MercerMarsh Benefits

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Darwin Analytics Centre

A Guide to Predictions

Introducing predictions forecasting in DAC 8.2

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Introduction

The Darwin Analytics Centre (DAC) is designed to help you make sense of your data and leverage that insight to drive informed actions. It uncovers trends that may not be immediately apparent, assisting you in navigating complex decisions.

This guide will introduce you to the new prediction functionality introduced in DAC version 8.2, replacing the previous projections, enabling a clearer understanding of potential future outcomes based on your data.

What are Predictions?

Predictions are informed estimates about what might happen in the future based on existing data. In our forecasting system, we use a method called an ensemble model. This approach combines various forecasting techniques, allowing us to harness their strengths. As a result, we can provide more accurate predictions, helping you understand potential future outcomes better.

Why is it useful?

Predictions are valuable for several reasons, through the visualisations mentioned in the section below this will enable you to:

- **Informed Decision-Making:** Forecasts for key metrics like employer costs, employee costs, approved reimbursements, and login rates enable you to make informed decisions, helping you plan budgets, allocate resources, and manage expenses effectively.
- **Identifying Trends:** The predictions reveal patterns and trends over time. By analysing forecasted employer and employee costs, you can determine if expenses are expected to rise or fall, allowing for proactive financial management.
- **Budget Planning:** Insights into approved reimbursements and login rates help you anticipate future needs and adjust your budgets accordingly. This foresight allows you to avoid unexpected financial shortfalls and ensures you are prepared for upcoming expenses.
- **Enhanced Strategy Development:** Seeing predicted trends enables you to develop strategies that align with future expectations. For example, if login rates are expected to rise, you may want to invest in additional support or resources to boost user engagement.

- **Customised Insights:** The visualisation tools let you filter data by global or country-specific views, ensuring the predictions are relevant to your context. This tailored approach allows you to focus on the insights that matter most to your organisation.

How we Forecast

Our forecasting process involves several key steps to ensure we provide accurate and reliable predictions:

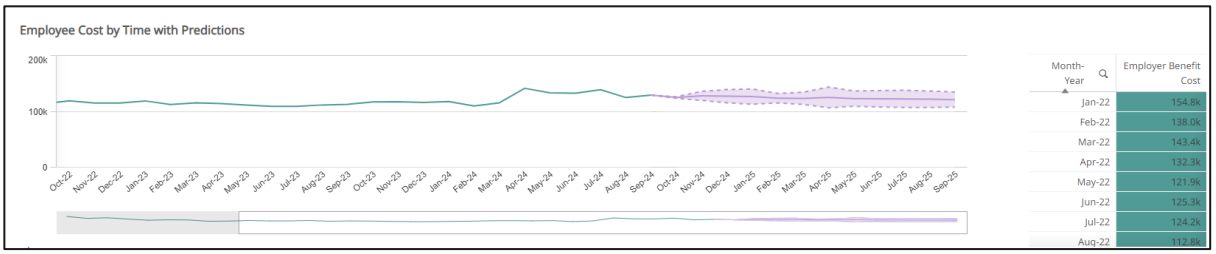
1. **Data Preparation:** We begin by collecting and cleaning the data. This step is crucial because it ensures that the information we use is accurate and ready for analysis. We address any missing details and remove any unusual data points that could distort the results.
2. **Forecasting Methods:** We employ three main techniques to analyse the data:
    - **ARIMA:** AutoRegressive Integrated Moving Average model is a popular statistical method used for time series forecasting. It is based on the idea that past values of a time series can be used to predict its future values. This method helps us identify overall trends in the data, giving us a broad view of what's happening.
    - **SARIMA:** Seasonal Autoregressive Integrated Moving Average is a versatile and widely used time series forecasting model. It's designed to handle data with seasonal patterns. SARIMA captures both short-term and long-term dependencies within the data, making it a robust tool for forecasting This technique focuses on seasonal patterns, allowing us to see changes that occur at specific times of the year.
    - **Exponential Smoothing:** This method quickly adapts to recent changes, ensuring our forecasts stay relevant and up to date.

By using all three methods together, we create a comprehensive forecast called our *Ensemble Model* that captures different aspects of the data, leading to more accurate predictions.

