

# **ScaleneWorks: HR analytics**

# Problem Analysis

# Understanding the business problem

## Business problem:

1. 20%-25% of the candidate do not join the companies payroll post offer acceptance stage.

## Time impact:

1. X hrs. of effort wasted by the business and HR on a candidate during  
Sourcing → Screening → Selection  
→ Fitment & offer → PoFu  
phases in the talent acquisition lifecycle (TALC).

## Cost Impact:

1. Cost/hire goes up by Y% impacting the bottom-line of the business.
2. Compromise on the final offer to a new candidate vis-a-vis the quality of the new candidate.
3. Any delay in staffing with a new candidate may result in embracement in front of the customer and penalty clause evoked by the end customer

## Quality Impact:

1. Quality of resource hired thereafter may suffer due to less turnaround time for the business.

Numbers to be quantified based on data

## Key Questions/deliverables:

1. What are the key drivers that influence the candidate joining/not-joining a company/LOBs.
2. What rules can be used to predict the acceptance or rejection of offer.
3. Devising a predictive algorithm to calculate the probability of acceptance of an offer letter and joining the company after offer acceptance stage.
4. Devising a predictive algorithm to calculate the probability of acceptance of an offer letter and joining the company during screening/selection stage. (To be taken up on another project).

# Approach

# High level activities

## HR Analytics

Analytical approach to understand candidates propensity to honor an offer from a company.

### Discovery

Business problem

- Identify the set of questions which will help find a solution to stated business problem
  - Set of three questions already identified as a part of the project.
- Formulate hypothesis for testing each of the questions.

### Understanding data needs

Data - Prepare and explore

- Identify data requirement to test hypothesis
- Carry out data cleansing and data exploration
- Prepare training and validation data set.

### Analytical Modelling

Identify tools and techniques

- Classification tree
- Logistic regression
- Neural Network

### Validation and Implementation

Results Interpretation

- Perform validation activity on the validation dataset.
- Finalize business rules which can be rolled to production.

# **Business Problem – Deep Dive**

# Business problem: Project approach

Approved

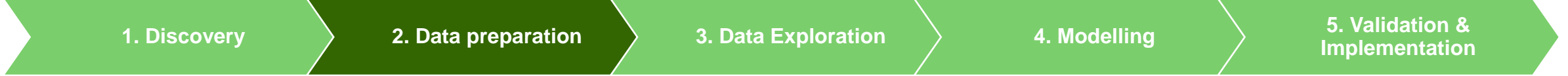
20%-25% of the candidate do not join the companies payroll post offer acceptance stage.



Question	Hypothesis*	Deliverables / Remarks
<ol style="list-style-type: none"> <li>1. What are the key drivers that influence the candidate joining/not-joining a company/LOBs.</li> <li>2. What rules can be used to predict the acceptance or rejection of offer.</li> <li>3. Devising a predictive algorithm to calculate the probability of acceptance of an offer letter and joining the company after offer acceptance stage.</li> </ol>	<p><i>Uncertainty of a candidate joining a company increases :</i></p> <ul style="list-style-type: none"> <li>• <b>H1:</b> <i>when the offered compensation is less than the expected compensation by X%.</i></li> <li>• <b>H2a:</b> <i>when candidate has to re-locate from one city to other city.</i></li> <li>• <b>H2b:</b> <i>when there is significant disparity between salary increment vis-a-vis per capita income in the city</i></li> <li>• <b>H2c:</b> <i>when there is minimal responsibility ,on the candidate ,of immediate family members (parents/siblings).</i></li> <li>• <b>H3:</b> <i>when candidate move from a higher tier company to a lower tier company (employer of choice in a particular LOBs)*.</i></li> <li>• <b>H4:</b> <i>when candidate moves from a product development company to a service oriented company.</i></li> <li>• <b>H5:</b> <i>when there is less disparity between the candidates current designation and offered designation.</i></li> <li>• <b>H6:</b> <i>when candidates spouse is working in a different location.</i></li> <li>• <b>H7:</b> <i>when candidates educational background is from Tier1 Institute.</i></li> <li>• <b>H8:</b> <i>when the time lag between the different stages of selection process increases*.</i></li> <li>• <b>H9:</b> <i>based on the period in which offer was rolled out. (Salary Increment cycle in the parting company vs. salary increment cycle in the joining company).</i></li> <li>• <b>H10:</b> <i>with the channel through which the candidate's profile was sourced.</i></li> <li>• <b>H11:</b> <i>when candidate's hiring happens on weekends compared to hiring on weekdays.</i></li> <li>• <b>H12:</b> <i>based on the number of company hopping's candidate has gone through in the past.</i></li> <li>• <b>H13:</b> <i>when the hiring is not project specific but general hiring.</i></li> <li>• <b>H14:</b> <i>when the variation of weightage assigned in different stages of PoFu.</i></li> <li>• <b>H15:</b> <i>when the delay in BGV process extends beyond the date of joining of the candidate.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Set of approved hypothesis.</li> <li>• Only the hypothesis marked in green can be tested at this stage.</li> <li>• *To be tested for Male and Female candidate separately. But attributes completeness is not a satisfactory.</li> <li>• *To be tested for different experience level (range) of candidate separately. <i>May have data challenge</i></li> </ul>

