DOI: 10.15838/esc.2024.5.95.13
UDC 331, LBC 65.24

Sustainability of Digital and Non-Digital Forms of Employment: Comparative Assessments

Natalia V.
TONKIKH
Ural State University of Economics
Yekaterinburg, Russian Federation
e-mail: tonkihnv@usue.ru
ORCID: 0000-0003-2957-7607; ResearcherID: O-9705-2018

Tatyana A.
KAMAROVA
Ural State University of Economics
Yekaterinburg, Russian Federation
e-mail: kta@usue.ru
ORCID: 0000-0003-0087-9310; ResearcherID: ABC-9312-2021

Tatiana L.
MARKOVA
Ural State University of Economics
Yekaterinburg, Russian Federation
e-mail: tmark@mail.ru
ORCID: 0000-0002-2520-6836; ResearcherID: ABC-7152-2021

For citation: Tonkikh N.V., Kamarova T.A., Markova T.L. (2024). Sustainability of digital and non-digital forms of employment: comparative assessments. *Economic and Social Changes: Facts, Trends, Forecast*, 17(5), 232–246. DOI: 10.15838/esc.2024.5.95.13

Abstract. Modern theoretical and practical views on the impact of digitalization on welfare and quality of working life are controversial and fragmentary. The effectiveness of the application of digital social and labor relations is considered in scientific publications, as a rule, outside the context of sustainability. The aim of the work is to identify differences between digital and non-digital employment according to the criteria of sustainability in the context of standard and non-standard forms of social and labor relations. Key tasks are to develop our own methodology for assessing the sustainability of employment forms; carry out comparative and rating assessment of the sustainability of digital and non-digital forms of employment based on objective and subjective indicators. Empirical basis includes the results of a nationwide survey of able-bodied population aged 20 to 59, N = 2,896 people, quota sample. Key controlled features are sex and type of residence area (region's administrative center, city, rural settlement). All federal districts are covered with the exception of the Southern Federal District. We reveal that, according to most indicators, digital standard and non-standard forms of employment are more stable than non-digital forms, they occupy 1st and 2nd places in the final ranking. Digital standard employment is inferior to non-digital standard employment only in terms of the ratio of labor income to subsistence minimum. According to other objective indicators, digital employment demonstrates either significantly better working conditions or comparable social effectiveness. Digital non-standard employment is significantly more sustainable than non-digital non-standard employment in terms of the ratio of labor income to subsistence minimum, probability of a normal working week and possibility of voluntary choice of afterhours. The non-digital format is more stable in terms of legitimacy of labor relations and possibility of voluntary choice of underemployment. Subjective assessments of the effectiveness of employment formats among respondents in the digital segment are higher in all indicators of sustainability, especially in terms of job satisfaction and financial situation. A promising direction for future research les in conducting expert assessments of the significance of the proposed indicators for the development of an integrated index methodology for assessing employment sustainability.

Key words: employment, sustainable employment, digital employment, non-digital employment, non-standard employment, standard employment, sustainability indicators, methodology.

Acknowledgment

The study was supported by Russian Science Foundation grant 22-18-00614 "Research on the impact of digital employment on fertility and parental well-being", https://rscf.ru/project/22-18-00614/.

Introduction

Sustainability is one of the key characteristics of modern living conditions, including labor relations. The problems of paid labor have recently become one of the vectors of the discussion on sustainable development. In recent decades, a vast array of Russian (Kuchenkova, Kolosova, 2018; Leonidova, Chekmareva, 2018; Bobkov et al., 2022) and foreign publications devoted to the problems of sustainable employment and the identification of the main criteria of unsustainability in the sphere of labor have appeared. Sustainability is considered as a criterion of social efficiency of employment (Kolesnikova, 2010) and an important factor in shaping the labor world of the future (Littig, 2018).

In the context of digitalization, the academia and political circles more often recognize the importance of understanding the impact of information and communication technologies (ICTs) on efforts to sustainably transform societies (Azmuk, 2020). With the emergence of "digital

workplaces" (Lee, Sirgy, 2019), workers have two broad groups of flexibilities when using ICTs: time flexibility and workplace flexibility (Čiarnienė et al., 2018). Reversing the flexibilities are the risks of digitalization of working conditions in relation to sustainable employment security.

Although the digitalization of working conditions and sustainable development have been widely analyzed by the scientific community in recent years, the intersection of these two areas in a single focus of attention is quite rare. There are few studies devoted to both topics (Čiarnienė et al., 2018). The lack of research on the risks and opportunities of digital employment forms in the context of sustainability determines the novelty of the research question.

The aim of our study is to identify the differences between digital and non-digital employment by sustainability criteria in the context of standard and non-standard forms of social and labor relations.

The key tasks are the development of our own methodology for assessing the sustainability of employment forms on the basis of generalization and supplementation of existing theoretical provisions; testing of methodological tools on the materials of sociological survey of working Russians; comparative and rating assessment of the sustainability of digital and non-digital employment forms by objective and subjective indicators, taking into account the parameter "standardness/non-standardness" of working conditions.

Our own methodological toolkit should integrate both objective and subjective approaches to test the hypothesis.

The study tested the following scientific hypothesis: digital employment forms have greater sustainability compared to non-digital forms.

Theoretical background of the research

Despite the extensive body of theoretical and practical research, the literature has underdeveloped a unified approach to the definition of the concept of "sustainable employment". The substantive interpretation of the concept of "sustainable employment" is formulated on the basis of the semantic opposite of the terms sustainability/unsustainability. Sustainable employment is employment that have no instability signs.

