eleks | people analytics

White Paper

People Analytics Mathematical Model: Enterprise Use Cases

Succession planning Skills gap Performance Risk of leaving

Introduction

Large corporations and organizations are still making talent decisions based on intuition, instead of leveraging data. Such decisions may increase the number of managerial mistakes, that cost a lot to a company in terms of hiring, firing, promoting or developing employees.

At ELEKS, we have created a people analytics tool based on a mathematical model. The solution is aimed at helping a company make sure all the talent decisions are informed and meaningful.

Read this document to explore the model's capabilities and use cases.



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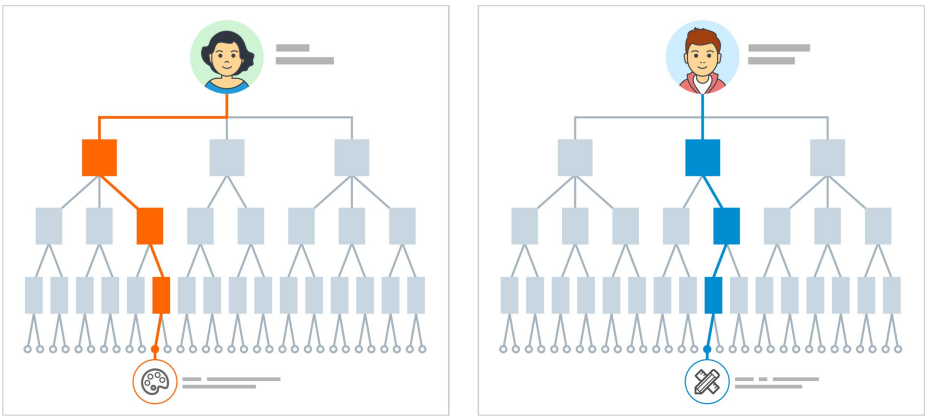
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Challenge

In this document, we are targeting 4 business needs that are often faced by HR managers and company management. These business needs were identified with the help of the leading companies in the field. They are as follows:

1. Measuring and managing performance and productivity;
2. Identifying, understanding and managing the skills gap;
3. Measuring and understanding the risk of quitting;
4. Filling open positions with candidates from the candidate pool.

Working on these cases in a simulation context, we can better prepare for real projects as well as understand data requirements and how to tackle various challenges, thus reducing the cost and execution time.



Simulation context

In order to design and test the people analytics algorithm, we created a simulation context - a comprehensive set of virtual data about the assumed enterprise.

This approach provides an effective framework for identifying and prioritizing the sets of data required to solve the aforementioned business problems, as well as testing different models to improve prediction accuracy.

What is more important - this approach allows us to test new hypotheses and, in case they are proven correct, - implement new approaches and models to real-world business cases.

FMCG
10 years in business (2005)

≥7K EE
2.5K considered for simulation
Turnover **≥15%**

HQ in Spain
Other locations in **Greece** and **Italy**
8 production facilities

Automated EE
and organisation **management**

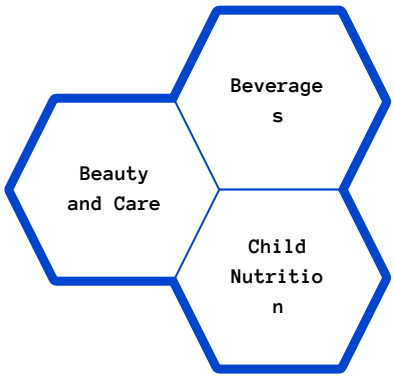
HR policies in place
Compensation, employee development, workforce planning, competency mapping

€1.5 bln revenues
5.5% Growth Rate

€150 mln
Salary fund

117 positions
42 unique

Matrix
structure



EE Profile

55% males
45% females

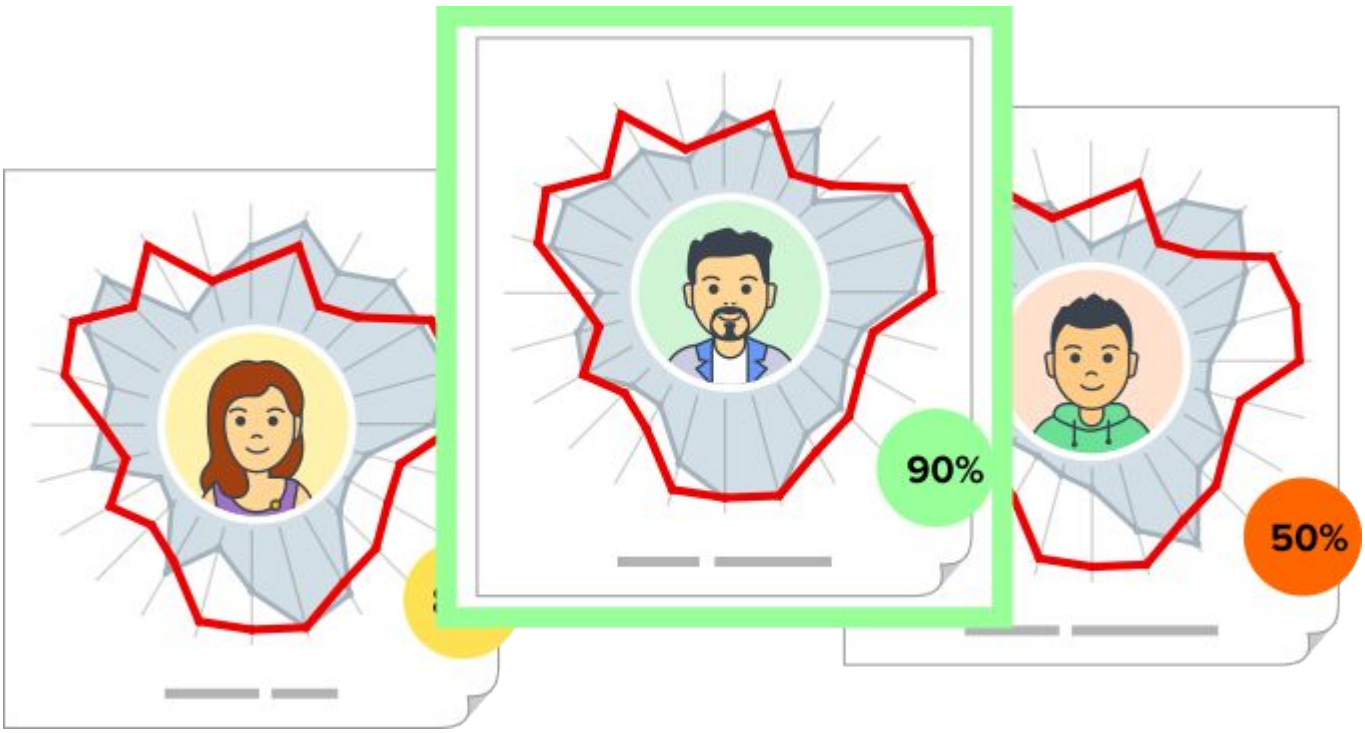
30% aged **18-36**

3.4 years
average employment cycle

30%
of employees work from **day 1**

We have generated a large set of data for this company:

1. Organizational structure (a list of positions, organizational hierarchy, career map, job profiles);
2. Employee profiles (personal details, compensation rate, courses taken, education, experience, positions held, distance to work, age, marital status);
3. Course catalog and competency map;
4. 120 monthly intervals covered – 10 years;
5. Causation (business rules, such as interrelation between employee's level of seniority and his/her salary rate, performance-driven compensation and promotion, logical rules such as age > years of experience);
6. Enterprise business and financial data (revenues, salary fund, diversity details, turnover).



Filling positions

Problem

Filling positions is always a challenge for a company, especially when it concerns managerial positions. Usually, HRs and Line Managers participating in the staffing process have to rely on raw data and their own intuition. For those companies that do not leverage the benefits of employee data analytics, the decision-making process can be associated with higher risks. Hence, there is a need to consider all the possible information to make not only intuitive, but also comprehensive, well-informed decisions.
In the case described below, an HR manager needs to make an internal replacement of the experienced, highly effective Beauty Marketing manager.

Approach

A Line Manager asks an HR Data Analyst to help him fill the internal position with the best-suited candidate. In this case, we use a mathematical model to analyze the job profile of the particular employee who occupied this position earlier. Next, we analyse the profiles of the potential candidates to find the best match, using the centroid method.

To learn more about the data analysis approach we used, please check out this article.

Position overview:

Beauty Marketing manager
Plan and coordinate marketing policies and programs, develop pricing strategies, oversee product development and monitor market trends.

