Evaluating Champions League performance using two metrics

From 2020-21 to 2024-25 seasons

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Presentation of the two metrics used

Metric	Description	Range (Min - Max)
TMQS (Team Match Quality Score)	Evaluates a team's performance in a match	0 - 100
MQS (Match Quality Score)	Evaluates the quality of a match	0 - 100

* Description of metrics in the last slide

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1. Ten matches with the best MQS

Match	Score	MQS
Red Bull Salzburg - Benfica (2023-2024 Group stage)	1 - 3	**80.86**
PSV Eindhoven - Juventus (2024-2025 Knockout phase play-offs)	3 - 1	**80.52**
Internazionale - Barcelona (2024-2025 Semi-finals)	4 - 3	**78.24**
Liverpool - Paris Saint-Germain (2024-2025 Round of 16)	0 - 1	**76.86**
Red Bull Salzburg - Bayern Munich (2020-2021 Group stage)	2 - 6	**76.76**
Real Madrid - Chelsea (2021-2022 Quarter-finals)	2 - 3	**75.64**
Beşiktaş - Dortmund (2021-2022 Group stage)	1 - 2	**73.63**
Juventus - Porto (2020-2021 Round of 16)	3 - 2	**72.88**
Galatasaray - Bayern Munich (2023-2024 Group stage)	1 - 3	**71.99**
Barcelona - Napoli (2023-2024 Round of 16)	3 - 1	**71.9**

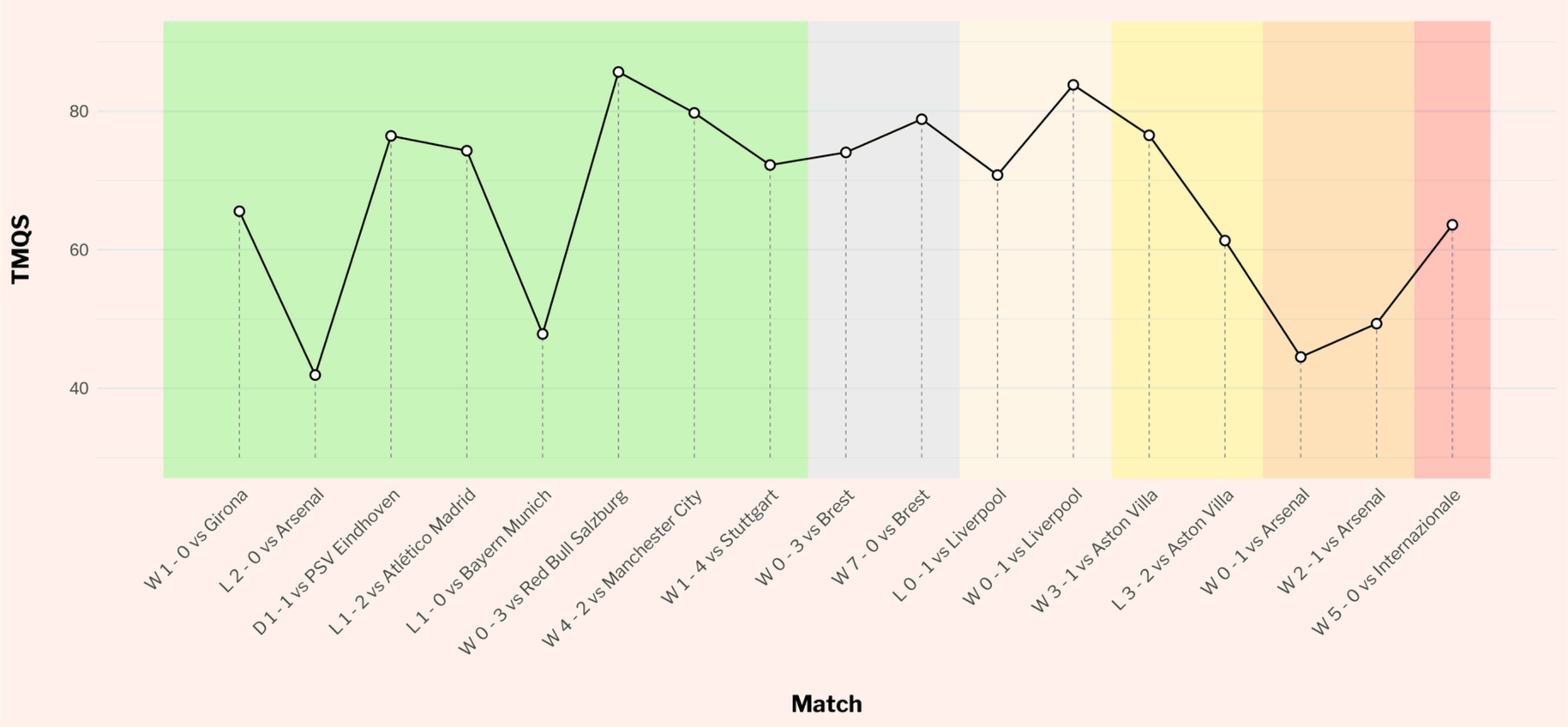
2. Ten best performances in a single match based on TMQS