As defined by the International Labour Organization (ILO), precarious employment is "work performed in the formal and informal economy that is characterized by uncertainty about the duration of employment, multiple possible employers or hidden/ambiguous employment relationships, lack of access to social protection and benefits normally associated with employment, low pay, and significant legal barriers to unionization and collective bargaining. Insecure employment is used by employers as a way of reducing the workforce, increasing its flexibility and shifting responsibility for possible risks to the workers themselves" [1].

Western studies of the parameters of employment precariousness conducted in the late 20th – early 21st century consider the concept of "sustainable employment" in the context of standard/non-standard labor relations (Rodgers, 1989). From this perspective, sustainable employment is characterized by a single employer, year-round employment and full-time employment. Sustainable employment involves working on the employer's premises using the employer's means of production, an open-ended contract and the provision of state-guaranteed benefits and rights (Cranford et al., 2003).

The generalization of definitions of precarious employment in 63 review articles by foreign authors (Kreshpaj et al., 2020) showed that modern foreign researchers refer to the lack of job security; insufficient income; lack of rights and social

[1] Policies and regulations to combat precarious employment (2011). *International Labour Organization*. 48 p. Available at: http://www.ilo.org/wcmsp5/groups/public/@ed_dialogue/@actrav/documents/meetingdocument/wcms_164286.pdf

protection as the main criteria of precarious employment. At the same time, a significant number of studies rely solely on income and employment status as criteria of precariousness, adhering to the view that the lack of a full-time and/or long-term contract is not a criterion of precariousness (Kreshpaj et al., 2020). In recent years, particular attention has been paid to study the characteristics of the relationship between precarious employment and workers' subjective well-being (Conigliaro, 2021), to identify the nature of the impact of precarious employment on work-family balance (Littig, 2008; Gálvez et al., 2020).

Russian scientists also have different approaches to defining the key properties of "unsustainable employment", noting that unsustainable employment is associated with negative effects for the employee (Kuchenkova, Kolosova, 2018) and lack of access to social guarantees (Bobkov et al., 2023). When analyzing the concept of "employment", A.M. Panov concludes that "sustainability along with regularity are not mandatory characteristics of employment, so the division into 'sustainable' and 'unsustainable' employment is based on its ability to preserve or not to preserve its quantitative and qualitative characteristics under the influence of external causes" (Panov, 2016, p. 3).

In general, Russian scientific discourse identifies the sustainable employment on the basis of the analysis of the criteria of the form of the employment contract and employment conditions; sustainable employment is recognized as work with the following characteristics: "open-ended employment contract, standard working hours (full working day, normal working week), provision of labor and social guarantees provided by the Labor Code of the Russian Federation" (Bobkov et al., 2023).

The scientific publications have an essential intersection of the concepts of unstable and precarious employment. Some researchers consider them as synonyms (Marin, 2013; Bobkov et al., 2016; Veredyuk, 2016), it is proposed to consider unstable/precarious employment as a multidimensional construct with a number of unfavorable characteristics of employment quality (Kreshpaj et al., 2020). Other scholars distinguish these concepts (Standing, 2014). For example, A.M. Panov, analyzing the concept of G. Standing (Panov, 2016), draws attention to the fact that the distinguishing characteristics of precariat are employment in the informal sector and the threat of job loss, while precarity becomes an attribute of employment in the formal sector.

In recent years, the emerging studies (Kuchenkova, Kolosova, 2018; Bobkov et al., 2023) use an integrated approach to analyze objective and subjective signs of employment instability.

Taking into account the above-mentioned formulations of the criteria of unsustainable employment based on the materials of foreign and Russian publications, we have summarized them into a classification list (*Tab. 1, 2*).

The systematization of scientific publications reveals differences both in the number of criteria identified and the possibility of their use in different national contexts. For example, it is noteworthy that in the concepts of precarious employment formulated by foreign researchers, one of the key criteria of employment sustainability is the possibility of defending employee rights through trade unions. In Russian conditions, this criterion cannot be used, as the degree of unionization of enterprises and industries does not allow assessing the bargaining power of employees (Panov, 2016, p. 5).

In general, the existence of different methodological approaches to the study of sustainable / unsustainable employment indicates the multidimensionality of this phenomenon. Some forms of digital social and labor relations (e.g., platform and self-employment) are defined as a type of employment with high risks of precarious and unsustainable labor relations. Nevertheless, we did

Table 1. Objective criteria of employment sustainability in the concepts of Russian and foreign researchers