Job requirements summary:

- flexible schedule and business trips
- brand/product development background
- previous b2b experience
- relevant education profile (MA and higher will be preferred).

Result

The result is shown in the table below.

Every row is a set of the employee characteristics, including various data points, such as employee's skills, the amount of the days off during previous years and even the number of kids. The most important characteristics that differentiate the employees at the group - and are worth paying attention to - are highlighted in yellow color.

	 **Jose Carlos Vizcaíno-Manso** Pasaje de Asunción Rodrigo 59 Piso 2 Albacete, 96307, +34 844 67 95 14	 **Aroldo Martinelli** Incrocio Grassi 39 Borgo Gerlando, 37945 Trieste (IM), +39 741 35 90 3903	 **Cristian de Cárdenas** Camino de Jose Miguel Rodrigo 12 Apt. 70 Ceuta, 01551, +34991207413
	62% position match Despite the highest working experience among all the candidates and lower salary expectations, Jose Carlos is not fit for the position because of high amount of days off. Moreover, his ample experience in the revenue-generating office makes him a less desirable candidate for a non revenue-generating position.	**21% position match** Aroldo is the oldest candidate; he has children and almost no relevant skill set. In addition, the need to travel long distances to work makes Aroldo more adverse to the job.	**91% position match** MBA in Marketing, low amount of days off and good skills make Christian a good match for this position. Since he has no children, he can work flexible hours and go on multiple business trips.
Education level education_level	Bachelor	Bachelor	MBA Marketing
Age age	37	47 Age does not match well with flexible schedules and business trips; the candidate might be non-innovative in marketing.	33
Distance to work distance	7 Shorter distance to work.	25	17
Children children	1	3 Having children usually does not allow for flexible schedules and business trips.	0
Years of experience in the company experience_part*experience	8,6 yrs The highest work experience in the company.	6,6 yrs	6 yrs
Average days off per year dayoff2exp	16.24 (276 days) Higher number of days off per a year of experience.	11.53 (173 days)	8.26 (157 days)

	Jose Carlos Vizcaíno-Manso	Aroldo Martinelli	Cristian de Cárdenas
Generated revenue revenue_growth	1.032 We should not fill a non revenue-generating position with a person whose task is to generate and grow revenues on the current position.	0	0
Initial number of skills for the position start_skills	2	0	18
Average salary average_salary	€ 2,808 Lower salary expenditure (economy)	€ 3,604	€ 6,020.96
Number of skills compared to the employees in other similar positions skills_compare	Middle (1.2)	Middle (0.96)	High (1.8)
Average number of skills learned by the candidate in one month skills_learned2work	0.45	0.35	0.7 The total number of skills to total number of months of employment ratio.
Skills acquired for the given position during the time in company skills_time	3	1	13
Rank of skills based to similar positions skills_scale	0.1 lower skills (development) between similar positions	0.8	0.7
Duration of work in a position compared to similar positions work_compare	1.85 The duration of work on the current position is longer than the average duration of work on similar positions	1.26	1.33
Number of days off compared to average number of days off of employees on similar positions dayoff_compare	1.4 Unstable employee with high level of absenteeism	1.00587	0.82

	Jose Carlos Vizcaíno-Manso	Aroldo Martinelli	Cristian de Cárdenas
Ratio of skills learned in the position to initial skills set before start of work in a company sk_learned2start	1.394 Higher skills quantity for work start	0.683	0.707
Influence of sick leaves on revenue rev2dayoff_corr	-0.27 Negative coefficient means that company starts losing revenue when employee is sick - relevant for revenue-generated positions.	0	0



Cristian de Cárdenas

25 years

Attention points

The characteristics that are better, when compared to the group level:

- **‘education_level’** - The level of education;
- **‘start_skills’** - Initial number of skills for the position;
- **‘skills_compare’** - Number of skills compared to the employees on other similar positions;
- **‘skills_learned2work’** - The average number of skills learned by the candidate over one month;
- **‘skills_time’** - Skills acquired for the given position over the time spent with the company;
- **‘work_scale’** - The rank of the employee, comparing to other employees, when the continuity of employment within the company is considered. May imply company loyalty. The evidence of experience and deep knowledge of the company’s working processes;
- **‘work_len’** - 0-120 - The number of the month the employee stayed with the company;
- “**dayoff_scale**” - The rank of the employee among other employees in a company according to the the quantity of the days off. If the rank is close to ‘0’ - the employee can be considered a hardworking person, compared to those with the rank close to ‘1’;
- **‘dayoff2exp’** - The ratio of the days off in relation to the total experience in years;
- **‘dayoff_compare**” - The number of days off compared to the average number of days off of the employees in similar positions;
- **‘experience’** - Total years of experience;
- **‘exp2age’** - The ratio of years of experience in relation to the employee’s age.

Summary

Cristian de Cardenas is the best fit for this internal position, because he has a proper level of education in the required field (MBA in Marketing). Smaller number of days off, as compared to other candidates, can be a proof of his high motivation at work. The number and types of the skills that Cristian had when starting his work in the company, as well as the speed and number of the acquired new skills, mean that the selected candidate meets the position’s requirements. At the same time, Cristian has no children. This fact makes him suitable for work that requires a flexible schedule and frequent business trips.

At the same time, the concern associated with the candidate may be related to his high average salary, resulting in higher costs for his job and having no “lower salary consumption” effect on the business.

Recommendation

1. **Assign Cristian for the position as the best fit.**
2. Maybe analyse the ratio of his salary to his skills at the start to see whether this appointment is beneficial for the company in terms of the salary.
3. Create a development plan for Cristian in order to extend his skills set.



Jose Carlos Vizcaíno-Manso

35 years

Attention points

The characteristics that are below the group level are:

- **‘dayoff_std’** - The deviation of the days off for an employee. The evidence of the employee’s stable work attendance;
- **‘revenue_scale’** - The rank of the employee according to the revenue on different positions;
- **‘revenue_growth’** - The revenue increase over the entire period of time;
- **‘dayoff_scale’** - The rank of the employee within the company according to the number of days off. The closer the number is to 1, the more days off an employee takes;
- **‘rev2dayoff_corr’** - The correlation of revenue and days off - how revenue is influenced by days off;
- **‘dayoff2exp’** - The number of days off in relation to the total years of experience;
- **‘dayoff_quantity’** - The total number of days off within the company;
- **‘experience'** - Total years of experience;
- **‘average_revenue**” - The average discounted monthly revenue;
- **‘exp2age’** - The ratio of years of experience in relation to age.

Summary

Jose Carlos Vizcaino-Manso has the biggest work experience in the company, which means that he has the deepest knowledge of the company’s processes and strategy. At the same time, he is a prospective candidate in terms of salary, as far as a lower salary rate can provide savings for the company’s budget. In addition, the shorter distance to work makes him more satisfied, while working not far from home. With one child, he can still take business trips and a flexible schedule.

At the same time, a large number of days off (276 for approximately 7 years) makes him unsteady in terms of work attendance. Moreover, his ample experience in the revenue-generating office makes him a less desirable candidate, as far as we should not fill a non-revenue-generating position with a person whose key task currently is to generate and grow revenues. The exception is the case when the candidate fits all the other criteria of the position profile.

In addition to applying the model, we considered the Skills Scale - the employee’s rank regarding the number of skills for similar positions. The results show that this employee has a smaller number of skills.

Recommendation

We recommend not to consider this candidate for the given position.



Aroldo Martinelli

42 years

Attention points

The characteristics that are below the group level are:

- **‘age’** - the age of a candidate;
- **‘distance’** - distance to work;
- **‘children’** - number of children;
- **‘skills_time’** - number of the skills acquired over a period of time.

Summary

Aroldo Martinelli has 3 children and is the oldest candidate. He did not have a lot of business trips and may be non-innovative in marketing. At the same time, he has almost no relevant marketing skills that are required for this position. The long distance to work makes Aroldo more adverse to the job.