Team	Match	TMQS
Bayern Munich	2020-2021 Quarter-finals, Bayern Munich - Paris Saint-Germain (2 - 3)	**88.40**
Barcelona	2024-2025 Semi-finals, Internazionale - Barcelona (4 - 3)	**88.14**
PSV Eindhoven	2024-2025 Knockout phase play-offs, PSV Eindhoven - Juventus (3 - 1)	**86.34**
Paris Saint-Germain	2024-2025 League phase, Red Bull Salzburg - Paris Saint-Germain (0 - 3)	**85.67**
Benfica	2023-2024 Group stage, Red Bull Salzburg - Benfica (1 - 3)	**85.46**
Liverpool	2021-2022 Group stage, Porto - Liverpool (1 - 5)	**84.62**
Bayern Munich	2021-2022 Group stage, Bayern Munich - Benfica (5 - 2)	**84.35**
Chelsea	2021-2022 Quarter-finals, Real Madrid - Chelsea (2 - 3)	**83.87**
Bayern Munich	2024-2025 League phase, Bayern Munich - Slovan Bratislava (3 - 1)	**83.83**
Paris Saint-Germain	2024-2025 Round of 16, Liverpool - Paris Saint-Germain (0 - 1)	**83.80**

3. Ten biggest upsets based on TMQS

Round	Home Team	HT TMQS	Away Team	AT TMQS	Score
2020-2021 Quarter-finals	Bayern Munich	**88.40**	Paris Saint-Germain	**44.39**	**2 - 3**
2024-2025 Round of 16	Paris Saint-Germain	**70.79**	Liverpool	**28.28**	**0 - 1**
2023-2024 Group stage	Atlético Madrid	**32.48**	Feyenoord	**68.46**	**3 - 2**
2021-2022 Quarter-finals	Villarreal	**47.01**	Bayern Munich	**79.76**	**1 - 0**
2021-2022 Group stage	Paris Saint-Germain	**45.79**	Manchester City	**77.03**	**2 - 0**
2021-2022 Final	Liverpool	**76.22**	Real Madrid	**46.36**	**0 - 1**
2024-2025 League phase	Aston Villa	**39.74**	Bayern Munich	**69.09**	**1 - 0**
2021-2022 Group stage	Real Madrid	**74.48**	Sheriff Tiraspol	**46.29**	**1 - 2**
2024-2025 League phase	Red Star	**74.78**	PSV Eindhoven	**47.86**	**2 - 3**
2024-2025 League phase	Paris Saint-Germain	**74.30**	Atlético Madrid	**48.15**	**1 - 2**

4. TMQS evolution during Paris Saint-Germain's Champions League campaign (2024-25)



League Phase | Knockout phase play-offs | Round of 16 | Quarter-finals | Semi-finals | Final