# Business problem: Project approach

20%-25% of the candidate do not join the companies payroll post offer acceptance stage.

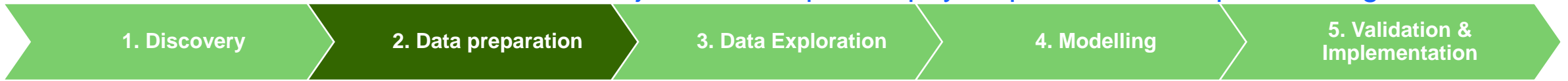


Question	Key activities*	Deliverables
<ol style="list-style-type: none"><li>1. What are the key drivers that influence the candidate joining/not-joining a company/LOBs.</li><li>2. What rules can be used to predict the acceptance or rejection of offer.</li><li>3. Devising a predictive algorithm to calculate the probability of acceptance of an offer letter and joining the company after offer acceptance stage.</li></ol>	<ul style="list-style-type: none"><li>• <i>Understanding the PoFu process.</i></li><li>• <i>Identifying attributes needed to test the hypothesis.</i></li><li>• <i>Data collection for identified attributes. Checking for data completeness.</i></li></ul>	<ul style="list-style-type: none"><li>• Recommendations for improvement in existing PoFu process.</li><li>• Gap in expected vs. available data.</li><li>• Recommendations for inclusion of attributes in existing process.</li><li>• Hypothesis which cannot be tested.</li></ul>



# Business problem: Project approach

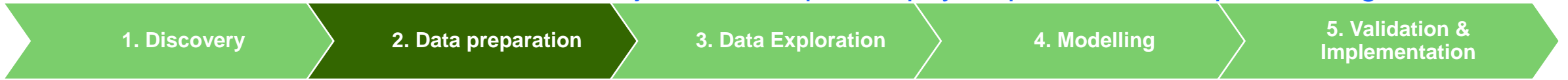
20%-25% of the candidate do not join the companies payroll post offer acceptance stage.