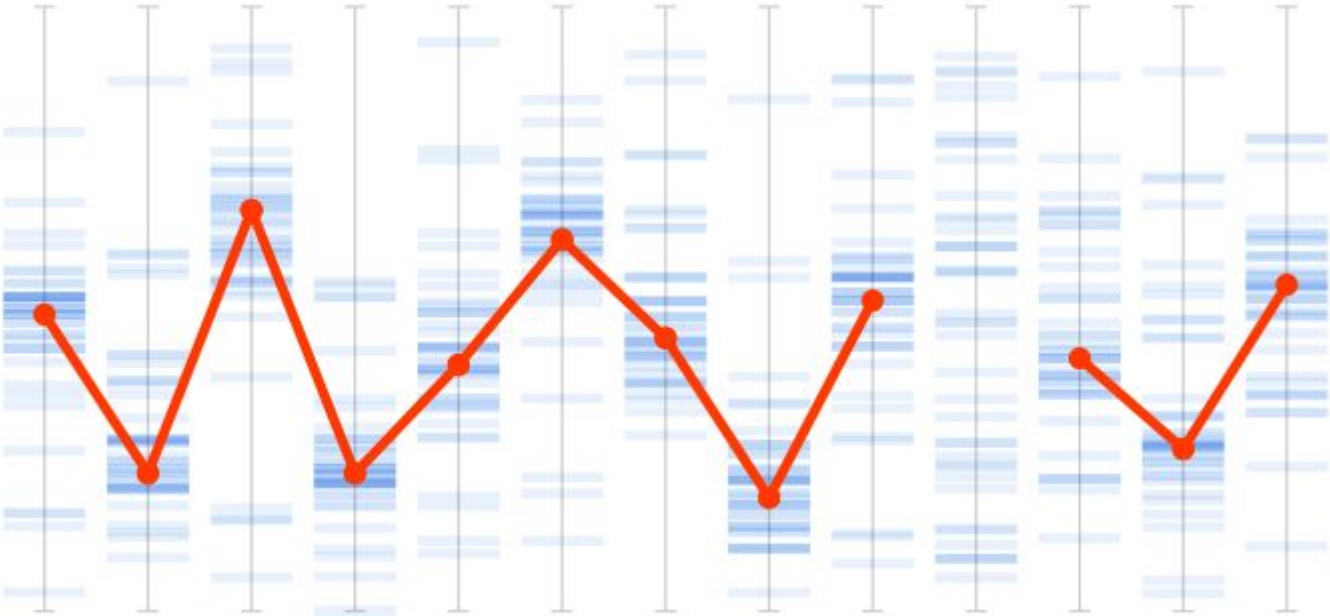
Recommendation

Consider other candidates for this position.

Conclusion

Overall conclusions, based on the group analysis.

Cristian de Cardenas is the best fit for this position regarding his education profile, skills acquisition pace and their relevance as well as the number of days off. The other candidates - **Jose** and **Aroldo** - do not match the position requirements because of the number of days off, their age and family considerations.



Skills Gap

Problem

A line manager has to conduct a semi-annual performance review for three employees of his department. All of them hold the same position - Supply and Demand Planner - have the same seniority level, similar duties and responsibilities.

The goal of the line manager is to define how these employees compare with the most successful employees of the company, and what characteristics they should improve to perform better.

Approach

The line manager asks an HR Data Analyst to help pre-review each employee's results and recommendations.

The HR Data Analyst uses ELEKS' proprietary people analytics solution to identify the skills gaps of the employees and develop a guideline to fill these gaps.

To learn more about the data analysis approach we used, please check out this article.

Result

The result would look like in the table below.

Every row represents an employee's feature. The features consist of various data points, including the employee's skill up to the days off during previous years and the number of children. The important features that differ significantly from the average group's level are worth paying attention to.

	 **Cosetta Martino** Rotonda Teseo 472 Quarto Maruska, 95160 Imperia (SS), +39 90 233 98 614	 **Ramon Pulido Baquero** Avenida de Anna Fuster 19 Piso 6 Ciudad, 83074, +34 79 148 65 84	 **Maik Budig B.** Jähnstr. 766787 Wolfenbüttel, +30 82 952 10 85
dayoff_std	1.63	4.59	4.63
education_level	Supply chain	Bachelor of IT	Bachelor's degree in Food Science and Technology A gap in education
revenue_scale	0	0	0
salary_growth2work	-8.28	1.02 According to internal employee processes or external labour market dynamics, we decrease salary (since we have higher possibility to find cheaper labour)	-8.55
revenue_growth	0	0	0
revenue_std	0	0	0
salary_std	198.16	85.28	140.79
revenue2exp	0	0	0
start_salary2start_skills	161.71	176.85 Higher salary per skill	110.52
dayoff2work	2.33	2.44	3.08
work_scale	0.014 Significant experience in our company	1	0.106 Significant experience in our company
work_len	9 Significant experience in our company	100	13 Significant experience in our company

	Cosetta Martino	Ramon Pulido Baquero	Maik Budig B.
start_skills	['warehouse management', 'supply chain', 'project planning', 'fmcg', 'purchasing', 'quality management', 'outlook', 'performance management', 'distributed team management', 'gmp', 'inventory management', 'trade marketing', 'forecasting', 'sales', 'performance management', 'microsoft excel', 'demand', 'market research', 'teamwork', 'process improvement', 'marketing', '3pl']	['sales operations', 'team leadership', 'performance management', 'purchasing', 'training', 'logistics management', 'budgets', 'analysis', 'production planning', 's&op implementation', 'demand forecasting', '3pl', 'marketing strategy', 'strategy', 'production planning', 'gmp', 'customer service', 'marketing', 'demand forecasting training', 'certified professional in supply management (cpsm) training', 'operations management in lean supply chain course training', 'logistics management training']	['supply network planning', 'reverse logistics', 'manufacturing', 'forecasting', 'gmp', 'sourcing', 'fmcg', 'leadership', 'demand', 'consumer products', 'inventory management', 'teamwork', 'microsoft excel', 'inventory management', 'business strategy', 'sap r/3', 'global sourcing', 'master scheduling', 'supply chain', 'erp', 'supply chain', 'distributed team management', 'demand planning', 'food processing', 'outlook', 'quality management', 'sales operations', 'project planning', 'food safety', 'food technology', 'process improvement', 'sales', 'supply', 'performance management', 'team building']
average_salary	4273.55	4108.18	4185.05
dayoff_scale	0.569	0.62	1 The number of days off is higher than other employees on similar positions have
experience_scale	0.63	0.63	0.287 Insufficient experience
skills_compare	0.59 Increased intensity of skills development	0.92	0.67
salary_scale	0.573	0.505	0.568
skills_learned2work	0.22	0.34	0.31
rev2dayoff_corr	0	0	0

	Cosetta Martino	Ramon Pulido Baquero	Maik Budig B.
skills_time	['food manufacturing', 'production planning', 'certified professional in supply management (cpsm) training']	['business planning', 'supply chain systems training', 'product management', 'negotiation', 'global sourcing', 'london chamber of commerce & industry (lcci) (3rd level) london chamber of commerce & industry (lcci) (2nd level) training', 'distributed team management', 'continuous improvement', 'warehousing', 'food processing', 'mrp', 'commercial director english courses german courses of economy training', 'forecasting ocp level 2', 'erp', 'management', 'supply chain management production planning training', 'quality management', 'business analysis', 'principles of expediting training', 'supply chain operations', 'demand planning ocp level 2', 'supply network planning', 'sap ocp level 2', '1 year biochemistry study training', 'teamwork', 'lean manufacturing', 'key performance indicators', 'supply chain ocp level 2', 'delivery performance management training', 'process improvement', 'import', 'change management training', 'tpm', 'fmcg ocp level 2']	['key performance indicators', 'demand supply planning', 'operations management in lean supply chain course training', 'international business course training']
skills_gap	['sap', 'lean manufacturing']		['warehouse management', 'certified professional in supply management (cpsm) training']
experience_part	0.037	0.415	0.083
sk_learned2start	0.077	1.478	0.105
rev2salary_corr	0	0	0
skills_quantity	25 Fewer skills	56	39
dayoff2exp	1.05	12.2 Decreased absenteeism	3.08
education_profile	BS in Industrial Engineering	Corporate IT systems/information security specialist Education gap	BS
dayoff_quantity	21	244 Decreased absenteeism	40

	Cosetta Martino	Ramon Pulido Baquero	Maik Budig B.
dayoff_compare	0.81	1.72 Decreased absenteeism	1.07
salary_growth	0.999	1	0.999
skills2exp	1.25 Increased intensity of skills development	2.8	3
gender	0	1	1
age	49	38	34
revenue_compare	0	0	0
salary_compare	1.04	1	1.02
experience	20	20	3 Insufficient experience
work_compare	0.2	2.24	0.28
average_revenue	0	0	0
revenue_growth2work	0	0	0
skills_scale	0.2 Fewer skills (slower development) than average on similar positions	0.4	0.6
salary2exp	213.57	205.31	321.68 Higher salary per every year of experience (salary review)
exp2age	0.645	1	0.812
experience_compare	1.3	1.3	0.72 Lack of experience as compared to an average employee on a similar position
distance	6	8	1
expat	0	0	1 Local specialists preferred
children	0	2	2
marital_status	1	1	1



Cosetta Martino

49 years

Attention points

Characteristics that fall below the group level are:

- **‘work_scale’** - the rank of an employee among other workers by the length of work, Loyalty to the company, experience, deep knowledge of work processes;
- **‘work_len’** - 0-120 - number of months the employee has been working for the company;
- **‘skills_compare’** - the ratio of number of skills to average number of skills the employees have on the same position;
- **‘skills_quantity’** - total number of skills;
- **‘skills_gap’** - ['sap', 'lean manufacturing'];
- **‘skills2exp’** - the ratio of number of skills to total years of experience;
- **‘skills_scale’** - the rank of the employee among employees on similar positions based on the number of skills (1 - top, 0 - bottom).