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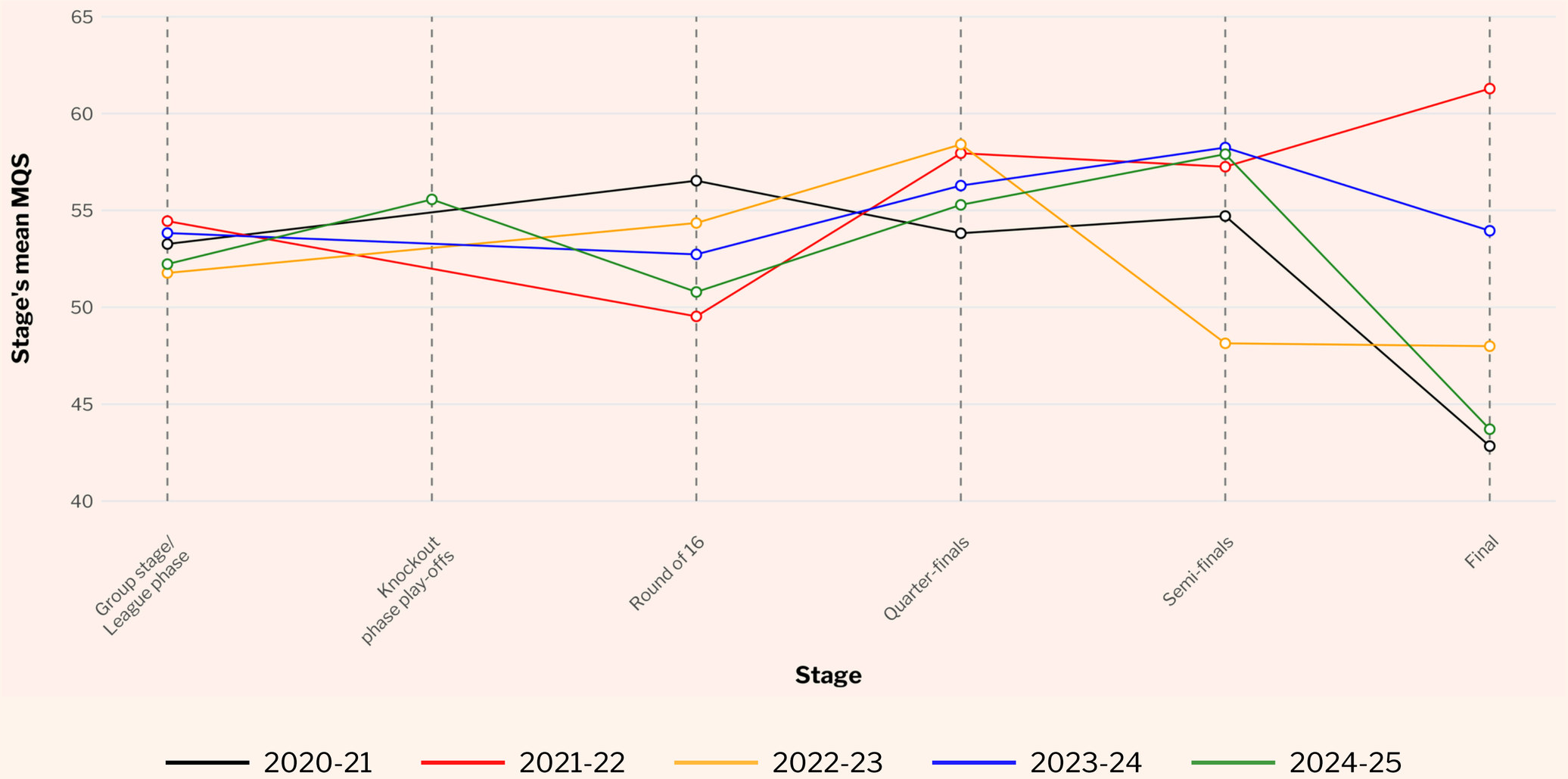
5. Change in average MQS over the stages



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6. Description of metrics

Step 1 - Selection of match statistics

npxG E(Non Penalty Expected Goals), **SoT** (Number of Shots on Target), **xAG E** (Expected Assisted Goals), **SCA** (Number of Shot-Creating Actions), **GCA** (Number of Goal-Creating Actions), **PrgP** (Number of Progressive Passes), **PrgC** (Number of Progressive Carries), **STO** (Number of Successful Takes-Ons), **Tkl** (Number of Tackles), **Int** (Number of Interceptions), **Blocks** (Number of Blocks)

Step 2 - Compute the Empirical Cumulative Distribution for each statistic of a team *t* in match *m*

$$M(v_{s,\,t,\,m}) = \sum_{i=1}^{n} \mathbf{1}_{\{x_{s,i} \le v_{s,\,t,\,m}\}} \times 100$$

Where:

- $\boldsymbol{v_{s,t,m}}$ is the value of the statistic ***s*** for team ***t*** in match ***m***
- $\boldsymbol{x_{s,i}}$ is the value of the statistic ***s*** for the team performance ***i***
- $\mathbf{1}_{\{xs,i \le v,s,t,m\}}$ is an indicator function that equals **1** if $\mathbf{x_{i,s} \le v_{s,t,m}}$ else **0**
- ***n*** is the number of team performances from the 2020-21 to 2024-25 Champions Leagues seasons

Step 3 - Compute the TMQS for a team *t* and a match *m*

$$\mathbf{TMQS_{t,\,m}} = \frac{\begin{array}{c} M(v_{npxg\ E,\,t,\,m}) + M(v_{SoT,\,t,\,m}) + M(v_{xAG\ E,\,t,\,m}) + M(v_{SCA,\,t,\,m}) + \\ M(v_{GCA,\,t,\,m}) + M(v_{PrgP,\,t,\,m}) + M(v_{PrgC,\,t,\,m}) + M(v_{STO,\,t,\,m}) + \\ M(v_{Tkl,\,t,\,m}) + M(v_{Int,\,t,\,m}) + M(v_{B,t,\,m}) \end{array}}{11}$$

Step 4 - Compute the MQS for a match m

$$\mathbf{MQS_m} = \frac{TMQS_{\text{ Home team, m}} + TMQS_{\text{ Away team, m}}}{2}$$