Sustainability/ unsustainability attributes	Formulation of criteria	Authors
1. Labor relations 1.1. Term of employment contact	Unstable employment (no long-term contract). Part-time employment under contract. Temporary employment/work (fixed-term contracts, temporary agency work, seasonal work or outsourced and subcontracted work). Temporary employment (frequent job changes). Seasonal, casual, day labor. Employment during the probationary period / internship period.	(Standing, 2011); (Kreshpaj et al., 2020); (Rodgers, 1989); (Bobkov et al., 2018) (Kuchenkova, Kolosova, 2018); (Odintsova, 2018); (McKay et al., 2011)
	Urgent employment. Work "on call". Hourly employment contract (zero hours contract).	(Lewchuk et al., 2013); (McKay et al., 2011)
1.2. Type of employment relationships	Lack of labor rights. Unofficial employment, job without an employment record book, employment agreement, contract. Employment on the basis of civil law relations. Involuntary nature of the employment relationship. Multilateral (e.g. agency) or hidden employment relations. Multiple employment. Self-employment. Platform employment.	(McKay et al., 2011); (Kuchenkova, Kolosova, 2018); (Bobkov et al., 2018); (Rodgers, 1989); (Lewchuk et al., 2013); (Kreshpaj et al., 2020)
2. Labor conditions 2.1. Income / remuneration of labor / salary	Unofficial (partially or fully) payment of labor (in-cash). Insufficient (low and/or unstable) income; income from main employment does not provide a sustainable financial situation; wage level is below the minimum wage. Reduction of wages / salary reduction by the employer not at the will of the employee. Wage arrears / underpaid wages and salaries.	(Kreshpaj et al., 2020); (Lewchuk et al., 2013); (Bobkov et al., 2023); (Kuchenkova, Kolosova, 2018)
2.2. Working hours	Lack of control over working hours. Part-time employment (involuntary part-time work/reduction of working hours not at the will of the employee, working week of 15–20 hours, job sharing between several employees).	(McKay et al., 2011); (Kuchenkova, Kolosova, 2018)
	Instability in the length of the working week.	(Lewchuk et al., 2013)
	Deviating from standard working hours (under- and over-employment).	(Bobkov, Odintsova, Podvoiskii, 2023)
2.3. Work schedule	Unstable and unpredictable work schedule. Lack of control over the schedule.	(Lewchuk et al., 2013); (McKay et al., 2011)
2.4. Safe working conditions	Inadequate and/or hazardous working conditions.	(Kuchenkova, Kolosova, 2018); (McKay et al., 2011)
2.5. Workplace	Home-based employment. It is possible to change the workplace at the employer's request.	(Rodgers, 1989); (Standing, 2011)
2.6. Employment guarantees	Lack of rights to social guarantees and benefits typical of sustainable employment (state and corporate). Lack of social security system. Involuntary unpaid leave at the initiative of the employer. No paid vacation during the year.	(Lewchuk et al., 2013); (Standing, 2011); (McKay et al., 2011); (Bobkov, Odintsova, Podvoiskii, 2023); (Kuchenkova, Kolosova, 2018)
2.7. Standing up for labor rights through trade unions	Lack of rights and social protection (no access to employee representation through independent trade unions, regulatory support and workplace rights).	(Kreshpaj et al., 2020); (McKay et al., 2011); (Lewchuk et al., 2013)
2.8. Promotion / career growth	Lack of career prospects. Lack of on-the-job training opportunities to develop professional skills and competencies. Low degree of independence and variability of tasks. Lack of professional self-identification	(Lewchuk et al., 2013); (Standing, 2011); (McKay et al., 2011)
Source: own compilation.		

Table 2. Subjective criteria of employment instability in the concepts of Russian and foreign researchers

Sustainability/unsustainability attributes	Formulation of criteria	Authors
1. Labor relations	Sense of uncertainty in the employment relationship.	(Shkaratan et al., 2015); (Vorobyova, 2021)
2. Employment guarantees	Fear of losing a job / subjective feeling of job insecurity / feeling of unreliability of labor relations / presence of concern among employees about losing their job, desire to find a new job.	(Shkaratan et al., 2015); (Chuikova, Sotnikova, 2016); Vorobyova (2021); (Bobkov et al., 2023); (Kuchenkova, Kolosova, 2018)
3. Remuneration of labor	Employees' dissatisfaction with labor remuneration.	(Bobkov et al., 2023)
4. Labor conditions	Employees' dissatisfaction with working conditions.	(Bobkov et al., 2023)
5. Social status n so	Subjective perception of social status.	(Zudina, 2013)
6. Satisfaction with life	Employee's self-assessment of life and job satisfaction as an integral indicator of advantages and limitations of the form of employment.	(Aistov, Leonova, 2011); (Aistov et al., 2012)
Source: own compilation.		

not find any comprehensive comparative studies of the sustainability of digital and non-digital employment, which confirms the relevance and novelty of the question we have posed.

Methods and materials

The generalization of theoretical and practical research results on the issues of risks, sustainability and precarization of employment allowed formulating our own methodological approach to assessing the sustainability level of different employment forms. The selection of criteria for the indicative methodology for assessing the sustainability of employment forms was based on the classification list of employment instability criteria presented in the concepts of Russian and foreign researchers (see Tab. 2), taking into account the frequency of references. The methodological core of our toolkit was based on the findings of the research team led by Doctor of Sciences (Economics), Professor V.N. Bobkov, namely, a complex block system of indicators covering the attributes of labor relations and working conditions, labor status and employment satisfaction (Bobkov et al., 2022).

We understand the sustainable employment not only as the standard employment models (open-ended employment contract, standard working hours, social guarantees in accordance with the Labor Code of the RF), but also non-standard ones, if they are chosen by the employee voluntarily and meet their life needs.

A distinctive feature of our methodology is its focus on the "positive" type of indicators. For example, the criterion "income/payment of labor" in the block of objective criteria is considered not as an indicator of precarious employment according to the methods (Kreshpaj et al., 2020; Kuchenkova, Kolosova, 2018, etc.), but as an indicator of sustainability. We agree with the arguments of V.N. Bobkov, E.V. Odintsova and G.L. Podvoyskii (2023) that in addition to the size of labor income it is important to take into account the ratio of income to the minimum wage, so the list of objective indicators of the sustainability of employment forms includes the criterion "the ratio of labor income to the minimum wage of the working-age population" (*Tab. 3*).

