2 The 4th Industrial Revolution and its impact on the individual employment relationship: general considerations and the regulatory context in Russia

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Introduction

Despite the critics of the term and the concept, scholars got used to mentioning three "industrial revolutions."[2] Generally – and very superficially – speaking, the 1st Industrial Revolution is believed to have given us mechanisation. The 2nd is known for bringing mass and regionally distributed production. The 3rd one enriched us with automation and transnationally distributed production. Therefore, current technological – as well as related economic and societal – changes are usually called "the 4th Industrial Revolution", if not in scientific terms, then at least in a narrow sense.

Much research has been done on the features, essence and outcomes of industrial revolutions, and almost every author directly or indirectly has mentioned the effect a given industrial revolution produces in relations concerning work and in employment relations in particular. Work is known to take up to one-third of an average person's life,[3] so it is hard to overlook the relations built around it. Even nowadays in this time of ubiquitous computerisation these relations still lie at the heart of most productive activities.

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1   The author is deeply indebted to Polina Buyatova for igniting interest in the topic and for its extensive discussion.
2   This topic is not covered here, but the literature on it is abundant and includes both works that by now have become classical as well as those published recently. See f.i.: Horn, J., Rosenbland, L.N., & Smith, M.R. (Eds.). (2010). *Reconceptualizing the industrial revolution*. Dibner Institute studies in the history of science and technology. Massachusetts, MA: MIT Press; Freeman, Ch,, & Louçã, F. (2001). *As time goes by: From the industrial revolutions to the information revolution*. Oxford: Oxford University Press; De Vries, J. (1994). "The industrial revolution and the industrious revolution." *Journal of Economic History, 54*(2), 249–270; Church, R.A., & Wrigley, E.A. (1994). *The Industrial Revolutions*. 11 Volume Set. Hoboken, NJ: Wiley; Steams, P.N. (1993). *The industrial revolution in world history*. Boulder, CO: Westview Press; Steams, P.N. (1991). *Interpreting the industrial revolution*. Washington, DC: American Historical Association; Habakkuk, H.J., & Postan, M. (Eds.). (1966). *The Cambridge economic history of Europe 6, The industrial revolutions and after: incomes, population and technical change*. Cambridge: Cambridge University Press; Clark G.N. (1953). "The idea of industrial revolution." David Murray lecture. Glasgow University publications (ТОМ 95). Lecture on the David Murray Foundation (ТОМ 20). Glasgow: Jackson, 1953; Ashton, T.S. (1948). *The Industrial Revolution, 1760–1830*. Oxford: Oxford University Press, etc.
3   For this data see f.i.: World Health Organization. (1994). *Global strategy on occupational health for all: The way to health at work*. Recommendation of the second meeting of the WHO Collaborating Centres in Occupational Health, 11–14 October 1994, Beijing, China. Geneva: World Health Organization. Retrieved November 26, 2018, from http://www.who.int/occupational_health/publications/globstrategy/en/index2.html.

In this short chapter, the author makes an attempt to link technologies which are considered to represent the coming of the new technological era to people involved in – or influenced by – their application, and to discuss whether the new issues the technologies bring to employment relations and workers' legal status, are really detrimental to the workers' rights. Also the chapter aims at showing the advantages of the new technologies from the labour lawyer's viewpoint and the ways they can be consolidated. To that end, the author describes the state of the art in the regulation of work-related technological innovations in Russia.

Today's technical buzzwords

Recently few events or publications can afford not to mention new technologies in one way or another. We all know these buzzwords or have heard some of them more than once: digitalisation, "uberisation", distributed ledger (blockchain), smart contacts, cryptocurrencies (digital currencies), decentralised autonomous organisations (DAOs), big data, platform work, internet of things, cobots, neural networks, etc.[4] All these technological solutions bear several common features of

which the most obvious is their aim to exclude the possibility of human interference from as many processes and as many stages as possible, ideally excluding this interference completely. The ultimate goal is the same as for the newest technologies that have arisen during the previous industrial revolutions: to attain the highest level of incorruptibility, flexibility, objectivity, accuracy, and immunity to adverse influences. These technologies streamline and speed up processes they become a part of and allow entrepreneurs to cut costs.

