

Analysing the staff supply of a dairy enterprise in the Samara region

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Abstract. The key objective of any enterprise's staff policy is to form a system of providing managers, specialists and workers of mass professions who can solve tasks of future development at a high professional level. The volume and timeliness of all work, the efficient use of fixed assets and, as a result, the volume of production, its cost, profit and several other economic indicators depend on the availability of labour resources and the efficiency of their use. The most important social and labour indicators in enterprises are ensuring full employment of labour resources and high labour productivity, creating good working conditions for staff and increasing wages, achieving proper economic growth and quality of life for workers. Labour has a major role to play in realizing these economic objectives. The article analyses the indicators characterizing the level of labour supply of the enterprise, their qualitative composition and the level of labour productivity.

1 Introduction

One of the main conditions for the successful production and social development of an enterprise is the selection and recruitment of staff [6]. Staff supply is an activity that aims at staffing a team of workers who are professionally trained and able to perform their duties effectively within the law and within their job description, at the level of up-to-date requirements. Staff policy is not only about providing effective staff and encouraging them to work constructively, but also about creating attractive working conditions, safety and opportunities for advancement [2]. During the recruitment process, the employer does not know the actual quality of the workers, but has access to several characteristics (education, age, gender, work experience), considered as signalling information about the capabilities and abilities of the worker [1]. Staff efficiency includes not only the attributes and characteristics of individual workers, but also the quality of interaction of these workers and their groups among themselves. It also involves the psychological climate, in which the release of everyone's energy has a synergetic effect. Thus, the staff of an enterprise and their changes have certain quantitative, qualitative and structural characteristics to be measured with lesser or greater certainty and reflected in the following absolute and relative indicators:

– the average number of workers of the enterprise and (or) its internal divisions for a certain period;

- the share of workers of individual divisions (groups, categories) in the total number of workers of the organization;
- the rate of growth (increase) in the number of workers of the organization for a certain period;
- the share of workers with higher or secondary vocational education in the total number of workers and (or) workers of the organization;
- the average work experience in the specialty of managers and specialists of the organization;
- the list and attendance number of workers of the organization and (or) its internal divisions, certain categories of groups on a certain date;
- the staff turnover.

2 Results and discussion

When analysing the structure of labour resources by category and profession, it is important to assess whether the enterprise has sufficient labour resources of a particular quality. The supply of appropriate labour resources depends on comparing the actual number of workers by category and profession with the planned need. Particular attention focuses on analysing the availability of human resources for the most important professions [3].

Table 1 gives an indication of the labour force availability of the enterprise.

Table 1. Labour supply of the enterprise in 2021, people.

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Category of workers	Planned	Actual	Supply, %
Average number of production staff	210	197	93.8
including workers	175	167	95.4
including butter shop workers	23	21	91.3
raw shop workers	40	42	105.0
whole-milk workers	50	48	96.0
support workers	62	56	90.3
Employees	35	30	85.7

The average number of workers decreased by 13 people, or 6.2%. This decrease was mainly due to auxiliary workers. There was also a 14.3% drop in the number of employees due to the dismissal of an accountant, an economist and posts are still vacant.

An important factor in the qualitative composition of the workforce is the optimum ratio of men to women in different positions and occupational groups. General trends in the participation of men and women in different positions are as follows: men are better able to cope with physically demanding work, line managers (directors of enterprises, heads of workshops, sites, shifts), while women have proven themselves in functional management positions (heads of departments, offices, sectors, groups) and specialists. Women also find it easier to cope with monotonous work and areas requiring tidiness. An analysis of the qualitative composition of staff with their education and qualifications involves determining the number of workers with different levels of education, the qualitative level of placement of workers in their positions, the extent to which specialists with higher education are used rationally, etc. Analysis of the qualitative composition of the workforce involves studying workers by gender, age, education, qualifications, length of service and other socio-demographic characteristics (Table 2).

Table 2. The qualitative composition of the enterprise's workforce.