Summary

Cosetta’s primary shortcoming is the low number of skills. This means that she would probably be good only at very specific jobs and would not perform well if she switches to new roles. She has fewer skills than other employees in this position. Her overall set of skills is smaller; she is mastering new skills more slowly than others. At the same time, her average salary is a bit higher as compared to other employees.
Also, Cosetta has been working for the company for only 9 months; thus, the reason for her low number of skills may be her youth and insufficient experience.
Next, we check Cosetta’s age and see that she is the oldest among the candidates - she is 49.
Now, we can see the full picture: 49 year-old employee with few skills and a low ability to learn, receiving the same compensation as the other employees in the group.

Recommendation

Obviously, there are some actions the line managers might follow after this analysis:

1. Try to improve the learning and development capabilities of Cossetta by using different learning techniques.
2. Cosetta may be extremely good at those few skills that she knows, since she has been doing that job for many years. This means that the manager can plan her work involving mostly these skills. Also, the manager can consider some mentoring programs for her to transfer her profound knowledge to younger employees. Even so, the results of the model and the approach we follow show a lower number of skills as compared to centroid, which is a bad sign.
3. Cosetta should develop new skills: 'sap', 'lean manufacturing', that are essential for this position.
4. In this case, the employee with the smallest set of skills has the highest salary. This may be a sign that the manager should review compensation levels.

What else would you recommend doing?



Ramon Pulido Baquero

36 years

Attention points

The features that fall below the group level are:

- **‘salary_growth2work’** - average salary growth a month in the current position;
- **‘dayoff2exp’** - the ratio of number of days off to total years of experience;
- **‘dayoff_quantity’** - the ratio of total number of days off for the entire period of work;
- **‘dayoff_compare’** - the ratio of number of days off to the average number of days off of employees in similar positions;
- **‘education_profile’** - the employee’s education profile, by category.

Summary

In general, Ramon is the most experienced employee in the group; he is a fast learner and has some well-developed and important skills. He has been working for the company for over 8 years. However, his compensation level is similar to other team members.

There are 2 main risky features that we should pay attention to.

1. Take a look at this row:

salary_growth2work	-8.28	1.02	-8.55

Here we can see that the compensation level for this position was decreased for everyone except Ramon. Such decrease may be the result of an overall decline of the importance of this job, its increased automation, the low season or other factors, depending on the type of work. For some reason, Ramon’s compensation remained at the same level, and a line manager should attend to this fact.

2. Ramon has a significantly higher number of days off as compared to other employees, which totals up to a significantly higher number of days off for his entire period of work for the company. However, we should look more closely at the data and analyse additional facts related to the employee’s days off, specifically:

dayoff_scale	0.569	0.62	1

‘dayoff_scale’ - the employee’s rank within the company according to the number of days off (1 - lazy, 0 - horse)

The employee’s rank shows us that the overall correlation of number of days off to the number of workdays is acceptable and no additional actions are required.

Recommendation

We recommend checking the compensation level and the reason it was not changed as it was for other employees on similar positions.



Maik Budig B.

34 years

Attention points

The features that fall below the group level are:

- Education level;
- **‘work_scale’** - the rank of an employee among other workers by the length of work: loyalty to the company, experience, deep knowledge of working processes;
- **‘work_len’** - 0-120 - number of months the employee has been working for the company;
- **‘dayoff_scale’** - the employee’s rank within the company according to the number of days off (1 - lazy, 0 - horse);
- **‘experience_scale’** - the employee’s rank based on experience. 1 - the most experienced employee in the company;
- **‘skills_gap’** - ['warehouse management', 'certified professional in supply management (cpsm) training'];
- **‘salary2exp’** - the ratio of the employee`s average discounted salary to the total employee`s experience in years;
- **‘experience_compare’** - the ratio of the employee’s experience in the position to the average experience of other employees on similar positions;
- expat.

Summary

Maik is an English speaking expatriate. He is 34 years-old and has only 3 years of total work experience with 10 months in his current job.

Our analysis reveals that Maik is less experienced; he has worked less on the position and has fewer skills than other employees. Additionally, Maik took 40 days off during those 10 months he has been working for the company. His average salary equals the salary of other more experienced employees.

It is worth checking another feature:

‘skills_learned2work’ - average number of skills acquired by an employee per one month of work.

Here we can see that the employee under analysis has a strong ability to learn and master new skills.

Recommendation

The potential action steps recommended for the line manager:

1. Plan the learning, development and training for the missing skills, especially those that the rest of the group has: 'warehouse management', 'certified professional in supply management (cpsm) training'.
2. Discuss absenteeism; maybe there’s a chance of decreasing the number of days off.

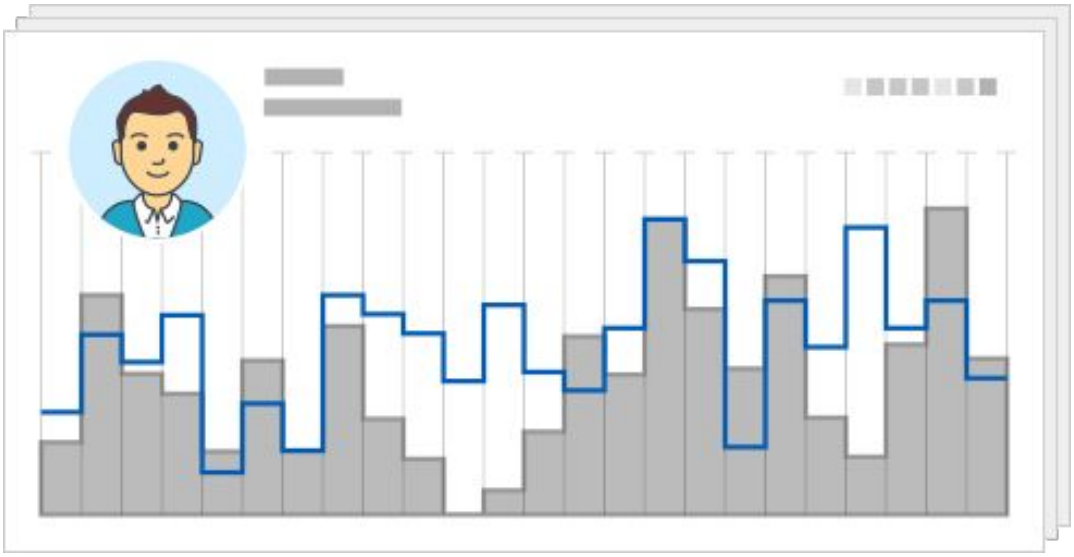
Conclusion

The overall conclusions are based on group analysis.

Every employee in the analyzed group has different levels of experience ranging from 3 to 20 years, different skills set, age and ability to learn. Clearly, all these employees are capable of making a different impact on the company's performance. However, their salaries are relatively the same.

That brings us to the fact that the compensation level for newly-hired employees is based on some "position standard" but not on the value that an employee can bring to the company.

We can recommend to review the compensation policy and link it to performance or some other characteristics.



Performance

Problem

Companies always strive to hire employees with high performance as well as boost the performance of the already existing staff. Measuring employee performance is a crucial activity not only for HR but also for company's management.

The tools capable of analyzing, with the high probability, the employee's performance now and in the future are in high demand now. Especially when it comes to measuring the performance of the people who are directly involved in the revenue-generating process.
We are investigating the problem of evaluating non-revenue-generating employees through the analysis of the available data, either as a part of the company's systematic performance review or on demand for a particular employee.