4   Due to size limitations no technical details of these concepts and phenomena are given. However, they are extensively described in many research papers, white papers, articles, interviews, blogs, etc. To name a few: Hassani, H., Huang, X., & Silva, E. (2018). "Big-Crypto: Big Data, Blockchain and Cryptocurrency." *Big Data Cognitive Computing*, *2*(34), 1–15. DOI: 10.3390/bdcc2040034; Wigler, B., & Cary, N. (2018). *The Future is Decentralised: Block Chains, Distributed Ledgers, & the Future of Sustainable Development*. Geneva: UNDP. Retrieved November 12, 2018, from https://www.undp.org/content/dam/undp/library/innovation/The-Future-is-Decentralised.pdf; Hinchcliffe, D. (2018). "Digital transformation in 2019: Lessons learned the hard way." *ZDNet*. October 11. Retrieved November 12, 2018, from https://www.zdnet.com/article/the-biggest-lessons-learned-in-digital-transformation/; McAfee, A., & Brynjolfsson, E. (2017). *Machine, Platform, Crowd: Harnessing Our Digital Future*. New York, NY: W. W. Norton & Company; Choudary, S.P. (2015). *Platform Scale: How an emerging business model helps startups build large empires with minimum investment*. Boston, MA: Platform Thinking Labs; Schwab, K. (2016). *The Fourth Industrial Revolution*. New York, NY: World Economic Forum; Bächle, T.C. (2016). *Digitales Wissen, Daten und Überwachung zur Einführung*. Junius Verlag; Berger, J. (2016). *Contagious: Why Things Catch On*. New York, NY: Simon & Schuster; Schrage, M. (2014). *The Innovator's Hypothesis: How Cheap Experiments Are Worth More than Good Ideas*. Massachusetts, MA: MIT Press, etc. Among the most popular blogs on these topics are: Cisco Digital Transformation Blog (blogs.cisco.com/digital), Reddit Digital Transformation (reddit.com/r/digitaltransformation), XenonStack Blogs (xenonstack.com/blog/), Digitalist Magazine (digitalistmag.com), InnovationLab Blog (innovationlab.net/blog/), etc.

For example, blockchain is known to embrace the following remarkable features: (1) direct interaction between the participants (computers) in a blockchain with no intermediaries involved (i.e. peer-to-peer networking); (2) the distributed nature of data storage and operation preventing data corruption and loss; (3) totally decentralised management and control with no single management centre and no third parties authorised to verify transactions – an approach which offers unprecedented levels of objectivity, accuracy and independence; (4) consensus-based control[5] where a transaction (or a number of transactions) in a block is (are) verified and included in the chain only if all computers of the respective blockchain confirm that it is correct (otherwise the block is rejected) – a feature which adds protection from intrusion and improper influence; (5) asymmetric (or public key) cryptography used to make the system secure through the verification of the source of transactions – possibly the best crack-proof technology of today. All other new technologies mentioned above share most of these features. Thus, smart contracts being – in a simplified interpretation – just a piece of code, are absolutely "human-free", and DAOs operating through them in a blockchain environment share all the advantages of these two.

Each of these five features was not *per se* brand-new at the time the blockchain emerged. For example, A. Wright and P. De Filippi mention that P2P (peer-to-peer) networks[6] and public-private key encryption[7] were developed in the late 1970s (and P2P networks gained mainstream acceptance in the early 2000s), consensus mechanisms (such as Proof of Work) have been around since the late 1990s,[8] and decentralised and distributed data storage has been used since some 2005.[9] However, when combined, these technologies have opened a revolutionary new world of opportunities.

5   A short (and quite digestible for non-IT people) description of the idea is given here: Kalinov, V. (2018). *Consensus mechanisms*. July 04. Retrieved December 10, 2018, from https://blockchainhub.net/blog/blog/consensus-mechanisms-2.

6   Wright, A., & De Filippi, P. (2015). "Decentralized Blockchain Technology and the Rise of Lex Cryptographia." *SSRN Electronic Journal*. DOI: 10.2139/ssrn.2580664. Note 15 at p. 5. In regard to P2P networks they cite A. Oram (2001). *Peer-to-peer: Harnessing the benefits of a disruptive technology*. Sebastopol, CA: O'Reilly Media, where a history of the networks was pictured, and the Usenet introduced in 1979 was mentioned as the "grandfather of today's peer-to-peer networks".