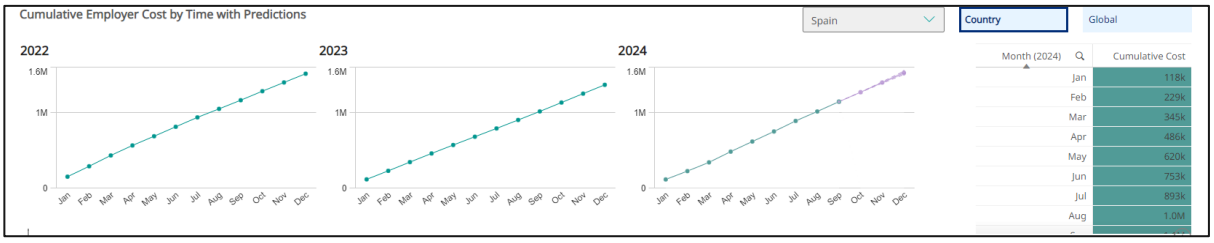
Visualisations showing Predictions

Our visualisations are designed to provide you with clear insights into forecasted trends and cumulative totals. Here's what you can expect:

- **Forecasted Trends:** You can view predicted patterns for the next 12 months, helping you understand how key metrics are expected to change over time.

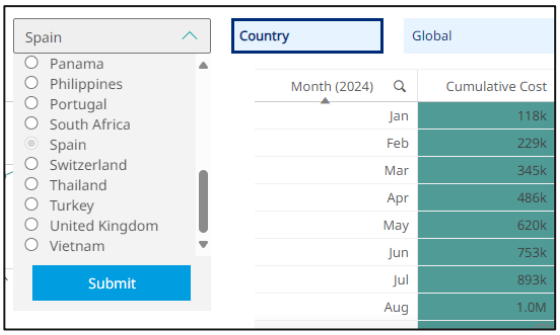


- **Cumulative Totals:** The visualisations also show the range within which our models predict total figures will fall by the end of the calendar year.



Filtering Options: At the top right of the visualisation, you'll find 'Global' and 'Country' buttons. These allow you to filter the data:

- **Global View:** Displays forecasts based on all available company data.
- **Country View:** Provides a more detailed look at individual countries, but only if the accuracy meets our established thresholds.



Where to Find Visualisations: You can access these visualisations in the following sections:

- **Employer Costs:** Navigate to the Benefits > Costs section and select the measure for employer costs.
- **Employee Costs:** Go to the Benefits > Costs section and select the measure for employee costs.
- **Approved Reimbursements:** Find this in the Reimbursements > Reimbursements section.
- **Login Rate:** Access this in the User Activity > Engagement section.

Ensuring Accuracy

To make sure our forecasts are as accurate as possible, we use several straightforward methods to measure their performance:

1. **MAPE (Mean Absolute Percentage Error):** This metric tells us how close our predictions are to the actual results. For example, if we have a MAPE of 5%, it means our forecasts are typically within 5% of the real numbers, giving us a clear idea of our accuracy.
2. **RMSE (Root Mean Square Error):** This measure helps us understand the size of our errors, particularly focusing on larger mistakes. It gives us insight into how significant our prediction errors might be.
3. **AIC (Akaike Information Criterion):** This criterion allows us to compare how well different forecasting methods fit the data. By using AIC, we can prioritise the models that are best suited for our specific data set.

By regularly assessing our forecasts using these methods, we can ensure that we are providing you with the most reliable and accurate predictions possible.

Accuracy Threshold Rule

Visualisations that use Predictions have a rule to ensure they only show values that we deem of a certain accuracy. Here's how it works:

- **MAPE Value Assessment:** Each visualisation is evaluated based on its MAPE (Mean Absolute Percentage Error) value.
- **Display Criteria:**
    - If the MAPE value is **greater than or equal to 30%**, the visualisation will not be displayed. This indicates that the forecast is less reliable.
    - If the MAPE value is **lower than 30%**, the visualisation will be shown.

By using this logic, we ensure that you only see visualisations that meet a certain accuracy threshold. This prevents you from viewing prediction forecasts that may lack sufficient data points for reliable results.

Considerations

Whilst we have developed this ensemble forecasting model with great care to provide accurate predictions, it's important for users to keep the following points in mind:

1. **No Guarantee of Future Events:** The outputs of the model are forecasts based on historical data and current trends. They do not guarantee specific future outcomes.
2. **Data Limitations:** The accuracy of our forecasts can be affected by several factors, including:
    - Insufficient or incomplete data
    - The presence of outliers in the dataset
    - Changes that deviate from historical trends

3. **Model Uncertainty:** Although ensemble forecasting combines multiple models to enhance prediction accuracy, there are still inherent uncertainties associated with any forecasting method.
4. **User Responsibility:** We encourage users to use their own judgment and consider additional factors when making decisions based on these forecasts.