



2023 WOMEN'S WORLD CUP PASSING EDA

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DATA BACKGROUND

- Data derived from Hudl StatsBomb
 - Documents all individual passes from the 2023 Women's World Cup
- **Notable variables**
 - Team and player id
 - Pass characteristics
 - Under pressure, pass outcome name
 - Game state
 - Pass tracking coordinates



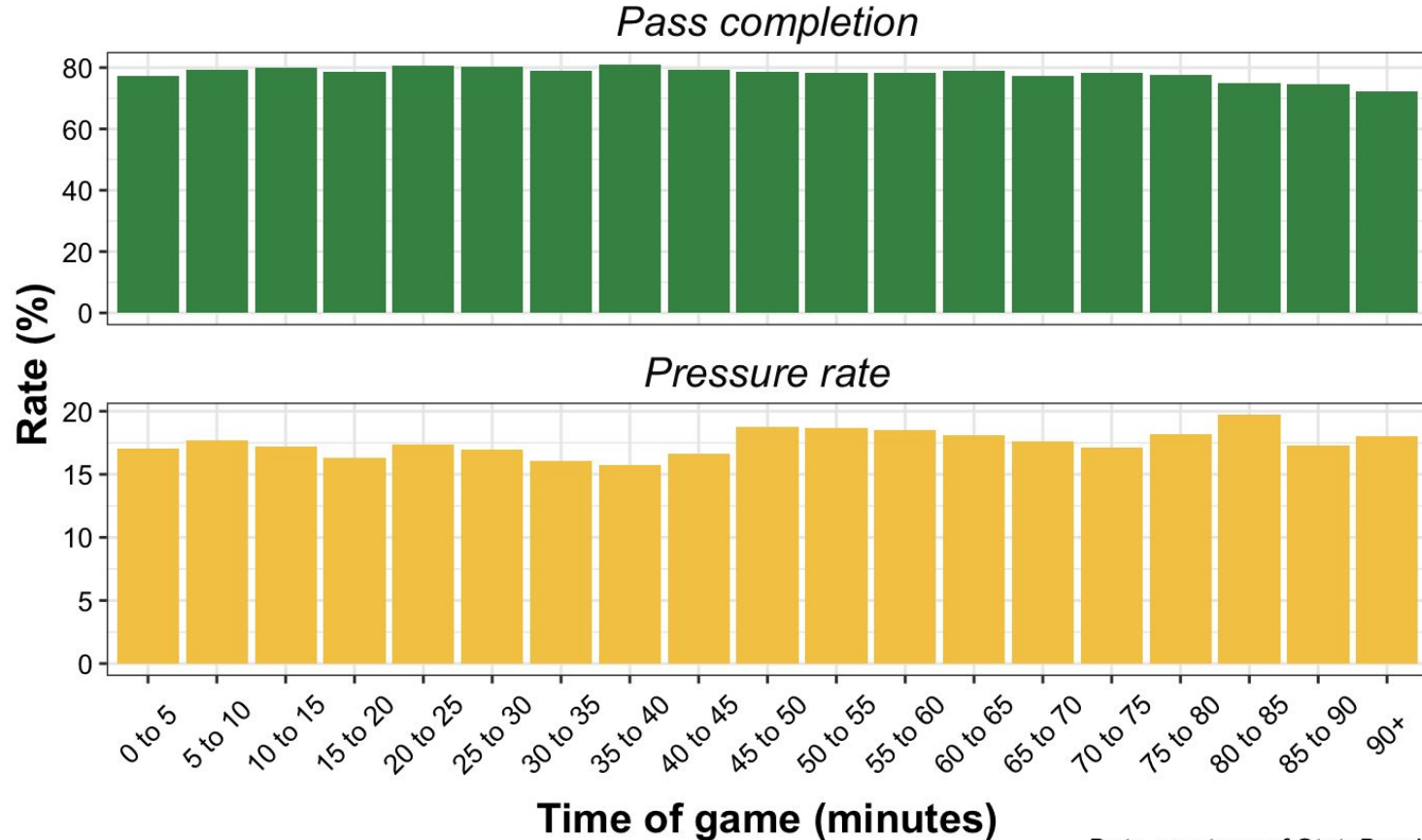


01:

PASSING EFFECTIVENESS

How do teams' passing abilities generally change as the game goes on?