7   Wright, A., & De Filippi, P. Op. cit. In regard to the concept of public key cryptography they cite original works of the founding fathers of the RSA and public-key cryptography: Diffie, W., & Hellman, M.E. (1976). "New Directions in Cryptography." *IEEE Transactions on information theory*, *IT-22*(6), 644–654. Retrieved December 10, 2018, from https://ee.stanford.edu/~hellman/publications/24.pdf; Rivest, R.I., Shamir, A., & Adleman, L. (1978). "A method for obtaining digital signatures and public-key cryptosystems." *Communication of the ACM*, *21*(2), 120–126. DOI: 10.1145/359340.359342. See also: Mollin, R.A. (2003). *RSA and public-key cryptography*. Boca Raton, FL: Chapman & Hall/CRC Press; Lynn, J.C. (2013). *Cryptography: Its history and mathematical transformation of RSA and Diffie-Hellman algorithm*. Elizabeth City, NC: Elizabeth City State University, etc.

8   Wright, A., & De Filippi, P. Op. cit. Speaking about these mechanisms they cite: Back, A. (1997). A Partial Hash Collision Based Postage Scheme. Retrieved December 10, 2018, from http://www.hashcash.org/papers/announce.txt.

9   In regard to this technology Wright and De Filippi cite Chacon, S., & Straub, B. (2014). *ProGIT*. Apress. P. 5. Retrieved December 10. 2018, from http://git-scm.com/book/en/v2/Getting-Started-A-ShortHistory-of-Git.

Blockchain as a new "operating environment"

Technically a blockchain technology offers a distributed (decentralised) and shared ledger (or a database, or a digital platform)[10] based on cryptographic algorithms that stores information about all verified (approved) transactions[11] performed over a certain asset[12] (digital or digitised).[13] A transaction or several transactions written as datasets form(s) a separate *block*. The blockchain participants (computers pooled in the blockchain, or the blockchain *nodes*) verify transaction(s) in the block that causes the block to be transferred to another participant. If all participants approve the transaction(s), the respective block is added to the other already verified blocks in a *chain*. Blockchain blocks are organised in

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chronological order. Together with information on the verified transactions, each block contains a timestamp, a reference (lin preceding block in the chain (a *hash* pointer) and a solution to a computational (mathematical) puzzle the blockchain nodes u the data associated with a particular block.[14]

10 Umeh, J. (2016). "Blockchain double bubble or double trouble?" *ITNOW, 58*(1), 58–61.

11   The word "transaction" here (and in the majority of research works on blockchain) is used to represent a concept of a legally meani action capable of bringing about legal consequences. This meaning is now common among the researchers of the blockchain technolo

12   Asset here is used in its common meaning of "an object of a transaction." This meaning of the term also shows signs of bein blockchain scholarship.

13   This particular definition is generally based on the formula given in: Saveliev, A.I. (2016). "Dogovornoe pravo 2.0: "Umnye kontrak kontza classicheskogo dogovornogo prava" [Contract law 2.0: "Smart contracts" as a beginning of an end of the classical contra *grajdanskogo prava [Bulletin of Civil Law], 3*, 35-59 (at 41). However, more or less similar definitions have been given in: Deshpan K., Lepetit, L., & Gunashekar, S. (2017). *Distributed Ledger Technologies/Blockchain: Challenges, opportunities and the prospect.* Prepared for the British Standards Institution (BSI). Retrieved December 22, 2 http://k1.caict.ac.cn/yjts/qqzkgz/bgtj/201708/P020170818579005375876.pdf; Wright, A., & De Filippi. Op. cit.; European Securiti Authority. (2016). *The Distributed Ledger Technology applied to securities markets.* Discussion Paper. Retrieved December https://www.esma.europa.eu/sites/default/files/library/2016- 773_dp_dlt.pdf. p. 8; Kakavand, H., Kost De Sevres, N., & Chilton, F blockchain revolution: An analysis of regulation and technology related to distributed ledger technologies." *SSRN Electronic* 10.2139/ssrn.2849251, etc.

14   Deshpande, A. et al. Op. cit. Pp. 6-7. See also: Bonneau, J., Miller, A, Clark, J., Narayanan, A., Kroll, J.A., & Felten, E.W. (2015). " Perspectives and Challenges for Bitcoin and Cryptocurrencies." IEEE Xplore Digital Library: 2015 IEEE Symposium on Security a Jose, CA, 17–21 May 2015, 104–121 (at 107). DOI: 10.1109/SP.2015.14.