Table 3. Indicative methodology for assessing the sustainability of employment forms

Objective indicators		
Criterion	Indicator	Calculation
1. Ratio of labor income to the minimum subsistence level of working-age population	Coefficient of the ratio of labor income to the minimum wage level of the able-bodied population in the i-th region ($C_{li\,i}$)	1. $C_{li\ i} = R_{av.inc.\ i} / MW_i$, where i – regions: CFD, NWFD, NCFD, VFD, UFD, SibFD, FEFD, SFD; $R_{av.inc.\ i}$ – average monthly income of respondents in i-th region MW_i – minimum wage of working-age population in i-th region. 2. $C_{li\ n} = \frac{\sum i\ = C_{li\ i} \times d\ i}{100}$ where $C_{li\ n}$ – average labor income coefficient of respondents of n-th employment group; n – employment groups: digital standard, digital non-standard, non-digital standard, non-digital non-standard (there may be other groupings); d i – share of respondents from i-region
2. Legitimacy of employment contracts	Formal employment rate (R_{EC}), %	$R_{EC} = N_{EC} / N_e \times 100$, where N_{EC} – number of those employed with formal employment contracts $N_{e\ -}$ number of employed
3. Prevalence of permanent employment relationships	Permanent employment rater (R_{pe}), %	$R_{pe} = N_{pe} / N_e \times 100$, where N_{pe} – number of employed persons with permanent jobs
4. Prevalence of the normal working week	Share of employees with a normal working week according to the Labor Code of the RF ($S_{E\ 40h.}$), %	$S_{E\ 40h.} = N_{e\ 40/36h.} / N_e \times 100$, where $N_{e\ 40h.}$ – number of employees working 40/36 hours per week
5. Frequency of voluntary choice of underemployment	Voluntary underemployment rate (R_{VUE}), %	$R_{VUE} = N_{Вмз.} / N_{ue} \times 100$, where $N_{Vue.}$ – number of employees working less than 40/36 hours per week on their own initiative $N_{ue\ -}$ number of underemployed
6. Frequency of voluntary choice of over-employment	Voluntary overemployment rate (R_{VOE}), %	$R_{VOE.} = N_{Voe.} / N_{oe} \times 100$, where $N_{Voe.}$ – number of employees working more than 40/36 hours per week on their own initiative N_{oe} – number of overemployed
Subjective indicators		
Criterion	Indicator	Calculation
1. Job satisfaction	Job satisfaction rate ($R_{Job\ satisf.}$), %	$R_{Job\ satisf.} = N_{Job\ satisf.} / N_e \times 100$, where $N_{Job\ satisf.}$ – number of employed people satisfied with their jobs
2. Satisfaction with financial position	Financial satisfaction rate ($R_{fin.satisf.}$), %	$R_{fin.satisf.} = N_{fin.satisf.} / N_e \times 100$, where $N_{fin.satisf.}$ – number of employed people satisfied with their financial situation
3. Satisfaction with life in general	Rate of life satisfaction in general ($R_{Life\ satisf.}$), %	$R_{Life\ satisf.} = N_{Life\ satisf.} / N_e \times 100$, where $N_{Life\ satisf.}$ – number of those satisfied with life in general in the workforce
4. Happiness index	Share of happy people in employment (S_{Happy}), %	$S_{Happy} = N_{Happy} / N_e \times 100$, where N_{Happy} – number of people who consider themselves happy
Source: own compilation.		

The expert environment considers an income comparable to one times the minimum wage (MW) as the poverty line, while two times – as the poverty line. A single worker with an income of three times the MW is at the entry level of the average standard of living. A decent wage for a working parent should ensure the possibility of supporting at least one dependent, which implies an income level of 5–6 minimum wages. However, in Russia there are problems of underestimation of the cost of labor and high differentiation of labor income. The established value of the minimum wage for working-age population was 16,844 rubles in the country as a whole for 2023[2]. The median wage is 46,751 rubles; the average monthly accrued wage of salaried employees is 57,210 rubles[3]. The ratio of the average monthly wage to the minimum wage is 3.4 times. We chose a threefold ratio of wages to the minimum wage level of working-age population as a threshold value taking into account the current economic realities. The employment form is considered sustainable by this parameter if the ratio exceeds threefold value (more than 3.0).

The next important feature of the methodology is a three-aspect consideration of the parameter "working hours". First, we estimate the probability of a normal working week according to the Labor Code of the Russian Federation (no more than 36/40 hours per week, depending on the professional profile). Second, we propose to take into account the circumstances of part-time work and to include only the risk of forced underemployment (at the employer's initiative) as negative factors; the possibility to work part-time by one's own choice is a sign of sustainable employment. The third aspect is represented by the indicator of "voluntary choice of over-employment", i.e. working more than the normal working hours (36/40 hours per week). Those who work beyond the normal working hours on their own initiative for reasons not related to the lack of labor income are not considered to be unsustainably employed. "Voluntariness" of the choice of non-standard working hours is relevant to consider in connection with the growth of individual entrepreneurship and self-employment, when workers independently set their working hours in accordance with their personal vector of self-actualization.

The block of subjective indicators of employment sustainability (see Tab. 3) combines and somewhat expands the methodologies of Russian researchers. The indicators "job satisfaction" (Bobkov et al., 2023) and "satisfaction with life in general" (Aistov et al., 2011; Aistov et al., 2012) are supplemented by the indicator the "share of the happy among the employed". The basis is the following: the New Economics Foundation proposed the International Happiness Index as a measure of the "real" well-being of the population in 2006, since recently the goal of most people is to be happy and healthy instead of being rich. Studies of happiness at work among the employed population confirm the relevance of this criterion. Recently, Russia demonstrates a growing interest in the development and implementation of tools for managing employee happiness, which begin complementing / replacing traditional tools for managing staff satisfaction, engagement and loyalty[4]. The positions of "happiness director", "happiness director and head of HR-brand", etc. are appearing in the staff of large Russian companies.