Question	Key activities ( <i>Understanding the PoFu process.</i> )	Deliverables
<ol style="list-style-type: none"> <li>1. What are the key drivers that influence the candidate joining/not-joining a company/LOBs.</li> <li>2. What rules can be used to predict the acceptance or rejection of offer.</li> <li>3. Devising a predictive algorithm to calculate the probability of acceptance of an offer letter and joining the company after offer acceptance stage.</li> </ol>	<p><b>Recommendations for improvement in existing process:</b></p> <ul style="list-style-type: none"> <li>• <b>Doc submission:</b> Doc. Management team not aware of the revised process. Candidate is asked to furnish personal and professional details every time there is a revision in offer letter. Candidate may not feel interested in giving in the details again which was provided by him earlier. This may be a deterrent for some candidate to proceed with the process again. <i>Doc. Management team to be trained and educated on the process. It will help in reducing the cycle time of the document submission process.</i></li> <li>• <b>BGV status:</b> Currently, 2% of the cases are tagged red in BGV which is identified late in the candidate's selection process. <i>Issues with the candidate's education, work experience should be signaled earlier.</i> This will help in bringing down the cost per hire as well as the effort wasted by the HR team from screening to PoFu.</li> <li>• <b>Delay in BGV check:</b> Currently, the delay in BGV process leads to discomfort for the candidate and at times leads to uncertainty of candidate joining the firm. <i>Process should ensure that the BGV is completed well within the date of joining of given to the candidate.</i></li> <li>• <b>Questionnaire in different stages of PoFu:</b> The predictability from the questionnaire does not give meaningful result. <i>The relevance of the question at certain stages does not seem to be proper. This may be one of the reasons of low predictability shown by the system in each stage. The placement of the questions in different stages requires analysis and update.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Recommendations for improvement in existing PoFu process.</li> </ul>

# Business problem: Project approach

20%-25% of the candidate do not join the companies payroll post offer acceptance stage.



Question	Key activities (Identifying attributes needed to test the hypothesis.)	Deliverables								
1. What are the key drivers that influence the candidate joining/not-joining a company/LOBs.	<b>General</b>								<ul style="list-style-type: none"> <li>Gap in expected vs. available data.</li> <li>Recommendations for inclusion of attributes in existing process.</li> </ul>	
	Candidate Id	Requisition ID	Gender	Date of Birth	Marital Status	Age at time of first contact				
	<b>Education</b>									
	College name - Bachelors Degree		College Tier	College name - Masters Degree			College Tier			
	<b>Location</b>			<b>CTC and City profile</b>						
	City located in	City of relocation	Current CTC	Expected CTC	CTC offered	per capita income of the city currently located in	per capita income of the city of relocation			
	<b>Dependents</b>									
	Parent - Working/Dependent		#Brother	Working /Dependent	#Sister	Married /Dependent	Spouse	Working / Dependent		Spouse work location
	<b>Company Profile</b>									
	DoJ- Prev company 1	DoJ - Prev company 2	DoJ- Prev company 3	DoJ - Prev company 4	DoJ - Prev company 5	DoJ - Prev company 6	DoJ - Current company	Company working in currently		
<b>Company Profile</b>										
Tier - parting company	Tier - joining company	Parting Company Type	Joining company Type	Designation in Parting company	Designation in Joining company	Level difference in Designation	Salary Increment month in Parting company	Salary increment month in joining company		

Attributes
Available
Not available
Derived

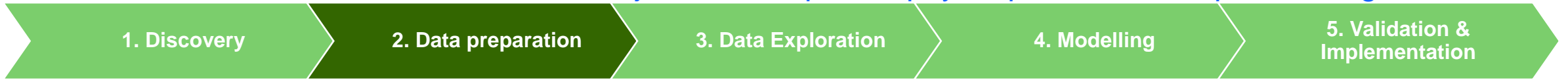
Based on attribute name available in the system. Not from completeness of data perspective.

**Recommendations:**

- It is recommended to make provision for capturing the attributes which are not being captured in the system currently. Attribute names are indicative which may be reworded appropriately.
- Attributes to be made as mandatory fields in the system before recruiter can finalize and proceed to next step.

# Business problem: Project approach

20%-25% of the candidate do not join the companies payroll post offer acceptance stage.



Question	Key activities (Identifying attributes needed to test the hypothesis.)	Deliverables
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1. What are the key drivers that influence the candidate joining/not-joining a company/LOBs.

Recruitment Cycle										
Channel of resume	Total Experience at the time of first contact	Relevant experience at the time of first contact	Weekend drive /Weekday drive	Requisition source	Date of first contact	Date of first interview	Date of second interview	Date of third interview	Offer released date	Joining date confirmed by candidate

- Gap in expected vs. available data.
- Recommendations for inclusion of attributes in existing process.