We are currently witnessing the penetration of blockchain-based technologies into a constantly increasing number of s from cryptocurrencies or internet of things (IoT), blockchain can be used to provide digital identity (f.i. to be used in a so government"[15]), support digital voting, financial services or supply chain management.[16] It can certainly be used relationships – to execute the terms of regular (legal) contracts through the "computerised transaction protocol"[17] that blocke (this application of a blockchain technology seems to have given birth to an alternative interpretation of the term "smart c contractual relation concerning work is no exception.

15   See f.i.: The Conference Board of Canada. (2018). *Enabling digital government with blockchain.* Recorded webinar. March 1. Retri 02, 2018, from https://www.conferenceboard.ca/e-library/abstract.aspx?did=9503; Kennedy, J. (2018). "Is blockchain key to an acco government?" *SiliconRepublic*, January 22. Retrieved December 02, 2018, from https://www.siliconrepublic.com/enterprise/digit blockchain; Sweden, E. (2017). "Blockchains: Moving digital government forward in the States." *NASCIO*. Retrieved December https://www.nascio.org/Portals/0/Publications/Documents/2017/NASCIO%20Blockchains%20in%20State%20Government.pdf; Stor "The tiny European country that became a global leader in digital government." *Forbes*. June. Retrieved December 0 https://www.forbes.com/sites/delltechnologies/2016/06/14/the-tiny-european-country-that-became-a-global-leader-in-digital-governm Z.K., Kusek, Z., & Verheijen, J. (2014). *Logged on: Smart government solutions from South Asia.* Washington, DC: World E December 03, 2018, from https://openknowledge.worldbank.org/handle/10986/20487, etc.

16   See f.i.: Marr, B. (2018). "How blockchain will transform the supply chain and logistics industry." *Forbes*, March 23. Retrieved Dece from https://www.forbes.com/sites/bernardmarr/2018/03/23/how-blockchain-will-transform-the-supply-chain-and-logistics-industry (2017). "How blockchain is revolutionizing supply chain management." *Digitalist Magazine*, September 06. Retrieved December https://www.ey.com/Publication/vwLUAssets/ey-blockchain-and-the-supply-chain-three/$FILE/ey-blockchain-and-the-supply-chain-t Gilbert, D. (2016). "Blockchain technology could help solve $75 billion counterfeit drug problem." *International Business Time*, Apr December 02, 2018, from http://www.ibtimes.com/blockchain-technology-could-help-solve-75-billion-counterfeit-drug-problem-2355

17   This description uses the interpretation of "smart contracts" given in: Szabo, N. (1997). *The idea of smart contracts.* Amsterdam Cent and Communication (University of Amsterdam). Retrieved December 02. 20 http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_cc though actually Szabo is widely known to have introduced the term yet in 1994. See f.i.: Tapscott, D., & Tapscott, A, (2016). " revolution: How the technology behind Bitcoin is changing money, business, and the world." *Portfolio*, 71–72.

18   On the controversy concerning the interpretation of the term "smart contract" and on the essential features of the phenomenon please (2018). "Smart contract – an elusive definition." *Medium.* June 23. Retrieved December 02, 2018, from https://medium.com/co contract-an-elusive-definition-a3f3dbc2c799; Bourque, S. (2018). "Smart contracts are neither smart nor contracts." *Medium*, July December 02, 2018, from https://medium.com/@SamREye26/smart-contracts-are-neither-smart-nor-contracts-1799d6d30bb5; Bour S.F.L. (2014). "A lawyer's introduction to smart contracts." *Scientia Nobilitat. Reviewed Legal Studies*, 4-23. Retrieved December https://github.com/joequant/scms/blob/master/doc/pdfs/A%20Lawyer%27s%20Introduction%20to%20Smart%20Contracts.pdf.

In the management of relations concerning work (including human researource management) the blockchain-based solu mostly in two roles: (1) as an advanced database for a secure storage, retrieval and exchange of documents; (2) an advanc system for accurate and reliable calculations of either vulnerable numeric data or large amounts of numeric data. Therefore, i an exaggeration to say that in this field the main interest in the use of the blockchain-based solutions lies not in t

technological specificity, but in the levels of security and accuracy it is able to provide. In this sense, any technology would provide the same or higher levels of these features.

Employment relations may more or less benefit from most of the features of the technologies brought about by the Revolution as almost any social relations may. So long as direct interaction saves time and money spent before on i involvement, employers may also enjoy this, substituting banks for smart contracts in wage payments, processing collect votes in a blockchain, and so on. It can also tempt us to test a platform or a DAO for having the actual legal status of "en

making a new type of legal fiction (shall we call it a "digital person"?[20]) and as the current research shows, it is not impossible.