The indicator "satisfaction with financial position" was introduced due to objective limitations of the empirical database. It is advisable to

[2] Information on the minimum wage level. *Official website of the Federal State Statistics Service*. Available at: https://rosstat.gov.ru/vpm

[3] Median salary calculated on the basis of administrative data of the Pension and Social Insurance Fund of the Russian Federation. *Official website of the Federal State Statistics Service*. Available at: https://rosstat.gov.ru/labour_costs

[4] Who is the head of happiness? *Article in the portal HH.ru*. Available at: https://ekaterinburg.hh.ru/article/32093

replace it with "satisfaction with wages" in future studies. Nevertheless, a significant part of the working population considers labor income as the main source of income, which allows using this indicator as a measure of employment sustainability.

We purposely chose the "positive" type of relative metrics, which suggests that the metric should tend to the maximum; the higher the value of a particular indicator – the higher the employment sustainability rate. The principle of uniformity in the choice of metrics helps to subsequently conduct an integral assessment of the sustainability of any employment form, to perform a comparative analysis.

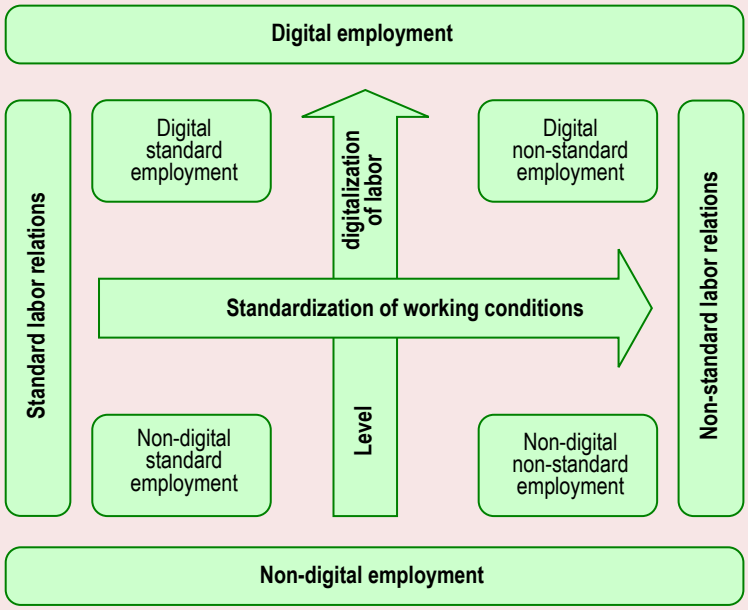
Practical application of the methodology on the materials of regular labor force surveys conducted by Rosstat is possible only in terms of the first four indicators included in the block of objective indicators in terms of gender, age, industry and professional structure of the employed. The full application of the methodology requires special sociological research.

The empirical basis for testing our own methodological approach to assessing the sustainability of different employment forms was the data of the sociological all-Russian survey of the working-age population of the Russian Federation in the territories of all federal districts of the RF, except for the Southern Federal District, which is associated with the Special Military Operation (SMO) and the high level of anxiety among the target audience. The survey was conducted between November and December 2023, and 3,890 people aged 20–59 took part in it. The field research was conducted by the AO "Euro-Asian Center for Social Research". The key controlled characteristics were the following: gender, type of residence area (administrative center of the region, city, rural settlement). In the context of the purpose and objectives of the study, we excluded from the realized sample those

Table 4. Characteristics of final sample respondents, %

Indicator	Meaning
Gender structure of respondents	
male	51.7
female	48.3
Employment structure of respondents	
has only a full-time job	95.3
has both a full-time job and additional part-time job	4.7
Respondent structure by age	
20–24 years	6.1
25–29 years	8.4
30–34 years	16.0
35–39 years	16.9
40–44 years	15.6
45–49 years	12.7
50–54 years	9.8
55–59 years	14.4
Respondent structure by place of residence	
Central FD	29.7
Northwestern FD	10.8
North Caucasus FD	7.9
Volga FD	22.8
Ural FD	9.0
Siberian FD	12.8
Far Eastern FD	7.0
Source: own compilation based on our own sociological study.	

Aggregated groups of digital and non-digital employment



Source: own compilation.

respondents who were not working at the time of the survey and had only temporary jobs. The volume of the final sample amounted to 2,896 people (*Tab. 4*). The survey results were downloaded into Microsoft Excel format for further calculations.

The survey was conducted by the "face-to-face" method using a specially designed questionnaire, which included: 1) measurement questions for objective indicators; 2) measurement questions for subjective indicators; 3) identification questions for digital employment forms; 4) identification questions for working conditions to codify them into standard and non-standard ones.

We carried out the grouping of digital and non-digital forms according to our own classification (Kamarova, Tonkikh, 2023). *Figure* visualizes the classification.

Digital employment involves the intensive use of ICT and digital tools in the performance of work functions during the working day. Representatives of digital employment include IT specialists; specialists who use ICT intensively in the performance of work; and workers who use online platforms and digital services in the performance of work.

Non-digital employment involves employment without the use of information and communication technologies and tools as an integral part of performing core labor functions.