Approach

At ELEKS, we consider that performance is not just a direct indicator, like the amount of sales or the number of items produced. We believe performance is a combination of employee's marginal utility within an organization as well as his/her potential to develop and bring more value.

When calculating employees marginal utility, we consider various factors including, but not limited to: the revenue generated, the skills quality and number, the number of the days off, the salary and many others.

This approach allows us to measure the effectiveness of the employees whose performance can not be measured by common means.

Using the method described in the performance section of this article, we defined the binary approach and the factors that should be considered for employee performance measurement

To learn more about the data analysis approach we used, please check out this article.

Result

We have received the following result in the table below.

Every row contains employee characteristics that include various data points such as employee's skills set as well as the number of the days off during previous years and the number of kids. The important characteristics that differentiate the employee on the group level are worth paying attention to.

Now, let's analyze each employee individually to see if there are any valuable insights we can gain from this experiment.

	 **Gonzalo Juárez Palmer** Vial de Luz Solano 32 Apt. 06 Ourense, 04798, +30 495 482 91 37	 **Ierótheos Monachós** Σκαλανίου 2,60521 Ηγουμενίτσα, +32 07 580 79 52	 **Alejandro Antón** Paseo de Rodrigo Téllez 7 Apt. 15 Alicante, 22275, +34 08 522 00 62
dayoff_std	4.21	4.54	4.68
education_level	MBA Marketing	BSEET Electrical Engineering	General A post-secondary education level typically leads to better performance
revenue_scale	0	0	0
salary_growth2work	1.62	0.5	-3.81 Greater salary savings per employee
revenue_growth	0	0	0
revenue_std	0	0	0
salary_std	117.93	119.75	93.07
revenue2exp	0	0	0
start_salary2start_skills	118.82	128.54	191.39 Higher starting salary as compared to others
dayoff2work	2.15	2.34	2.33
work_scale	1 Works in the company during the whole analyzed period	1 Works in the company during the whole analyzed period	0.32 The most of staff are more experienced than this employee
work_len	120 Works in the company during the whole analyzed period	120 Works in the company during the whole analyzed period	51
average_salary	4226.96	3515.94 Cost savings per employee	3723.31
dayoff_scale	0.31 Lower absenteeism rate	0.736	0.59

	Gonzalo Juárez Palmer	Ierótheos Monachós	Alejandro Antón
experience_scale	0.669	0.75	0.332 Experience is below average for the position
skills_compare	1.8	0.47 Fewer skills than average for the position	0.63
salary_scale	0.33 The employee is more likely to perform well having a smaller salary than other employees on similar positions	0.504	0.456
skills_learned2work	0.56	0.17 Lower professional development speed	0.2 Lower professional development speed
rev2dayoff_corr	0	0	0
start_skills	['customer insight', 'competitive analysis', 'data analysis', 'e-commerce', 'brand awareness', 'teamwork', 'sap', 'cross-functional team leadership', 'microsoft excel', 'marketing communications', 'consumer behaviour', 'customer service', 'food', 'market research', 'media planning', 'account management', 'social media marketing', 'product management', 'advanced marketing and sales introduction to generating demand value creation seminar training', '7 habits of highly effective people effective business writing skills finance for non finance managers leadership and advancement course project management training']	['engineering', 'project engineering', 'pneumatics', 'data analysis', 'preventive maintenance', 'automation', 'ensure parts room has min/max for critical parts', 'team management', 'manufacturing', '5 why', 'validation', 'product development', 'packaging', 'sap 31i', 'autocad', 'food industry', 'chemical engineering', 'microsoft project', 'microsoft excel', 'microsoft office', 'supply chain', 'customer service', 'food', 'financial planning', 'continuous improvement', 'woodworking', 'fishbone']	

	Gonzalo Juárez Palmer	Ierótheos Monachós	Alejandro Antón
skills_time	['presentation skills training', 'sales & marketing major training', 'social media', 'business strategy', 'strategy', 'retail', 'merchandising', 'english', [...] 'analytics', 'integrated marketing', 'market planning', 'international business managing and leading strategically managing change managing financial resources marketing understanding strategy human resources management training', 'product marketing', 'programme grande ecole chaire produits grande consommation training']	['statistics', 'operational excellence', 'gmp', 'dmaic', 'brc', 'lean manufacturing', 'coaching', 'welding', 'change management', 'team building', 'dairy', 'fmcg', 'process engineering', 'inventory management', 'operations management', 'haccp ocp level 2', 'process improvement', 'event planning', 'chemcad', 'quality management', 'production planning']	['negotiation', 'inventory control', 'logistics: transportation training', 'shipping', 'certified in production and inventory management (cpim), professional designation in logistics and supply chain management (pls) certification, apics logistics, transportation and distribution certification (cltd) training', 'food safety', 'manufacturing', 'food', 'packaging', 'lean manufacturing']
experience_part	0.902 Loyal to the company (most of the experience gained within our company)	0.524	0.526
sk_learned2start	3.19 Gained the development pace upon joining the company	0.778	0.27
rev2salary_corr	0	0	0
skills_quantity	88 More skilled	48	47
dayoff2exp	23.45	14.79 Lower absenteeism rate	14.88 Lower absenteeism rate
education_profile	mba marketing	high school diploma	- A post-secondary education level typically leads to better performance
dayoff_quantity	258	281	119 Lower absenteeism rate

	Gonzalo Juárez Palmer	Ierótheos Monachós	Alejandro Antón
dayoff_compare	0.74	1.13	1.05
salary_growth	1.001	1	0.999
skills2exp	8	2.53 Slower development during total work experience	5.88
gender	1	1	1
age	30	37	31
revenue_compare	0	0	0
salary_compare	0.97	1	0.99
experience	11	19 High total work experience	8
work_compare	1.69	1.94	0.67 Novice in the company
average_revenue	0	0	0
revenue_growth2work	0	0	0
skills_scale	0.87 Higher average set of skills compared to similar positions	0.068	0.1
salary2exp	383.92	184.95 The employee is more likely to perform well having a smaller salary than other employees on similar positions	464.83
exp2age	0.916	0.999	0.615
experience_compare	1.76	1.9	0.76 Less experienced than an average employee on similar position
distance	1	6	10
expat	0	0	0
children	2	1	0
marital_status	1	1	1



Gonzalo Juárez Palmer

30 years

Attention points

The characteristics that are better than the group level:

- **‘start_salary2start_skills’** - the ratio of the employee`s starting salary to the number of skills at start. The higher the indicator - the more ‘expensive’ an employee is for the company;
- **‘start_salary2start_skills’** - the ratio of the employee`s starting salary to the number of skills at the start. The higher the indicator, the more ‘expensive’ an employee is for the company;
- **‘work_scale’** - the rank of an employee among other workers by the length of work. The feature influences the loyalty to the company and can tell of the employee’s experience and deep knowledge of work processes in the organization;
- **‘work_len’** - 0-120 - number of months the employee has been working for the company;
- **“dayoff_scale”** - the employee’s rank within the company according to the number of days off . If the rank is close to ‘0’, the employee is hardworking and has fewer days off than in the case where the rank is at ‘1’;
- **‘skills_compare’** - the ratio of number of skills to the average number of skills the employees have in the same position;
- **‘salary_scale’** - the employee’s ranking by salary, defined among similar positions. The lower the rank, the less “expensive” the employee is for the company;
- **‘experience_part’** - the ratio of work experience within a company in years in relation to total work experience in years. The higher the ratio, the more loyal the employee is to the company;
- **‘sk_learned2start’** - the number of skills acquired by an employee to the quantity of the initial skills at the moment when a person started working in a company;
- **‘skills_quantity’** - the total number of skills the employee has at the moment;
- **‘dayoff_compare’** - the ratio of the number of days off to the average number of days off of employees in similar positions. The indicator of the absenteeism level;
- **‘skills_scale’** - the rank of the employee among employees in similar positions based on the number of skills (1 - top, 0 - bottom).

Summary

Gonzalo is the best performer in the group.
He has been staying with the company from its start. His ratio of days off is low, as evidenced by Gonzalo`s loyalty to the company. He also has a low rate of absenteeism. The number of skills he possesses is almost twice as much, compared to other employees in similar positions. Gonzalo’s salary is lower than the average among similar assignments. At the same time, the pace of skills acquisition for him is the highest within the selected group of employees in the company. The same hold true for the number of skills: Gonzalo has 88 skills up to date, compared to 48 and 47 for other employees. The small number of days off and other high level indicators show Gonzalo as a top performer whose results do not depend on the salary.