Are new technologies a threat to employment relations and workers' legal status?

New technologies are often blamed[21] for the decay in traditional employment relations and even for "tempting away" wor protective umbrella of an

"employee" legal status with the promise of more autonomy, higher compensation, and brighter career prospects. However, their influence is quite complex, multidimensional, and controversial.

19 For an interesting exercise in "refocusing" control test to make it more suitable for platform work cases please see: Cunningham-Parmeter, K. (2016). "From Amazon to Uber: Defining employment in the modern economy." *Boston University Law Review, 96*(5), 1673–1728. Retrieved December 02, 2018, from https://www.bu.edu/bulawreview/files/2016/10/CUNNINGHAM-PARMETER.pdf.

20 The founding fathers of DAO state that it is not a legal person and doesn't hire people. However, this may change with time, because theoretically being a specific type of an employer is not impossible for DAO. Follow the development of the idea at the current DAO website: https://blog.daohub.org.

21 See f.i.: IR Global. (2018). "The changing employment landscape: Disruptive technology and the gig economy." Virtual Round Table Series Employment Working Group. Retrieved December 03, 2018, from https://www.irglobal.com/file/d40c6c88e28a211d82db1ca69e2c286c.pdf; O'Reilly, J., Ranft, F., & Neufeind, M. (2018). *Work in the digital age: challenges of the fourth industrial revolution.* Preprint. March. Retrieved December 03, 2018, from https://www.researchgate.net/publication/324091786; Aloisi, A (2016). "Commoditized workers: case study research on labour law issues arising from a set of 'on-demand/gig economy' platforms." *Comparative Labour Law and Policy Journal, 37*, 653–688; Albin, E., & Prassl, J. (2016). "Fragmenting work, fragmented regulation: the contract of employment as a driver of social exclusion." In: Freedland et al (eds.). *The contract of employment.* Oxford: Oxford University Press; Freedland, M. (2016). "The contract of employment and the paradoxes of precarity." University of Oxford, Legal Research Paper Series. Paper No 37/2016; Smith, R., & Leberstein, S. (2015). *Rights on demand: ensuring workplace standards and worker security in the on-demand economy.* New York: National Employment Law Project. Retrieved December 03, 2018, from http://www.nelp.org/content/uploads/Rights-On-Demand-Report.pdf; Ahsan, M. (2018). "Entrepreneurship and ethics in the sharing economy: A critical perspective." *Journal of Business Ethics,* 1–15 DOI: 10.1007/s10551-018-3975-2; Jacobs, D.C.D., & Yudken, J., (2004). *The Internet, organizational change and labor: The challenge of virtualization.* New York, NY: Routledge, etc. However, there are also well-known opponents to this viewpoint, f.i.: Braverman, H. (1974). *Labor and monopoly capital: The degradation of work in the twentieth century.* New York, NY: Monthly Review Press, p. 319.

First of all, to a classical model of employment relations – such as f.i. described in the ILO Recommendation No. 198 and the ILO guides to it – new technologies bring in an unprecedentedly high level of trust attainable between parties. The very idea of a blockchain as a decentralised system with innumerable nodes of verification of the data circulated in it makes violations of contractual terms and the parties' statutory responsibilities close to impossible.

If we lived in an ideal world, the ultimate result of the application of these technologies would produce completely error-free and deceit-free employment relations. There would be no wage arrears or non-payment of compensation, taxes or social contributions,[22] as well as no deceit with the calculation of working time,[23] with days of paid leave, with the number of votes in employee participation and workplace coordination cases, and no issues in the assessment of the number and gravity of workplace disciplinary offences leading to dismissal, and no fraud with documents on qualification.[24] For example, a smart contract would guarantee that neither party would be able to alter the contractual terms and workers' entitlements once the work has started, suddenly and without the other party's consent because all the changes in the blockchain environment would be recorded and then undergo verification over and over again.[25] Cryptocurrencies would allow cutting transactional and administrative costs of transnational wage payment down to zero, giving entrepreneurs an opportunity to offer higher wages without detriment to their financial stability and opening to workers a whole new world of job offers worldwide. Big data would provide unprecedented analytical power that would possibly allow stakeholders to summarise instances of particular workers' or entrepreneurs' behavior and decisions thereby concluding whether there would be evidence of them being prone to improper or unlawful behaviour.[26] For example, it is quite natural to use big data analysis for tracing and bringing together scattered instances of workplace violence among workers or an entrepreneur's discriminatory decisions in hiring or promotion

22 One of the blockchain-based solutions implemented through smart contracts in order to secure wage payment, make it transparent and reduce the time between working and getting paid is Etch: https://www.etch.work/. Etch is "the payroll protocol built on top of the Ethereum blockchain". It boasts to guarantee the money flows into a worker's Etch wallet every second of his/her working day. Another example is a Bitcoin-based payroll and international wage payment service Bitwage: https://www.bitwage.co.