Standard and non-standard segments of labor relations were identified on the basis of the generally accepted practice, when non-standard employment conditions are considered to be those in which at least one of the listed components of working conditions deviates from the following: employment in the employer's staff with a labor contract; full-time work in accordance with the norms of the national labor legislation; stationary workplace is located on the employer's territory or determined by the employer; start/end time of the working shift and work schedule are rigid. For example, non-standard is work for several employers on the basis of civil law contracts, home-based employment, self-employment, remote or hybrid work, platform employment.

Table 5. Respondents' structure by aggregated groups of digital and non-digital employment, %

Employment type	Employment format		Total
	Standard	Non-standard	
Digital employment	57.3	42.7	100.0
Non-digital employment	49.5	50.5	100.0
Source: own compilation based on our own sociological study.			

Table 5 presents the respondent structure by employment forms in terms of standardization of working conditions.

In the digital segment, the standard nature of employment is significantly predominant, while in the non-digital segment, the shares of standard and non-standard employment are almost equal.

Results and discussion

Table 6 presents the results of calculations of employment sustainability assessment by objective criteria in aggregated employment groups according to our own methodology.

We did not determine the prevalence of permanent employment relationships, as all respondents in the final sample have permanent jobs, and there are no segmental differences in the level of availability of additional work in various employment groups.

The first place by the sustainability criterion ***"ratio of labor income to the minimum wage"*** is occupied by the standard segment of non-digital employment – labor income exceeds the subsistence minimum by 4.4 times. There is an acute shortage of workers in the labor market, which, against the background of increasing defense orders for the SMO, leads to an increase in wages for working professions. In the digital segment of employment by the level of labor income only non-standard employment can be recognized as sustainable. The standard digital form is unstable, the ratio is less than 3.0. We assume that non-standard working conditions in the digital segment of employment (e.g., remote format of work) provide flexible opportunities for combining the main and additional work, thereby increasing labor income. The high level of "frequency of voluntary choice of over-employment" in the non-standard group of digital workers speaks in favor of this assumption (25.4%).

In general, a pairwise comparison of objective sustainability indicators of digital and non-digital employment forms in comparable groups by characteristics of social and labor relations showed that digital employment is more sustainable than non-digital employment by most objective social indicators.

Table 6. Results of employment sustainability assessment by objective criteria in aggregated groups of digital and non-digital employment, %

Criterion	Digital employment		Non-digital employment	
	Standard	Non-standard	Standard	Non-standard
Ratio of labor income to the minimum wage level of the working-age population	2.6	**3.0**	**4.4**	2.6
Legitimacy of labor relations	**95.7**	64.1	91.1	**74.6**
Prevalence of normal working week duration	**81.9**	**38.4**	77.4	29.5
Frequency of voluntary choice of underemployment	**95.7**	86.5	60.7	**90.0**
Frequency of voluntary choice of over-employment	13.7	**25.4**	16.1	18.3
Source: own compilation based on the materials of our own sociological research.				

Table 7. Assessment of employment sustainability by subjective criteria in aggregated groups of digital and non-digital employment, %

Criterion	Digital employment		Non-digital employment	
	Standard	Non-standard	Standard	Non-standard
Job satisfaction	**90.5**	**86.6**	64.9	69.9
Satisfaction with financial situation	**55.1**	**60.5**	45.8	49.5
Happiness index	**95.9**	**92.8**	89.3	87.0
Satisfaction with life in general	**88.4**	**84.8**	83.7	80.4

Note. In calculations of job satisfaction and happiness index, we determined the total frequency of "yes" and "more likely yes than no" answers to the corresponding questions: "Can we say that you are satisfied with your job?" and 'In your opinion, are you happy?'.
To calculate the indicators "satisfaction with financial position and "satisfaction with life in general" the group of satisfied respondents includes those who marked 10, 9, 8 or 7 points on a scale from 1 to 10, where 10 is the highest degree of satisfaction.
Source: own compilation based on the materials of our own sociological research.

The results of calculations of employment sustainability assessment by subjective criteria show that digital employment forms are leading in all parameters (*Tab. 7*).

It is worth noting that respondents of digital employment formats significantly more often than those in the non-digital segment chose the unambiguously affirmative answer "yes": 54.9% and 61.9%, respectively. The group of digital non-standard employment has the highest frequency of choosing the maximum points (10 points) to the question "How satisfied are you with your life in general at present?", it is 36.8%, and digital standard employment the lowest – 29.7% (non-digital standard – 31.5%; non-digital non-standard – 30.9%).

Table 8 summarizes the final and partial ranking positions of the employment forms according to the sustainability indicators.

Table 8. Rating of sustainability of employment forms, position number

Indicator	Digital employment		Non-digital employment	
	Standard	Non-standard	Standard	Non-standard
Objective indicator				
Ratio of labor income to the minimum wage level of the working-age population	4	2	1	3
Legitimacy of labor relations	1	4	2	3
Prevalence of normal working week duration	1	3	2	4
Frequency of voluntary choice of underemployment	1	3	4	2
Frequency of voluntary choice of over-employment	4	1	3	2
Average place	2.2	2.6	2.4	2.8
Position in the rating of objective indicators	**1**	**3**	**2**	**4**
Subjective indicators				
Job satisfaction	1	2	4	3
Satisfaction with financial situation	2	1	4	3
Happiness index	1	2	3	4
Satisfaction with life in general	1	2	3	4
Average place	1.3	1.8	3.5	3.5
Position in the rating of subjective indicators	**1**	**2**	**3**	**3**
Final place in the ranking	**1**	**2**	**3**	**4**

Source: own compilation.