Recommendation

We can suggest considering this employee as a top-performer. The company needs to help maintain the same level of performance. We also recommend taking the following steps:

1. Promote the employee to positions where loyal and experienced people are crucial.
2. Further develop the employee’s competencies, to extend the amount of the skills and allow the employee to perform new kinds of tasks.



Ierótheos Monachós

25 years

Attention points

Characteristics that are below the below group level are:

- **‘skills_compare’** - the ratio of number of skills to the average number of skills the employees have in the same position;
- **‘skills_learned2work’** - average number of skills acquired by an employee per one month of work;
- **‘dayoff_compare’** - the ratio of number of days off to the average number of days off of employees in similar positions;
- **‘skills2exp’** - the ratio of number of skills to total years of experience.

Summary

Ierótheos is also an experienced employee in the group (as Gonzalo is); he is also the most experienced in the company. He has a lower compensation level within the group. However, there are some weak points, showing that his performance could have been better:

1. By looking at these rows:

skills_compare	1.8	0.47	0.63
skills_learned2work	0.56	0.17	0.2

We can see that Ierótheos has the lowest indicator of skills compared to employees in similar positions. It could mean that he is not interested in personal development. At the same time, the ‘skills_learned2work’ indicator shows that Ierótheos and Alejandro are not interested in acquiring new skills. To dive deeper into the data, we need to analyze the time series and trends to see whether these are permanent characteristics of the aforementioned employees or a temporary attitude.

2. Ierótheos and Alejandro have a significantly higher number of days off compared to other employees in the group. This can be evidence of the increasing absenteeism level. The mentioned data indicators are shown below:

dayoff_compare	0.74	1.13	1.05

Recommendation

Our recommendation would be to conduct a one-on-one meeting with Ierótheos and assess his level of motivation. Next, a personal development plan is needed to boost the number and quality of the employee’s skills.



Alejandro Antón

28 years

Attention points

The characteristics that are below the group level are:

- Education level;
- **‘start_salary2start_skills’** - the ratio of the employee`s initial salary when joining a company to the number of the skills at that point. The higher the indicator the more “expensive” the employee is for the company;
- **‘work_scale’** - the rank of an employee among other workers by the length of service. The feature influences the loyalty to the company and can tell of the employee’s experience and deep knowledge of work processes in the company;
- **‘experience_scale’** - the employee’s rank based on experience. A rank of ‘1’ means the most experienced employee in the company;
- **‘skills_learned2work’** - average number of skills acquired by an employee per one month of work;
- **‘education_profile’** - the employee’s education profile, by category;
- **‘dayoff_compare’** - the ratio of number of days off to the average number of days off of employees in similar positions;
- **‘work_compare’** - the ratio of the length of service in months to the average length of service in similar positions;
- **‘experience_compare’** - the ratio of the employee’s experience in the position to the average experience of other employees in similar positions.

Summary

Even though the company has higher salary savings with this employee - as well as a low number of days off - other factors show the employee is underperforming.

The ‘work_scale’ indicator is low; this means the employee has the least amount of experience in the group. The same is with the the ‘experience_scale’ indicator. Additionally, Alejandro has a low level of skills development per month, compared to other employees in the group. Together with the high level of ‘dayoff_compare’ indicator, the results show possible absenteeism in the workplace and low motivation.

In addition to everything mentioned above, the company pays higher cost per skill for this employee as he had a higher salary at the time when he was hired. He is new to the company and his level of education is rather low.

All the abovementioned information can be evidence of an underperforming employee.

Recommendation

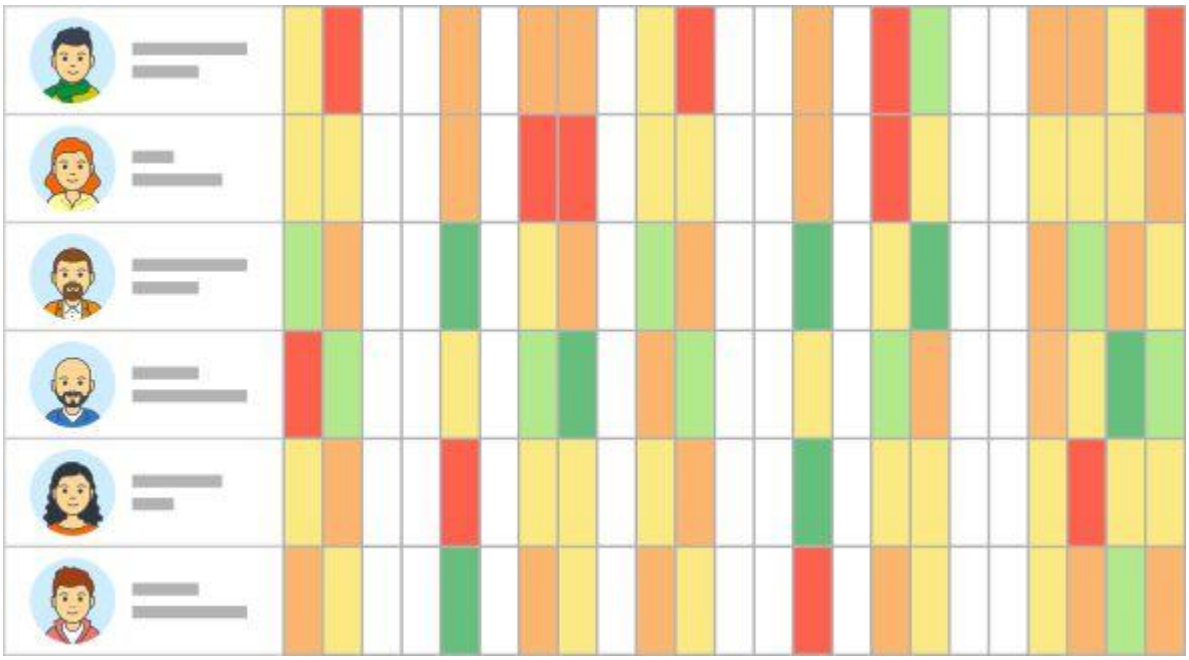
Potential actions recommended for Alejandro:

1. Discuss the absenteeism. There may be a way to decrease the number of days off.
2. Suggest boosting the employee’s skills level. Otherwise, he will remain unmotivated.

Conclusion

We have analyzed 3 employees in terms of their the performance and can see that, in general, people with more days off usually have higher levels of absenteeism; this could be evidence of their lack of motivation. At the same time, the pace of skills acquisition and professional development in the area shows that the employees are proactive and interested in their profession, defining their performance.

Having analysed the given set of employees, we can see that Gonzalo is the top performer within the group with the highest growth potential. Ierótheos is the mid-level performer who still needs to fix his weak points to perform better. Alejandro has the lowest level of performance. He needs a personal development plan to improve his motivation level.



Risk of Leaving

The problem

Losing valuable employees may be crucial for business. Key employees drive business growth and sometimes form an organization’s competitive advantage. People may leave just because their manager or HR officer did not recognize their increasing job dissatisfaction or need for a change.

Understanding the risk of leaving and, more importantly, understanding what are the factors that influence this risk helps organizations in keeping their key personnel happy and performing well, while remaining at the organization.

Approach

The model for estimating the risk of quitting the job analyses the historical data on employees who left the company. Then, the classifier is trained to recognize employees prone to quitting their jobs.

After running the model for different employees, we get the probability of leaving for every one of them. As a next step, let's analyze 3 random employees from our organization that demonstrate various levels of readiness to leave their jobs and explore how different employee characteristics influence that risk.

Knowing risk factors and characteristics that make employees quit can help us understand what actions are needed to decrease this risk.

Result

The result is shown in the table below.

Every row represents an employee feature. These features consist of various data points, including the employee's skill, to days off during previous years as well as salary changes. The features that increase the risk of leaving the job are marked in yellow; the features that decrease it are green.