23 One of the already implemented examples of blockchain-based solutions built around the working time control and recording is a platform Gigachain: http://gigacha.in/. Gigachain keeps records time workers spent working in a tamper-proof blockchain-based store and calculates pay based on hours worked and agreed terms of respective contracts for work.

24 Recently a number of interesting examples of such blockchain-based solutions have been developed, including: HumanTelligence (https://www.human-telligence.com) that combines self-assessment for workers with TalentFit and Culture Analytics features for employers; Path Framework (https://www.pathfoundation.io) that stores and allows to manage and share validated information on professional experience, education and skills (also with a reward system based on PATH tokens); TiiQu (https://tiiqu.com) which creates verifiable digital passports that include information on qualifications, etc.

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25   Such solution has already been developed: *Grain* protocol (https://grain.io) allows entrepreneurs to process work agreements on the blockchain, with an instant payment mechanism.

26   A step in this direction made with the blockchain-powered anti-harassment platform Vault can serve as one such example: http://www.vaultplatform.com. The platform allows its users to record their harassment experiences, store evidence and personal memos thus forming a sort of registry of "serial perpetrators." Information a user enters about his/her case can be accessed only with the explicit consent of this user. The platform also informs its users about the presence of their perpetrator's name in its "registry." However, it's still the user's decision what to do with this information further. The platform will not act in place of the user to actively protect his/her rights.

However, these new technologies are not immune to being used for evil, as hardly any technologies are. Respecting the size limitations for this chapter, let us consider one of the simplest, clearest and possibly the most popular examples of evidence that the situation is far from being ideal. It is the emergence of the term "uberisation" in regard to platform work[27] and other work organised with the use of new technologies. Labour lawyers and workers' rights activists tend to see platform work mainly as an employers' attempt to deprive workers of the legal

and financial protection that employment law has traditionally been providing. With the blockchain technology, the more or less central "Uber entity" is replaced with a countless number of smart contracts and blockchain nodes ensuring their transparent and independent deployment, but it hardly helps to provide better worker protection.

27   In addition to the examples of a platform work given throughout the text of this chapter, it may also be recommended to have a look at A. Aloisi's paper where a number of other employment-related platform solutions are analysed in the light of the workers classification problem: Aloisi, A. (2016). "Commoditized workers. Case study research on labour law issues arising from a set of 'on-demand/gig economy' platforms." *Comparative Labor Law & Policy Journal, 37*(3), 653–690. DOI: 10.2139/ssrn.2637485.

For example, the smart contract technology that was shown above as a promising tool for safeguarding the interests of the parties to an employment contract lacks the flexibility that new technologies usually declare to provide. Once a contract is executed all alterations to it become technically complicated at the very least[28] thus hindering any improvement in the conditions of employment and making the bargaining power of the parties an almost empty word. The need to alter or novate all smart contracts involved in a particular employment relationship may dramatically increase costs instead of cutting them. It may seem not all bad though – at least initially – because it may motivate entrepreneurs to abstain from signing "contracts for services" in arguable cases where grounds to sign an employment contract obviously exist (because otherwise once a court decides in favour of the employment nature of a particular contract, they would immediately face enormous expenses on technical implementation of the decision). Generally, this may give employees a better protection for a while. However, it may shortly make the labour market in this sector shrink because of the increased costs so that many workers would find themselves unemployed. Leaving entrepreneurs little flexibility with regard to the nature of the contracts they sign with workers is a very controversial way of solving the problem with platform workers' protection. Actually, any other reason for the alteration of the smart contracts – be it a solicited increase in benefits, a promotion or a sudden change in a worker's ability to work – would equally increase costs and cause problems for the parties because it would require the smart contracts either initially form a very complicated structure that takes into account most of such reasons or sustain alterations or novation each time a new reason arises.

