain transactions is ensured. The program is intended to appeal particularly to the elderly generation.

The company provides a budget of 5000 US $ for this purpose. This is represented in 500 tokens. One token equals a monetary value of 10 US $. However, this monetary value is only valid internally within the company. The tokens are not tradable to the outside world (prevented by an approval model created for this purpose[1]), or can be sent to other wallets except those that are whitelisted. At the end of the year the tokens can be exchanged for different vouchers. In addition, at the turn of the year the knowledge achievements are recorded on a Blockchain token dedicated to this purpose and the best employees receive additional awards, such as a badge for most knowledge contributions. The processes are controlled and evaluated by the in-house knowledge management department. In the case study presented below there are 2 wallet addresses. The one from the Knowledge Management Department and the one from Mr Berger, a 55-year old employee of a different department, who contributes knowledge work. To look into all transactions and wallets described in this use case, the authors recommend the 3rd party tool https://ardor.world, access the wallets using a web-wallet like https://ardor.jelurida.com/index.html or to download and run a node from https://www.jelurida.com.[2]

Situation 1: Mr. Berger writes a successful article on a specific topic for the confluence of the company. After a positive review of the work, the knowledge management department with the Wallet Address ARDOR-HTKL-LBPS-SXHH-5NBY5 transfers one KTKNY20 token to the Wallet Address ARDOR-VEWU-MCG2-ZDUR-FGT2V of Mr. Berger.[3] Besides the transaction of the token, the approval model was started[4], where a second transaction is written to the Blockchain which describes the rules for future transfers of the token. This protects this particular System so that it cannot be misused:

Situation 2: At the end of the year 2020 Mr. Berger has collected 26 tokens. He can now select prizes. He would like a holiday for himself and his family for 25 Tokens. And for the one token he has left, a ticket for the local football team. To redeem this, 2 transactions are made on the Blockchain.[5]

Situation 3: To record that Mr. Berger has created 26 contributions for the knowledge management, a unique token was created at the end of the year. (In technical language an NFT or Singleton Token). This token records Mr. Berger's performance and is kept in the main account of the Knowledge Management Department. In our case with a public message. In actual use, this would of course be encrypted and Mr. Berger would receive a shared-key.[6]

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[1] { "phasingHolding": "7950017087164886987",
"phasingQuorum": "1",
"phasingWhitelist": [
"3600967180533360178",
"description": "KTKNY20 approval model to safeguard the token economy"}

[2] E.g.: On https://ardor.tools/asset/1884938683674360328 you see the distribution of the asset "KTKNY20" (Token ID: 1884938683674360328) which has been created to represent the 500 "Knowledge Token Year 2020" for the use case described here. The initial creation of 500 tokens on the Ignis Childchain of the Ardor network can be reviewed here: https://ardor.tools/transaction/IGNIS/087acdf7bea5281a528097733a823a852d8250e905b9a1d1bdcb67cbf4354177

[3] You can see the transaction on the Block Explorer follwing this link: https://ardor.tools/transaction/IGNIS/3e3b56f07f40733888187101cbcf43e333632a6124dcafb8bce08c8584ed735c

[4] https://ardor.tools/transaction/IGNIS/7b99e3d1f0c99f51f9489dcf6e23689de5bcb55381378fd51fa4b244764e781e

[5] https://ardor.tools/transaction/IGNIS/0d7c0837ab59929b6d28c7580483db323df56681a01092ad15134eabf285c2a3 for the hotel voucher and (2): https://ardor.tools/transaction/IGNIS/350041c006052cdb50b5c91c27faf95f0cc9f9be4e60d63568f7bb0700e5de89 for the football ticket.

[6] Follow this link to see the token and the message on the block explorer: https://ardor.tools/asset/10525695843998069393

Situation 4: Mr. Berger now receives the Voucher Codes to book the hotel and redeem the tickets. This has been sent as encrypted direct message between the accounts (to demonstrate encryption and shared-key function).[7]

Situation 5: Mr. Berger receives the "knowledge contributor of the year award" which is again a Singleton Token / NFT[8]. [9]

Situation 6: Mr. Berger puts a PDF with important information in the confluence database. A message with the hash (MD5) and hash (SHA1) is sent from the knowledge department account to the account of Mr. Berger. This ensures that nobody can manipulate his document afterwards.[10]

During the focus group discussion, the feedback on the demonstration was consistently positive. Even the Blockchain expert admitted that he rarely participates in such clear use cases. For the knowledge manager at the university, this was a nice example of the future, even though she is naturally more interested in the frontend and the user experience for the end-user. For the knowledge management researcher it is still a future topic but he was interested in initiating further research projects in this direction. The retired knowledge manager had a hard time with the technology itself, but said that he was optimistic and positive. However, he warned that it might take some time for employees to get used to such systems. The gamification expert was thrilled as she has actively seen for the very first time the connection between Blockchain and gamification. Finally, the focus group discussed that in a few years the interaction between machine learning/data analysis and Blockchain technologies, built into a gamification framework and combined with motivating nudges can actually be a key to making knowledge processes more attractive, sustainable and transparent. But until then, all participants agreed, it is still a long way off.

6. Conclusion and further research

From a technical perspective, the authors have managed to demonstrate that Blockchain technologies can play a role in knowledge management. The initiation of knowledge transfer, particularly between generations, through gamification and nudging is possible and attractive. Securing documents so that they cannot be manipulated is feasible. A connection with the ID of the person involved can be ensured. However, data from the online survey and focus group suggests that due to its highly innovative stance, a broad adoption might not be ideal at this point in time. This is mainly due to the limited knowledge on both the concept of gamification and nudging and also lack of proper understanding on how Blockchain technologies effectively operate.

Based on the evaluation of the survey results and the expert opinions, the authors suggest that smaller companies which consist of a limited number of employees, have the potential to utilize these mechanics in order to maximize productivity between different teams in the area of knowledge exchange and consequently preserve the knowledge of employees leaving the company. Based on the feedback received, the authors will further develop the first demonstrator implemented in this project in order to provide a usable front-end. Together with a tutorial, this will serve as an educational tool for Blockchain-supported Knowledge Management with gamification mechanisms and thus secure a working prototype for further research and dissemination.

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[7] To see the message, use the shared key: 2db5b7fd3f8952535c86422a9cf36fe52482f2e05e7cb7b7c7336aba27bbc2a0 accessing the wallet representing the knowledge department (ARDOR-HTKL-LBPS-SXHH-5NBY5) through a web wallet or a full node. The proof of the message can be accessed here: https://ardor.tools/transaction/IGNIS/fb0c342130072d245e4ed0f74f4d3c2fca95eb006d4078fa999b435a07f415b6 to actually see the message

[8] See https://ardor.tools/asset/12129156985558784241

[9] The transfer to the account to Mr. Berger can be seen here: https://ardor.tools/transaction/IGNIS/e8a6d984358df501794118fb3c83a8f1c119adb9ca7480b3074464b9608778e9

[10] See https://ardor.tools/transaction/IGNIS/18a747fef6e95e484ef9ca16437bfebb38079de63a185cb3c401bde06fde6b2b

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