	 **Durward Berge Sr.** 861-863 Fulham Rd, London SW6 5HP, 0016 962 22 50	 **Boaz van Maaren** Nisabaan 357261OSMargraten, +31 (0)05 177 01 38	 **Élise Boyer** avenue Émilie Joubert74 506 Hubert, +33 (0)57 993 84 31
	Risk of leaving 0.85	**Risk of leaving 0.53**	**Risk of leaving 0.29**
dayoff_std	4.26	3.45 Predictable productivity	4.77
education_level	General	Master of Business Administration (MBA) Marketing	Master of Technology
revenue_scale	0	0.53	0
salary_growth2work	-3.37 May have a low motivation	5.94	7.53
revenue_growth	0	1.213 A positive trend bringing a revenue for the company	0
revenue_std	0	403.42	0
salary_std	274.99 Unstable compensation	32.63	45.69
revenue2exp	0	33287.57	0
start_salary2start_skills	259.28	62.32 Hired with low compensation	113.14
dayoff2work	2.32	1.61 Low absenteeism rate	2
work_scale	1	0.148 Novice (less chances to consider a new job)	0.146 Novice (less chances to consider a new job)
work_len	113	18 Novice (less chances to consider a new job)	20 Novice (less chances to consider a new job)

	Durward Berge Sr.	Boaz van Maaren	Élise Boyer
start_skills	['temporary placement', 'crm', 'onboarding', 'employee relations', 'vendor management', 'organizational', 'recruiting', 'time management', 'peoplesoft', 'business planning', 'job analysis', 'nonprofits', 'staffing services', 'strategic hr', 'powerpoint', 'screening', 'hr strategy', 'career development', [...] 'cornell university training', 'executive management training', 'recruitment strategy training', 'senior professional in human resources \x96 international (sphri\x99) certification training', 'hr analytics training']	['pharmaceutical sales', 'operations management', 'analysis', 'medical devices', 'strategic planning', 'cross-functional team leadership', 'digital marketing', 'b2b', 'supply chain', 'trade marketing', 'logistics', 'change management', 'event [...] 'delta associates business math boot camp i delta associates category management training', 'chartered institute of marketing training', 'sales 101 sales 102 train the trainer building retail excellence']	['fermentation technology', 'data analysis', 'food chemistry', 'quality system', 'agriculture', 'equipment commissioning', 'offset printing', 'coaching & mentoring', 'mass spectrometry', 'gmp', 'environmental biotechnology', 'food processing', 'teaching', 'diet nutrition', 'food microbiology', 'food safety', 'fmcg', 'presentation skills', 'lifesciences', 'project management', 'color management', 'flavors', 'continuous improvement', 'baking', 'product development', 'food science', 'bioplastics', 'team leadership', 'laboratory', 'biotechnology', 'lecturing', 'supply chain']
average_salary	10235.52	2813.14 Low salary	3544.78
dayoff_scale	0.86 Absenteeism rate higher than average	0.12	0.27
experience_scale	1	0.065 Novice (less chances to consider a new job)	0.423
skills_compare	1.97 Skilled specialist (may be a target for recruiters)	0.2	0.918
salary_scale	0.471	0.311 Smaller salary than average	0.523
skills_learned2work	0.45	0.5	0.55
rev2dayoff_corr	0	-0.25	0

	Durward Berge Sr.	Boaz van Maaren	Élise Boyer
skills_time	['leadership', 'english', 'hr consulting', 'business development', 'policy', 'orta do\xc4\x9fu teknik \xc3\x9cniversitesi / middle east technical university training', ' [...] 'outlook', 'the queens irc certificates in advanced human resources training', 'employee development', 'strategic planning training', 'strategic workforce planning training', 'project planning', 'negotiation', 'executive management']	['microsoft excel', 'english', 'consumer products', 'nielsen', 'sap', 'columbia college point park university virginia commonwealth university robert morris university training', 'outlook', 'recruiting', 'team leadership']	['sap', 'troubleshooting', 'training', 'quality control', 'microbiology', 'william angliss confectionery manufacturers technical course seer pharma quality management and gmp training program savour chocolate & patisserie school confectionery & fudge', 'qualitative research', 'leadership', 'iso 14001 standard review training', 'npd', 'iso 14001 executive overview training']
experience_part	0.408	0.72 Loyalty to the company	0.206
sk_learned2start	1.308 Skilled specialist (may be a target for recruiters)	0.196	0.344
rev2salary_corr	0	1	0
skills_quantity	81 Skilled specialist (may be a target for recruiters)	55	43
dayoff2exp	11.39 High absenteeism rate	4.5	5
education_profile	GSE A1	Accounting	Technology
dayoff_quantity	262	29	40
dayoff_compare	1.81 High absenteeism rate	0.81	0.93
salary_growth	0.901 May have a low motivation	1.521	1.023
skills2exp	3.52	27.5 Skilled specialist (may be a target for recruiters)	5.38

	Durward Berge Sr.	Boaz van Maaren	Élise Boyer
gender	1	1	1
age	50 May look for new challenges	26 May have junior ambitions	33
revenue_compare	0	1.21 Good performance	0
salary_compare	0.83 Salary level is below average	0.92 Salary level is below average	1.01
experience	23 May look for new challenges	2 May have junior ambitions	8
work_compare	2.83 May look for new challenges	0.32	0.31
average_revenue	0	66908.01	0
revenue_growth2work	0	73.41 Good monthly performance	0
skills_scale	0.85 Skilled specialist (may be a target for recruiters)	0.28	0.34
salary2exp	444.83	1399.57 Higher salary may be a reason for aquiring new skills	442.54
exp2age	0.719	0.25	0.533
experience_compare	1.13 May look for new challenges	0.23	0.86
distance	21 May consider a job closer to home	3	8
expat	1	1	1
performance_review	8 Too long before a next performance review, an opportunity to get salary increased or work conditions revisited.	2	6
last_salary_increase	17 No increase of salary for a considerable time	12	11
3_month_dayoff_growth	1.6 Increased absenteeism rate during last 3 months	0.8	1.03



Durward Berge

risk of leaving - 0.89

Points of attention

The features that increase the risk:

- **‘salary_growth2work’** - average salary growth per month in the current position - recently, *his salary was decreased;*
- **‘salary_std’** - the deviation of the additional benefits and fines to the main salary in relation to work results. Correlates with the revenue_std and days_std results - *his compensation is very unstable, varies from month to month;*
- **‘salary_compare’** - the ratio of the discounted average salary for the person to the discounted average salary of employees in similar positions - the employee’s salary *is low, which leads to decreased motivation;*
- **‘last_salary_increase’** - the number of the months since the last salary increase - the *salary was increased a long time ago;*
- **‘daysoff_time’** - total number of days off during company's operating time - Durward has taken a lot of days off; his level of absenteeism is high;
- **‘skills_compare’** - the ratio of the number of skills to the average number of skills the employees have in the same position - the employee’s ratio is high;
- **‘sk_learned2start**’ - the ratio of the number of skills learned in the position to the number of the initial skills at the moment the employee started his work in a company - this number is also high for the employee;
- **‘skills_quantity’** - the total number of skills the employee has at the moment - Durward’s ample skill set *makes him a potential target for recruiters;*
- **‘work_compare’** - the ratio of the length of service in months to the average length of service in similar positions - *he has been working in this position longer than an average employee and his total work experience is also bigger than average;*
- **‘distance’** - distance to work - *Durward has to commute to work and that may increase the risk of leaving;*
- **‘performance_review’** - the number of the months left to the next performance review - - it is 8 for Durward, *which is a risk as well since the employee will not be able to communicate his concerns in the near future as well as request a change in work conditions;*
- ***‘3_month_dayoff_growth’** is higher than average; so, the absenteeism rate has been increasing over the last 3 months.*

Summary

On the whole, the situation with Durward seems to be the following: the skilled and experienced employee is being underpaid when compared to his less experienced colleagues; moreover, his compensation level has decreased recently. He is often absent from work and his days off became even more frequent in the last 3 months.

It is up to Durward’s manager to consider whether he wants Durward to stay with the company. If the manager decides to retain the employee, he/she should take immediate steps such as a duties and compensation review.