Smart contracts are also of no use in cases where there is not physically or legally feasible way to manage without humans. For example, to lawfully dismiss an employee for truancy (absence without a valid reason) many national laws require an employer not only to calculate the number of days of such absence (which can easily be traced with modern workplace monitoring techniques) and to obtain the employee's written explanation (which can nevertheless be given in a specific digital form) but also to have talks with him/her, sometimes in the presence of workers' representatives. As for now, this process can hardly be fully digitalised without risking workers' interests. To implement it entirely with digital means might require quite serious changes in both regulatory and organisational approaches, i.e. we would need not just to amend laws, but modify many procedures involved at all the stages of the task implementation. Thus, in the example given above we would need a digital system that could not just register the fact that the talks actually took place but check the sufficiency and lawfulness of the contents of talks. Besides, as of yet, despite all discourse about reliability, nobody is really ready to guarantee that such systems are, or would be, fraud-and-error-proof.

28   While most academic papers state that smart contracts are absolutely immutable, our readers may find it interesting to look for the most recent non-academic articles that addresses the ways and consequences of smart contracts alteration. See f.i.: Carbon Blog. (2019). "How (Not) to Upgrade Smart Contracts." *Medium*. February 8. Retrieved from https://medium.com/carbon-money/stablecoins-and-upgradability-98bc64a46bcb (accessed on March 06, 2019). Cardozo Blockchain Project. (2018). "Smart Contracts" & Legal Enforceability. Research Report #2. October 16. Retrieved March 06, 2019, from https://cardozo.yu.edu/sites/default/files/Smart%20Contracts%20Report%20%232_0.pdf; Grincalaitis, M. (2018). "Can a Smart Contract be Upgraded/Modified?" *Medium*. February 06. Retrieved March 06, 2019, from https://medium.com/@merunasgrincalaitis/can-a-smart-contract-be-upgradedmodified-1393e9b507a, and possibly a worthy final paper a student from the University of Alicante wrote: Tulsidas, T. U. (2018). "Smart Contracts from a Legal Perspective" (final thesis for the degree in law, University of Alicante, Alicante, Spain). Retrieved March 06, 2019, from https://rua.ua.es/dspace/bitstream/10045/78007/1/Smart_Contracts_from_a_Legal_Perspective_Utamchandani_Tulsidas_Tanash.pdf.

Cryptocurrencies' rates are still very volatile and apart from this, in most jurisdictions, they have been legally recognised to be not money but property.[29] The latter poses a question of compliance with national,[30] supranational,[31] and international

norms on wage payment in kind (generally stipulated in article 4 of the widely ratified ILO Convention No. 95) for those entrepreneurs that think about cryptocurrencies utilisation in wage payment. In this sense, cryptocurrency-based wage solutions – such as Bitwage based on Bitcoin (already mentioned above) – may look a bit awkward unless the parties succeed in rendering the worker as "self-employed" (which automatically excludes her from the scope of the ILO Convention No. 95[32] and all other applicable laws which respect the ILO approach). However, this issue is complex enough to deserve a separate chapter.

29   In Russia courts had recognised cryptocurrencies to be a "property" before the State Duma or financial authorities issued any documents on it. See: Order of the 9th Court of Appeal of May 15, 2018 No. 09АП-16416/2018 on the case No. A40-124668/2017. Retrieved December 10, 2018, from https://kad.arbitr.ru/PdfDocument/3e155cd1-6bce-478a-bb76-1146d2e61a4a/58af451a-bfa3-4723-ab0d-d149aafecd88/A40-124668-2017_20180515_Postanovlenie_apelljacionnoj_instancii.pdf. In October 2017 Putin ordered the Government to specify the legal status of cryptocurrencies before July 01, 2018 (see the news about this on the Russian Newspaper website: https://rg.ru/2017/10/24/vladimir-putin-poruchil-podgotovit-popravki-o-kriptovaliute-do-1-iiulia.html; in Russian). However, in the middle of July 2018 the Chairman of the Committee for Financial Markets said that the law on cryptocurrencies will be enacted in September 2018 (see the news about this n the RIA Novosti website: https://ria.ru/economy/20180717/1524781617.html. The draft law No. 424632-7 approved in the first reading by the State Duma on May 22, 2018, is available here: http://asozd2.duma.gov.ru/main.nsf/(Spravka)?OpenAgent&RN=424632-7). Among the EAEU countries only Belarus has issued such regulation where cryptocurrency (tokens) is not called a property explicitly but still not included into the concept of "money" throughout the text (see Decree of the President of Belarus Republic No. 8 "On the Development of Digital Economy" of December 21, 2017. Retrieved December 22, 2018, from http://president.gov.by/ru/official_documents_ru/view/dekret-8-ot-21-dekabrja-2017-g-17716/).