Group of workers	Number of workers, people		Specific gravity, %	
	in average for 2017–2020	for 2021	in average for 2017–2020	2021
Age composition, years: up to 20	8	5	3.9	2.5
from 20 to 30	98	87	48.3	44.2
from 30 to 40	44	60	21.7	30.5
from 40 to 60	47	41	23.2	20.8
above 60	6	4	2.9	2.0
Total	203	197	100	100

By education level:				
Secondary, secondary vocational	165	157	81.3	79.7
Higher	38	40	18.7	20.3
Total	203	197	100	100
By service length, years:				
Up to 5	8	10	3.9	5.1
from 5 to 10	90	76	44.3	38.6
from 10 to 15	40	45	19.7	22.8
from 15 to 20	47	51	23.2	25.9
over 20	18	15	8.9	7.6
Total:	203	197	100	100

Examining the groups of workers by age, we can see that the largest share of workers is in the 20-30 age group, which decreased by 3.9 p.p. in 2021. The share of working pensioners decreased from 2.9% to 2% in 2021 in the total share of workers. This is a positive development, as most of the workforce comprises people in the prime of their lives and energy. Young people entering the working age are the primary source of labour replenishment in the economy by replacing the jobs of older generations that are leaving.

Most workers have secondary and secondary vocational education – 81.3% of the total share of workers. A positive development is an increase in the share of workers with higher education by 1.6 points in 2021 compared to the average data for the last 4 years. This category of workers consists mainly of managers and specialists of the enterprise.

In terms of length of service, workers with between 5 and 10 years of service have the largest share. Although in 2021 the share of workers between 15 and 20 years of service decreased and the share of workers between 15 and 20 years of service increased. 7.6% of all employees have been with the company for over 20 years.

The number of workers and their professional and qualification structure can be determined through the production programme, the production rates, the planned increase in labour productivity and the structure of the work. The qualitative composition of the labour force in terms of qualifications needs to be analysed (Table 3).

Table 3. Qualification composition of the enterprise workers in 2017–2021.

Worker qualifications	Pay rate multiplier	Number of workers, people	
		in average for 2017–2020	for 2021
First rate	3.96	5	5
Second rate	4.11	12	13

Third rate	4.41	59	61
Fourth rate	4.69	87	80
Fifth rate	7.96	10	10
Sixth rate	10.06	30	28
Total	–	203	197
Average pay rate of workers	–	3.86	3.82
Average pay rate multiplier	–	5.51	5.48

The movement of workers has reduced their qualifications: the average pay grade and tariff coefficient have fallen by the end of 2021.

Since changes in the qualitative composition come as a result of the movement of the labour force, this issue receives a great deal of attention in the analysis (Table 4).

Table 4. Data on the movement of the workforce in the enterprise.

Indicators	In average for 2017-2020	for 2021
Average annual number at the beginning of the year, people	204	195
Employed, people	51	24
Outflow, people.	54	20
resigned by their own volition	26	10
dismissed for breach of work discipline	8	4
Number of staff at the end of the year, people	201	199
Average number of workers, people.	203	197
worker turnover rate	0.25	0.12

Worker attrition rate	0.12	0.10
staff turnover rate	0.17	0.07
staff consistency factor	0.77	0.81

The intake turnover rate in 2021 decreased by 0.13 points compared to previous years. The situation is similar for the number of departures. Mostly, people resign of their own volition. Only a small percentage, namely 2% of workers, was dismissed in 2021 for breaches of labour discipline. staff turnover is very low, over the period and has continued to decline. The staff permanence rate is increasing, which is also a positive development in this situation.

The rate of utilization of working time is the indicator of team efficiency because the amount of production is proportional to the amount of working time and inversely proportional to its labour intensity at a given level of labour productivity.

We analysed the use of working time based on timesheets, photographs of working time, sick leave, overtime, idle time and pay slips. Preliminarily, we analysed the use of labour resources by worker category in the enterprise (Table 5).

Table 5. Use of labour resources by worker category.

Category of workers	Average annual number, people.	Days worked per year by one worker	Hours worked per year by one worker	Average working hours, h	Total working time, hours
Workers in the butter shop					
on average for 2017-2020	23	214	1605	7.5	36915
for 2021	21	207	1656	8.0	34776
Cheese shop workers					
on average for 2017-2020	43	210	1638	7.8	70434
for 2021	42	207	1615	7.8	67830
Workers in the whole-milk shop					
on average for 2017-2020	51	204	1530	7.5	78030
for 2021	48	207	1656	8.0	79488
Support workers					
on average for 2017-2020	56	219	1577	7.2	88301
for 2021	56	207	1635	7.9	91577
Employees					
on average for 2017-2020	32	216	1620	7.5	51840
for 2021	30	207	1656	8.0	49680

The analysis shows that there are no fundamental changes in the use of working time at the enterprise. The decrease in numbers in 2021 has led to a reduction in the total working time of the workers in the butter and cheese shop and the workers. A reduction in the number of workers in the whole-milk shop was compensated for by an increase in working hours.

To identify the causes of daytime and shift losses, we compare the actual and planned balances of working time. Table 6 presents the analysis.