Conclusion

The testing of our own methodology proved its viability for conducting a comparative analysis of the sustainability of digital and non-digital employment forms in the context of standard and non-standard types of social and labor relations. The advantages of the proposed approach are in the use of "positive indicators" and taking into account the factor of "voluntariness" of choosing non-standard social and labor relations.

We reveal that such types of employment as digital standard and non-standard took the first positions in the final ranking of sustainability of employment forms.

Pairwise comparative analysis of objective indicators of the effectiveness of digital and non-digital employment by sustainability criteria in the context of standard and non-standard forms of social and labor relations allows noting the following.

1. Digital standard employment is significantly inferior to non-digital standard employment by the economic criterion of the ratio of labor income to the minimum wage (1.7 times). According to other indicators, digital employment demonstrates either significantly better working conditions (legitimacy of labor relations, length of the working week, voluntary choice of underemployment) or comparable social efficiency (probability of voluntary choice of over-employment).

2. Digital non-standard employment is significantly more sustainable than non-digital non-standard employment in terms of the ratio of labor income to the minimum wage, the probability of a normal working week and the possibility of voluntary choice of over-employment. The non-digital format is more sustainable in terms of the legitimacy of labor relations and the possibility of voluntary choice of underemployment.

Comparative analysis of the effectiveness of employment forms by subjective indicators of sustainability revealed the advantage of digital formats by all criteria, the most striking difference is observed in the indicators of job satisfaction and financial position. The social advantages of non-standard labor relations in both digital and non-digital segments are expressed in job satisfaction under flexible working conditions.

The proposed methodology is universal and can be adapted to assess the sustainability of other employment forms, which were out of the focus of our study. We see the addition of indicators of numerical inequality between the parameters of urban and rural employment to the methodology and expert survey of leading specialists in economics and sociology of labor to prioritize the list of criteria of employment sustainability for integral assessments as promising areas for future research. The development of an index integral methodology for assessing the sustainability of employment forms will make it possible to carry out monitoring studies.

References

Aistov A.V., Larin A.V., Leonova L.A. (2012). Informal employment and life satisfaction: Empirical analysis taking into account endogeneity. *Prikladnaya ekonometrika*, 2(26), 17–36 (in Russian).

Aistov A.V., Leonova L.A. (2011). *Udovletvorennost' zhizn'yu i rabotoi, svyaz' s nezaregistrirovannoi zanyatost'yu: preprint WP15/2011/04* [Life and Job Satisfaction, Association with Unregistered Employment: Preprint WP15/2011/04]. Moscow: Izd. Dom Vysshei shkoly ekonomiki.

Azmuk N.A. (2020). Digital employment in the system of regulation of the national economy. *The Problems of Economy*, 1(43), 52–58. DOI: 10.32983/2222-0712-2020-1-52-58

Bobkov V.N. et al. (2019). *Neustoichivaya zanyatost' v Rossiiskoi Federatsii: teoriya i metodologiya vyyavleniya, otsenivanie i vektor sokrashcheniya: monografiya. 2-e izd., ster.* [Unsustainable Employment in the Russian

Federation: Theory and Methodology of Identification, Assessment and Vector of Reduction: Monograph. 2nd Edition, ster.]. Moscow: KNORUS.

Bobkov V.N., Kvachev V.G., Loktyukhina N.V. (2016) Unstable employment: The economic and sociological genesis of the concept. *Bulletin VSU, Ser. Economics and Management*, 4, 81–86.

Bobkov V.N., Odintsova E.V., Ivanova T.V., Chashchina T.V. (2022). Significant indicators of precarious employment and their priority. *Uroven' zhizni naseleniya regionov Rossii=Living Standards of the Population in the Regions of Russia*, 18(4), 502–520. DOI: 10.19181/lsprr.2022.18.4.7 (in Russian).

Bobkov V.N., Odintsova E.V., Podvoiskii G.L. (2023). Sustainable and precarious employment in the Russian Federation. *Mir novoi ekonomiki=The World of New Economy*, 17(3), 109–124. DOI: 10.26794/2220-6469-2023-17-3-109-124 (in Russian).

Chuykova T.S., Sotnikova D.I. (2016). Attitude to work under the conditions of insecure employment. *Organizatsionnaya psikhologiya=Organizational Psychology*, 6(1), 6–19 (in Russian).

Čiarnienė R., Vienažindienė M., Adamonienė R. (2018). Implementation of flexible work arrangements for sustainable development. *European Journal of Sustainable Development*, 7(4), 11–11.

Conigliaro P. (2021). Between social sustainability and subjective well-being: The role of decent work. *Social Indicators Research*, 157(1), 139–174.

Cranford C.J., Vosko L.F., Zukevich N. (2003) Precarious employment in the Canadian labor market: A statistical portrait. *Just Labor*, 3. Available at: http://www.justlabour.yorku.ca/volume3/pdfs/cranfordetal.pdf

Gálvez A., Tirado F., Martínez M.J. (2020). Work–life balance, organizations and social sustainability: Analyzing female telework in Spain. *Sustainability*, 12(9), 3567.

Josten C., Lordan G. (2020). Robots at work: Automatable and non-automatable jobs. In: Zimmermann K. (Ed.). *Handbook of Labor, Human Resources and Population Economics*. Cham: Springer.