30   For instance, it is directly and strictly limited in the articles 130 and 131 of the Russian Labor Code, in full compliance with the ILO Convention No. 95.

31   On the EAEU level the talks on "digital cooperation" and "transborder space of trust" have been conducted since the EAEU creation in 2014, and in 2016 a Working group on "digital agenda" was created (Decree of the Council of the Eurasian Economic Union No. 6 of March 13, 2016. Retrieved December 22, 2018, from https://docs.eaeunion.org/docs/ru-ru/01410351/cncd_02062016_39). However, in regard to the technologies discussed in this chapter no particular decisions have been made as for now. It is supposed that new technologies will be addressed in the draft Conception of Formation of the Common Financial Market that is planned to be launched in 2025. An interview with the Chairman of the EAEU Board. July 10, 2018 is at the website of the Eurasian Economic Commission: http://www.eurasiancommission.org/ru/nae/news/Pages/Forms/EEC_RSS_News.aspx.

32   Article 1 of the Convention defines wages as "…remuneration or earnings, …which are payable in virtue of a written or unwritten contract of employment by an employer to an employed person for work done or to be done or for services rendered or to be rendered."

To sum all this up, technically the new technologies have got no imminent features that would either automatically protect workers involved in relations concerning work organised with the help of such technologies or prevent people from using it in such relations at all. As history teaches us, technologies can be used for good and for bad. Therefore, we need a really *smart* regulation to step in and establish a system of minimal standards applicable for workers involved in such relations, and this regulation should utilise the capabilities of the new technologies to build a reliable and efficient framework. Furthermore, we need labour lawyers who know somewhat more than basics in these technologies.

The Russian context

Russia is comparatively good at utilising technical innovation, but the regulatory response usually tends to lag considerably. Thus, recent innovations in the Labour Code – such as the new Chapter 49.1 on remote work (where, for no apparent reason it was blended with telework which is just a specific case of remote work[33]) or provisions that implement risk management approach in Section X devoted to occupational safety and health – address issues which the majority of developed countries have regulated several decades ago.

Moreover, one of the few topical subjects for discussion with regard to new technologies the Russian authorities eventually decided to initiate[34] is that on the reasonableness and appropriateness of electronic technologies in human resource management (mostly employee records keeping and document procession). This is the main and almost only aspect of "digitalisation" and "new technologies in employment relations" which is currently widely discussed at governmental level. Publications and debates about other, more up-to-date aspects of "digitalisation" are still rare and sporadic.

33   Article 312.1 of the Russian Labor Code where the definition of remote work is given mentions the "use of ICT public networks including Internet" as an integral condition of a work being considered "remote".

34   Parliamentary hearings "Specificity of procedures related to employment relations in digital economy". 25.01.2018. Official website of the State Duma of the Russian Federation. Retrieved from http://duma.gov.ru/news/26028. Materials prepared for the hearings are available at the official website of the Committee for economic policy, industry, innovational development and entrepreneurship of the State Duma: http://komitet2-7.km.duma.gov.ru/Novosti-Komiteta/item/15390457/(in Russian); materials of the hearings are available at the same website: http://komitet2-7.km.duma.gov.ru/Kruglye-stoly-seminary-soveshhaniya-i-dr/item/15496727 (in Russian).

To some extent, this can be explained by the inflexibility of the governmental decision-making system or a lack of political will (or influence) to promote or lobby the necessary changes. Partly this lag may also be attributed to the simplified approach the Labour Code entertained with regard to the question of classification of platform workers (and other cases where new technologies are involved) thanks to which the Russian judicial system does not experience a rise in claims related to this issue despite the wide network of Uber-like services.[35] While many jurisdictions are concerned with the correct application of classical tests to these specific cases or employ scholars to suggest new ones, the Russian Labour Code uses a comparatively old "magic provision" that presumes employment relations to exist in case of doubts which cannot be ruled out when a court considers a dispute on the recognition of such relations to be employment relations.[36] If such relations become recognised as employment ones, they are recognised as existing since the date on which the worker was actually admitted (allowed) to do the work that is specified in the contract. Moreover, if a court re-qualifies the contract to an employment one, the employer is fined about 1,350 euros (and twice as such if the violation repeated)[37] because