The enterprise lost the most unproductive time due to subjective factors: additional leave with the permission of the administration, absenteeism, and downtime, counting as unused resources to increase the working time fund. The company also has significant non-productive labour costs, which resulted from time spent on producing substandard products and correcting defects, as well as due to deviations from the technological process. They amount to 591 h.

Table 6. Analysis of the working time use in 2021, days.

Indicator	Per worker		For all staff	
	Planned	Actual	Planned	Actual
Calendar number of days	365	365	76650	71905
including holidays and weekends	120	120	25200	23640
Nominal working hours	245	245	51450	48265
Absences at work	36	46	7560	9062
including annual leave	24	24	5040	4728
study leave	2	3	420	591
additional leave of absence with the approval of the administration	4	5	840	985
diseases	6	11	1260	2167
absenteeism	–	2	–	394
down time	–	1	–	197
Working time available	209	199	43890	39203
Working shift duration, h	8.0	7.8	–	–
Working time budget, h	1672	1552.2	351120	305783.4
Pre-holiday shorter days, h	14	14	2940	2758
Intra-shift downtime, h	-	58.6	–	11544.2
Useful working time available	1658	1980.6	348180	390178.2
Overtime worked, h	–	8	–	1576
Non-productive working time, h	–	3	–	591

The basis of society's development is the production of material goods, and the labour of the people who create these goods, along with nature, is the source of its

social wealth. The more productive the labour, the richer the society, and vice versa.

Increasing productivity is a universal economic law.

To determine the average annual output per worker and to calculate the impact of the factors, see Table 7.

Table 7 shows a decrease in output per worker in 2021, compared to previous years, in the amount of 15 thousand rubles, while there is an increase in the output of 16 thousand rubles relative to the worker's intensity of work. There is also an increase in the average daily and average hourly output, both compared to the previous period and to the plan.

Determine the effects of factors such as the share of workers, the number of days worked by one worker per year, the length of the working day and the average hourly output of workers (using absolute differences) on the annual average output of one worker.

Table 7. Input data for factor analysis of labour productivity.

Indicator	In average for 2017-2020	for 2021		Deviation	
		planned	actual	from planned	from average
Average annual number of workers, people	203	210	197	-13	-6
including workers	171	175	167	-8	-6
Share of workers in the total number of workers	0.84	0.83	0.85	+0.02	+0.01
Days worked per year by one worker	211	209	199	-10	-12
Average working hours, h	7.9	8.0	7.8	-0.2	-0.1
Product output, thousand rubles	54738	56230	56200	-30	1462
Average annual output per worker, thousand rubles	270	268	285	+17	-15
Worker's output: annual average, thousand rubles.	320	321	336	+15	+16
average daily, rubles.	1516	1537	1691	+154	+175
average hourly, rubles	192	192	217	+25	+25

In 2021, the average annual output per worker increased by 17,000 rubles compared to the target:

- the share of workers in the total number of company staff increased by 6.4 thousand rubles;
- the number of days worked by one worker during the year decreased by 13.0 thousand rubles;
- the working hours decreased by 6.5 thousand rubles;
- the average hourly output of workers increased by 30.1 thousand rubles.

The application of computer technology in determining the grade of milk reduced labour output by

37,000 hours, or 8.4%. As a result, the average hourly output rose by 9.2%, or 142 rubles.

Unproductive labour costs due to defective work amounted to 591 hours. This reduced the average hourly output by 0.14%, or 0.22 rubles.

Modernization of existing equipment has reduced labour costs by 6,780 man-hours, or 1.55%, resulting in an increase in the average hourly output of 1.6%.

Changes in product structure have a significant impact on the average production level. As the proportion of more labour-intensive products increases, the labour cost of producing them increases. Table 8 shows the calculation.

Table 8. Calculation of the impact of the production structure on the change in working time in 2021.

Type of product	Labour costs per 1.000 rubles of marketable production, hours	Commodity production, thousand rubles		Product structure		
		planned	actual	planned	actual	change
Butter	9.8	16000	15453	0.365	0.330	-0.035
Fat cheese	10.0	15800	16007	0.361	0.340	-0.021
Whole-milk products	10.3	10600	14214	0.242	0.300	+0.058
Low-fat	12.5	70	64	0.002	0.001	-0.001
Non-fat cheese	10.1	1300	1547	0.030	0.029	-0.001
Total	10.0	43770	47285	1.0	1.0	-

We calculate the change in average labour intensity as follows:

$$[(-0.035) \times 9.8 + (-0.021) \times 10 + (0.058) \times 10.3 + (-0.001) \times 12.5 + (-0.001) \times 10.1] = 0.0218 \text{ h}$$

Thus, the increase in labour output per 1.000 rubles of production was 1.31 min.