2. What rules can be used to predict the acceptance or rejection of offer.

Post offer follow-up status								
Stage 1 - Contacted by	Stage 1 - Contact date	Stage 1 - Weightage	Stage 2 - Contacted by	Stage 2 - Contact date	Stage 2 - Weightage	Stage 3 - Contacted by	Stage 3 - Contact date	Stage 3 - Weightage

3. Devising a predictive algorithm to calculate the probability of acceptance of an offer letter and joining the company after offer acceptance stage.

Post offer follow-up status								
Stage 4 - Contacted by	Stage 4 - Contact date	Stage 4 - Weightage	Stage 5 - Contacted by	Stage 5 - Contact date	Stage 5 - Weightage	Stage 6 - Contacted by	Stage 6 - Contact date	Stage 6 - Weightage

Joining status	BGV	
HR Status	Initiation date	Completion date

Attributes
Available
Not available
Derived

**Based on attribute name available in the system. Not from completeness of data perspective.**

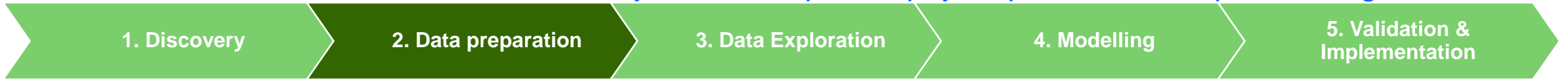
## Recommendations:

1. It is recommended to make provision for capturing the attributes which are not being captured in the system currently. Attribute names are indicative which may be reworded appropriately.

10 2. Attributes to be made as mandatory fields in the system before recruiter can finalize and proceed to next step.

# Business problem: Project approach

20%-25% of the candidate do not join the companies payroll post offer acceptance stage.



Question	Key activities (Completeness of available attributes)	Deliverables
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1. What are the key drivers that influence the candidate joining/not-joining a company/LOBs.
2. What rules can be used to predict the acceptance or rejection of offer.
3. Devising a predictive algorithm to calculate the probability of acceptance of an offer letter and joining the company after offer acceptance stage.

Data completeness %											
Current CTC	Offered CTC	Current location (City)	Offered location (City)	Current designation	Offered designation	Marital status	Educational Institute (Most recent)	Date of Birth	Candidate source type	REX	
47%	47%	0%	43%	0%	71%	0%	34%	0%	100%	100%	

- Gap in expected vs. available data.
- Recommendations for inclusion of attributes in existing process.

Data completeness %								
Requisition source	Current company	Previous company	Previous to previous company	HR status	Date of screening	Date of TP1	Date of TP2	Date of offer roll out
100%	29%	0%	0%	100%	21%	0%	0%	100%

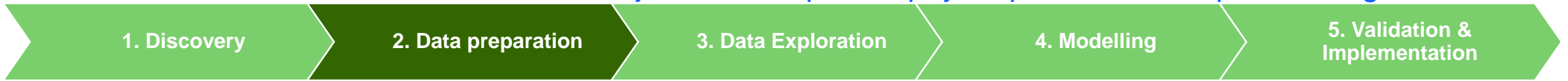
Data completeness %								
Date of offer accept	Date of joining	Date of rejection	BGV initiation date	Gender				
0%	63%	0%	0%	0%				

Attributes
0%
1%-50%
>50%

From completeness of data perspective.

# Business problem: Project approach

20%-25% of the candidate do not join the companies payroll post offer acceptance stage.