Kamarova T.A., Tonkikh N.V. (2023). Digitalization of employment: The conceptual apparatus. *MIR (Modernizatsiya. Innovatsii. Razvitie)=MIR (Modernization, Innovation, Researchr)*, 14(4), 554–571 (in Russian).

Kolesnikova O.A. (2010). Effective employment as the basis for an efficient economy. *Vestnik Voronezhskogo gosudarstvennogo universiteta. Seriya: Ekonomika i upravlenie*, 2, 42–44 (in Russian).

Kreshpaj B., Orellana C., Burström B. et al. (2020). What is precarious employment? A systematic review of definitions and operationalizations from quantitative and qualitative studies. *Scandinavian Journal of Work, Environment & Health,* 46(3), 235–247.

Kuchenkova A.V., Kolosova E.A. (2018). Differentiation of workers by features of precarious employment. *Monitoring obshchestvennogo mneniya: Ekonomicheskie i sotsial'nye peremeny=Monitoring of Public Opinion: Economic and Social Changes*, 3, 288–305. DOI: 10.14515/monitoring.2018.3.15 (in Russian).

Lee D.J., Joseph Sirgy M. (2019). Work-life balance in the digital workplace: The impact of schedule flexibility and telecommuting on work-life balance and overall life satisfaction. In: *Thriving in Digital Workspaces: Emerging Issues for Research and Practice*. Available at: https://doi.org/10.1007/978-3-030-24463-7_18

Leonidova G.V., Chekmareva E.A. (2018). Precarious employment as a barrier to effective implementation of employment potential. *Problemy razvitiya territorii=Problems of Territory's Development*, 1(93), 7–21. DOI: 10.15838/ptd/2018.2.93.1 (in Russian).

Lewchuk W., Lafleche M., WoodGreen D.D. et al. (2013). *It's More than Poverty: Employment Precarity and Household Well-Being, Poverty and Employment Precarity in Southern Ontario*. Available at: https://www.unitedwaygt.org/document.doc?id=91

Littig B. (2008). *Work Life Balance – Catchword or Catalyst for Sustainable Work?* Reihe Soziologie. Institut für Höhere Studien, Abt. Soziologie.

Littig B. (2018). Good work? Sustainable work and sustainable development: A critical gender perspective from the Global North. *Globalizations*, 15(4), 565–579.

Marin E. (2013). Precarious work: An international problem. *International Journal of Labour Research*, 5(1), 153.

McKay S., Clark N., Paraskevopoulou A. (2011). *Precarious Work in Europe: Causes and consequences for the Agriculture, Food and Tourism sectors*. Working Lives Research Institute, London Metropolitan University. Available at: http://www.precarious-work. eu/sites/default/files/effat/files/publications/EFFAT_Study_on_ Precarious_Work_ EN.pdf

Odintsova E.V. (2018). Indicators of precarious employment in the formal economy in Russia, quantitative evaluation. *Uroven' zhizni naseleniya regionov Rossii=Living Standards of the Population in the Regions of Russia*, 14(1), 7–14 (in Russian).

Panov A.M. (2016). Precarious employment: Conceptualization of the term and assessment criteria. *Voprosy territorial'nogo razvitiya=Territorial development Issues*, 3(33). Available at: http://vtr.isert-ran.ru/article/1894 (accessed: February 27, 2024; in Russian).

Rodgers G. (1989*)*. Precarious work in Western Europe: The state of the debate. In: *Precarious Jobs in Labour Market Regulation: The Growth of Atypical Employment in Western Europe*.

Shkaratan O.I., Karacharovskiy V.V., Gasiukova E.N. (2015). Precariat: Theory and empirical analysis (polls in Russia 1994–2013 data). *Sotsiologicheskie issledovaniya*, 12, 99–110 (in Russian).

Standing G. (2011). *The Precariat: The New Dangerous Class*. Bloomsbury academic.

Standing G. (2014). Work after Globalization. Building Occupational Citizenship. Cheltenham, UK, and Northampton, MA, USA. Edgar Elgar: Book review. *Nordic Journal of Working Life Studies*, 75–80.

Veredyuk O.V. (2016). Informal employment: Structure and risk determinants in Russia. *Vestnik SPbGU. Ser. 5*, 4, 33–48. Available at: https://dx.doi.org/10.21638/11701/ spbu05.2016.402 (accessed: April 7, 2004; in Russian).

Vorobyova I.V. (2021). Precarization of youth in the field of social and labor relations. *Znanie. Ponimanie. Umenie*, 3, 100–112 (in Russian).

Zudina A.A. (2013). Informal employment and subjective social status: The case of Russia. *Ekonomicheskaya sotsiologiya*, 14(3), 27–63 (in Russian).

Information about the Authors

Natalia V. Tonkikh – Candidate of Sciences (Economics), Associate Professor, head of laboratory, Ural State University of Economics (62/45, Vosmogo Marta/Narodnoi Voli Street, Yekaterinburg, 620144, Russian Federation; e-mail: tonkihnv@usue.ru)

Tatyana A. Kamarova – Candidate of Sciences (Economics), associate professor of department, Ural State University of Economics (62/45, Vosmogo Marta/Narodnoi Voli Street, Yekaterinburg, 620144, Russian Federation; e-mail: kta@usue.ru)

Tatiana L. Markova – Candidate of Sciences (Sociology), associate professor of department, Ural State University of Economics (62/45, Vosmogo Marta/Narodnoi Voli Street, Yekaterinburg, 620144, Russian Federation; e-mail: tmark@mail.ru)

Received July 23, 2024.