For the entire production 1.031 man-hours.

Due to the increase in the share of more labour-intensive products, such as whole-milk products, the total labour costs increased by 1031 man-hours, but due to changes in the production structure, the production in value terms also increased by 11298 thousand rubles.

The return on staff indicator is of great importance for assessing the efficiency of the use of human resources in a company in a market economy.

Calculating these figures for 2021 and the average for the previous 4 years, we obtain 142.1% and 102.5% respectively. The structural-logical model of factor analysis of staff profitability allows us to establish how much the profit per worker has changed due to the level of profitability of sales, the share of revenue in total production and labour productivity. Table 9 presents the data for the analysis.

Table 9. Data for factor analysis of staff profitability.

Indicators	In average	for 2021	Deviation
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	for 2017- 2020		
Profit from product sales, thousand rubles	208	280	+72
Average number of workers, people.	203	197	-6
Profit per worker, rubles	1025	1421	396

In Table 9, the profit per worker in 2021 is higher than the average for the past 4 years by 396 rubles, including the change:

- a) labour productivity – increased by 81 rubles;
- b) the share of sold products in total production – increased by 11 rubles;
- c) profitability of sales – increased by 304 rubles.

Errors in the calculations are due to rounding.

A combination of favourable economic and social factors is necessary to optimise the use of the workforce. The study of their impact on the efficiency of labour force utilisation makes it possible to identify the reserves of savings of live labour due to individual factors, imbalances in the equipment of processing production with productive forces. It determines specific measures for the implementation of the final objectives in the near and more distant future.

The impact of individual factors on labour efficiency varies. We have found the closest relationships between labour productivity, labour efficiency, labour capital formation, labour supply and employment, labour force composition, remuneration level and labour regime, development of the nonproduction sphere [4, 5].

Depending on the nature of the interaction between the factor and the result, we have identified the following reserves for efficiency gains as a result of our calculations.

When calculating the labour supply of the mill, it was found that the enterprise has a labour supply of 93.8%. If, however, the actual number of workers is equal to the planned number of workers, the gross product will consequently increase.

The reserve for increasing production by employing additional labour can be determined by multiplying the increase by the actual average annual production per worker ($W \uparrow GP = 13 \times 285 = 3705$ thousand rubles.). As a result of the calculations, we obtain that the reserve for increasing production in 2021 is equal to 3,705 thousand rubles.

Reducing loss of working time is one of the reserves for increasing production. To calculate it, we need to multiply the loss of working time through the fault of the enterprise (whole-day and intra-shift downtime, reduction of holiday with the permission of the administration, absenteeism, unproductive work) by the planned average hourly production of production: $\Delta GP = 13711.2 \times 192/1000 = 2633$ thousand rubles.

In turn, the successful development of production in the enterprise will contribute to an increase in jobs [7].

3 Conclusion

The analysis has led to the following conclusions: the total number of workers is decreasing each year, indicating a decline in production. It is mainly the share of auxiliary workers and clerical workers that is decreasing. This indicates a fairly rational workforce allocation, as it is the proportion of key workers that directly affects the amount of production.

The educational structure of the workforce shows that there is a decreasing trend in the proportion of workers with higher and secondary vocational education. But unfortunately, workforce deployment is not entirely rational, i.e. the qualifications of a worker are not always the same as the work they do. The analysis revealed that the percentage of correspondence between the complexity of the work and the qualifications of the workers performing it is low, indicating the misuse of workers in the enterprise.

We can describe the sex and age composition as satisfactory. The average age of workers is 42-43 years, which is a favourable and capable age for workers.

The indicator for length of employment is also the most favourable, at 8 years, and characterises the workforce as stable.

An analysis of the movement of human resources in the company has revealed that there is a problem with staff turnover. This has led to a waste of human resources: increasing recruitment, hiring and adaptation costs.

An analysis of the use of working time revealed that the company's workforce is also under-utilised. In particular, the use of working time in 2021 was 95.2 % on average by one worker. The main reasons for these losses include increased absenteeism due to sickness, with the permission of the administration, and absenteeism.

To improve the efficiency of the company, we can suggest measures to improve the use of human resources:

- providing training and skills development for workers in the main trades. This activity is aimed at a more rational professional-qualification placement of workers.
- introducing additional payments and wage supplements as a method aimed at reducing staff turnover.

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