Boaz van Maaren

risk of leaving - 0.53

Points of attention

The features that increase the risk:

- Both **‘dayoff_std’** - the deviation of the days off for an employee. The evidence of the employee’s stable work attendance, and **‘dayoff2work’** - the average monthly number of the days off are lower than average, which means that the employee loves going to work and does not take any extra days off;
- **‘revenue_growth’** - the ratio of revenue increase to the whole period of time is higher than 1, which means that the employee is performing well;
- **‘revenue_compare’** - the ratio of the discounted average revenue for the person to the discounted average revenue for similar positions is also high; so, he is performing well;
- **‘start_salary2start_skills’** - the ratio of the starting salary to the number of the skills at the start. The higher the indicator, the more ‘expensive’ an employee is for the company - the figure is low so the employee might feel underpaid. Together with high performance, this can be a risk factor;
- **‘work_scale’** - the rank of an employee among other workers by the length of service. The feature influences loyalty to the company and can tell of the employee’s experience and deep knowledge of work processes within the company. This employee is relatively new to the company, so he probably has many opportunities to grow;
- **‘work_len’** - 0-120 - number of months the employee has been working for the company - the employee is just starting his career within the organization;
- **‘average_salary’** - average discounted salary for the given period of time, ‘**salary_scale**’ - the employee’s ranking by salary, defined among similar positions - *both figures are lower than average, which means the employee is underpaid;*
- **‘experience_part’** - the ratio of work experience within a company in years to total work experience in years - the figure here *is high, which may speak of the employee’s loyalty to the company;*
- *Boaz* **is 26. He is a young professional and may need new** challenges. He can be considered a risk factor;
- **‘salary2exp’** - the ratio of an employee`s average discounted salary to the total employee experience in years - the figure *is high, which means the employee is getting good compensation for his skills;*
- **performance review** *is planned in 2 months. It looks like the manager can postpone any actions or decisions until that time.*

Summary

Boaz is just starting his career in the company. He is performing well; the revenue generated by him is increasing, and the salary is adequate to his skills.
The main risks are being underpaid compared to other employees in the organization and his possible strive for new challenges due to his young age.

Recommendation

It is worth checking the compensation policy to see how salaries are formed. Boaz’ performance review is planned in 2 months. If he continues to overperform himself, the company should consider a salary increase as a good motivation.



Élise Boyer

risk of leaving - 0.29

Points of attention

- **‘work_scale’** - the rank of an employee among other workers by the length of service - Élise’s rank is low;
- **‘work_len’** - 0-120 - number of months the employee has been working for the company - this number is also low. Elise is a new employee with lots of opportunities within the company;
- **‘salary_growth2work’** - average salary growth per month in the current position - *her salary is increasing faster than it is for the other employees within the organization. The increased compensation is good motivation for a new employee to retain them;*
- **‘skills_time’** - the dynamics of the employee’s skills acquisition over a month. Elise has regularly mastered new skills since the day of her employment; she is learning and it keeps her motivated;
- **‘dayoff_copare’** - the ratio of number of days off to the average number of days off of employees in similar positions - this figure for Elise is low; she enjoys going to work and does not take any extra days off.

Summary

Elise is relatively new to the company. She is actively acquiring a lot of new skills and her compensation level is growing faster than average. There are no significant factors that would lead to an increased risk of leaving.

Recommendation

The manager is recommended to screen the employee regularly, as Elise is evolving quickly and may become a target for recruiters.

Conclusion

Usually, managers and HR officers discuss the employee's satisfaction or dissatisfaction with the job during regular performance reviews. This is a typical approach when the employee's status is updated, for example once every 6 months.

Using data-driven analytics helps constantly monitor the risk of leaving for key employees and allows taking actions before it is too late.

Underpaid and a routine, unchanging job combined with the employee's multiple skills often lead to attrition. The ever-increasing number of days off during the recent months signals the employee's dissatisfaction and growing risk of quitting the job.

Features reference

For every employee, we have extracted the following indicators (features) from the simulated raw time series (HR/ERP data).

Feature Name	Description
dayoff_std	the deviation of the days off for an employee. The evidence of the employee's stable work attendance;
education_level	PhD, Master's, Bachelor's, General studies, Primary School degree;
expat	1-expat, 0 - local;
revenue_scale	revenue rank (1 - first place, 0 - last place) within the same position;
daysoff_time	total number of days off during company's operating time;
salary_growth2work	average salary growth within one month in the current position (absolute number);
revenue_growth	the ratio of the revenue increase to the whole period of time;
revenue_std'	the deviation of the revenue for current employee over the total period of work;
salary_std	the deviation of the additional bonuses and fines to the main salary in relation to work results. Correlates with the revenue_std and days_std results;
revenue2exp	the ratio of the average revenue to the employee's experience in years;
salary_time	monthly salary rate time series over 10 years, not discounted;
positions_time	positions categoric changes time series - display which positions has the employee acquired over some period of time;
retire_month	the ratio of quits for certain months. The seasonal indicator of employees` quitting their jobs;
children	the number of children. If the position requires flexibility - better no or small number of children;
start_salary2start_skills	the ratio of the starting salary to the number of the skills at start. The higher the indicator, the more 'expensive' an employee is for the company;
marital_status	1 - married, 0 - unmarried;
dayoff2work	the average monthly number of days off;
work_scale	the rank of an employee among other workers by length of service. The feature influences the loyalty to the company and can tell of the employee's experience and deep knowledge of work processes in the company;
work_len	0..120 - number of months the employee has been working for the company;
skill_bin	a binary set for every skill in the company, with 1 - the skill is present, and 0 - no skill;

Feature Name	Description
start_skills	initial set of employee's skills, names;
dayoff2retention	the number of the days off over the last three months of work. Shows the decrease in the attendance level due to hiring activities among other companies;
average_salary	average discounted salary for the given period of time;
dayoff_scale	the employee’s rank within the company according to the number of days off (1 - the biggest number, 0 - the smallest number);
revenue_time	non-discounted revenue time series for the workers who bring direct income;
birth_month	the month the employee was born;
experience_scale	the employee’s rank based on experience. 1 means the most experienced employee in the company;
skills_compare	the ratio of number of skills to the average number of skills the employees have in the same position;
rev2retention	the change in revenue that was generated by an employee during the 3 months before he/she left the company;
salary_scale	the employee’s ranking by salary, defined among similar positions;
performance_review	the number of the months left to the next performance review;
skills_learned2work	average number of skills acquired by an employee per one month of work;
salary_time_inf	the discounted salary time series;
rev2dayoff_corr	the correlation between revenue and days off. If the coefficient = 0, then the position is not revenue-generating; if > or <1 - then the employee has a positive or negative influence on the revenue, respectively;
skills_time	the dynamics of the employee’s skills acquisition over a month;
max_position	the highest possible position the employee can occupy in the organizational chart (arranged according to the salary);
position_increase	how many steps has an employee moved up during the work period;
experience_part	the ratio of the work experience within a company in years to total work experience in years;
sk_learned2start	the ratio of the number of skills learned in the position to the number of initial skills at the moment the employee started his work in a company;
rev2salary_corr	the employee`s revenue and salary correlation. Low correlation rate shows that the salary dynamics differs according to the revenue (It is better for the marginal profitability when the revenue growth rate is higher);
skills_quantity	the total number of skills the employee has at the moment;
dayoff2exp	the ratio of number of days off to total years of experience;
nationality	employee`s nationality - categorized;

Feature Name	Description
revenue_time_inf	discounted revenue time series per employee, per month;
education_profile	the employee's education profile, by category;
dayoff_quantity	the ratio of total number of days off to the entire period of work;
dayoff_compare	the ratio of number of days off to the average number of days off of employees in similar positions;
salary_growth	the growth of the discounted salary for the entire period of work;
skills2exp	the ratio of number of skills to total years of experience (the number of skills developed per every year of experience);
gender	0- female, 1 - male;
age	the employee's age;
revenue_compare	the ratio of the discounted average revenue for person to discounted average revenue for similar positions;
salary_compare	the ratio of the discounted average salary for a person to the discounted average salary of employees in similar positions;
experience	total employee's experience in years;
last_salary_increase	the number of the months since the last salary increase;
edu_bin	binary set (yes/no) of education: level and profile;
work_compare	the ratio of the length of service in months to the average length of service in the similar positions;
pos_bin	binary set (yes/no) of positions;
average_revenue	average discounted monthly revenue generated by employee. For revenue-generating profiles;
revenue_growth2work	monthly average revenue growth for an employee;
skills_scale	the rank of the employee among employees in similar positions based on the number of skills (1 - top, 0 - bottom);
retired_status	1-retired, 0 - not retired;
salary2exp	the ratio of an employee`s average discounted salary to the total employee`s experience in years;
exp2age	the ratio of employee`s total years of experience to age;
experience_compare	the ratio of the employee's experience in the position to the average experience of other employees in similar positions;
distance	distance to work.

About ELEKS

ELEKS is a trusted global organization that provides offshore, full-cycle, software product engineering services, from ideation to finished products. Since 1991, we' ve been helping businesses innovate and build advanced software products that matter, leveraging technologies such as Data Analytics, the Internet of Things, mobile applications and wearables.

Our award-winning solutions have significantly contributed to the success of our customers, including Fortune 500® companies, and are recognized as a valuable part of international best practices. Our delivery organization, consisting of approximately 900 professionals in Eastern Europe, is strengthened by a local presence in the U.S., Europe and the UK.

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Have a question? Contact us!

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