Question	Hypothesis which cannot be tested	Deliverables
<ol style="list-style-type: none"> <li>1. What are the key drivers that influence the candidate joining/not-joining a company/LOBs.</li> <li>2. What rules can be used to predict the acceptance or rejection of offer.</li> <li>3. Devising a predictive algorithm to calculate the probability of acceptance of an offer letter and joining the company after offer acceptance stage.</li> </ol>	<p><i>Uncertainty of a candidate joining a company increases :</i></p> <ul style="list-style-type: none"> <li>• <b>H1:</b> <i>when the offered compensation is less than the expected compensation by X%.</i></li> <li>• <b>H2a:</b> <i>when candidate has to re-locate from one city to other city.</i></li> <li>• <b>H2c:</b> <i>when there is minimal responsibility ,on the candidate ,of immediate family members (parents/siblings).</i></li> <li>• <b>H5:</b> <i>when there is less disparity between the candidates current designation and offered designation.</i></li> <li>• <b>H6:</b> <i>when candidates spouse is working in a different location.</i></li> <li>• <b>H8:</b> <i>when the time lag between the different stages of selection process increases*.</i></li> <li>• <b>H9:</b> <i>based on the period in which offer was rolled out. (Salary Increment cycle in the parting company vs. salary increment cycle in the joining company).</i></li> <li>• <b>H11:</b> <i>when candidate's hiring happens on weekends compared to hiring on weekdays.</i></li> <li>• <b>H12:</b> <i>based on the number of company hopping's candidate has gone through in the past.</i></li> <li>• <b>H14:</b> <i>when the variation of weightage assigned in different stages of PoFu.</i></li> <li>• <b>H15:</b> <i>when the delay in BGV process extends beyond the date of joining of the candidate.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Hypothesis which cannot be tested at this stage.</li> </ul>

## Recommendations:

1. Hypothesis testing may not be possible unless all the attributes listed in previous slides are captured. It is recommended to make provision for capturing the attributes which are not being captured in the system currently. Attribute names are indicative which may be reworded appropriately.
2. Attributes to be made as mandatory fields in the system before recruiter can finalize and proceed to next step.

## **Consolidated recommendations and Next steps**

# Consolidated recommendations

## Short Term (<1 month)

- **Doc Management:** *Doc. Management team to be trained and educated on the process. It will help in reducing the cycle time of the document submission process (Refer slide 8 for detail).*
- **Questionnaire in different stages of PoFu:** *The placement of the questions in different stages requires analysis and update. Discussion to happen as soon as possible. Update to the questionnaire in online system can be in medium term range ((Refer slide 8 for detail).*

### **Analytical modelling:**

- *Pulling out new set of data from the ITAP system for analytical modelling perspective.*

## Medium Term (1-4 months)

- **Delay in BGV check:** *Process should ensure that the BGV is completed well within the date of joining of given to the candidate (Refer slide 8 for detail).*
- **Data completeness:** *The existing attributes available in various forms in the ITAP system to be made mandatory fields (Refer slide 11 for detail).*

## Long Term (> 5months)

- **BGV status:** *Issues with the candidate's education, work experience which leads to Red status should be signaled earlier (Refer slide 8 for detail).*
- **Addition of attributes:** *Fields to be added in the ITAP system to capture additional information from the candidate (Refer slide 9 and 10 for detail).*

# Timeline



## HR Data Analytics

Phases		Week Number										Remarks
		18 5/2	19 5/9	20 5/16	21 5/23	22 5/30	23 6/6	24 6/13	25 6/20	26 6/27		
Discovery	Identify Business problem											
	20%-25% of the candidate do not join the companies payroll post release of an offer letter.											
	Create Hypothesis: To be analyzed for Male and Female Candidates seperately											
Data Preparation	Finalize single data attributes											Subject to data availability
	Finalize derived data attributes											Subject to data availability
	Extract data											Subject to data availability
Data Exploration	Data Cleansing											Subject to data availability
	Understand data behaviour											Subject to data availability
	Prepare training and validation data set											Subject to data availability
Analytical Modelling	Apply tools and techniques											Dependent on previous phase completion
	Classification Tree											
	Classification - Test hypothesis & Validate result											
	Logistic Regression											Dependent on previous phase completion
	Logistic - Test hypothesis & Validate result											
Model validation & Implementation	Validate results on validation data set											
	Deploy Model											
	Evalaute/Monitor Result											

**Thank you!!!**