Passing rates in 2023 WWC games fluctuate depending on time of game



Data courtesy of StatsBomb



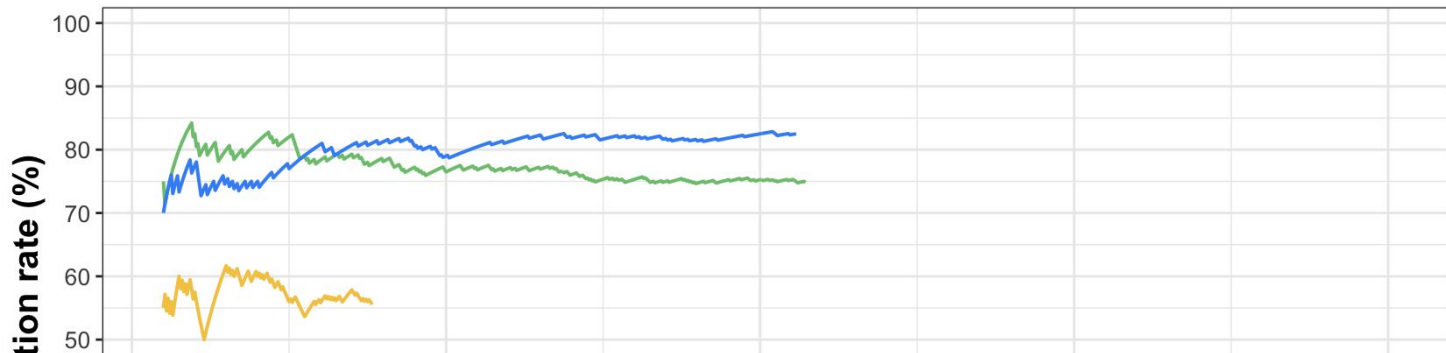
02

PASSING AS A TEAM

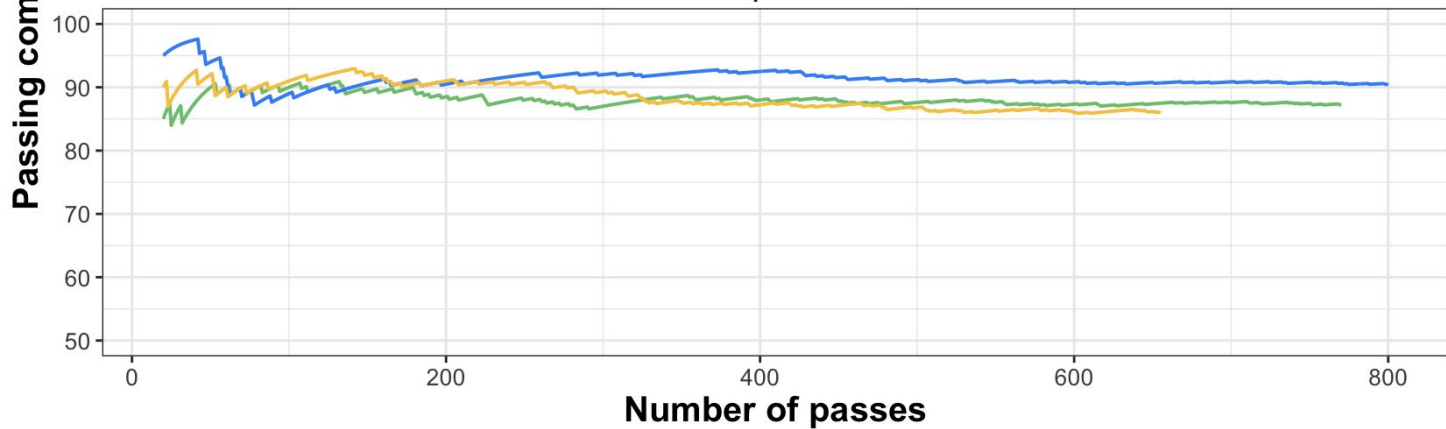
How can we distinguish teams by their passing performances throughout games?

Spain (2-0-1) is consistent in passing completion percentage through group stage compared to Costa Rica (0-0-3)

Costa Rica



Spain



Oponent

- Zambia
- Japan
- vs. Each Other

03

K-MEANS CLUSTERING

How can we segment players based on their passing performances?



SEGMENTING PLAYERS INTO 5 GROUPS

- k-means clustering analysis
- Variables used
 - Pass completion
 - Pass completion under pressure
 - Mean pass length
- Filtered data set to 320 players to reduce small sample passing

Median passing measures per cluster

CLUSTER	DESCRIPTION	PASS COMPLETION RATE (%)	PASS COMPLETION RATE UNDER PRESSURE (%)	PASS LENGTH (METERS)
1	Poor passers	58.82	44.44	16.74
2	Average passers	71.72	64.85	17.20
3	Accurate short passers	81.07	81.25	15.91
4	Accurate long passers	82.46	80.00	20.22
5	Longest passers	67.24	63.64	24.15

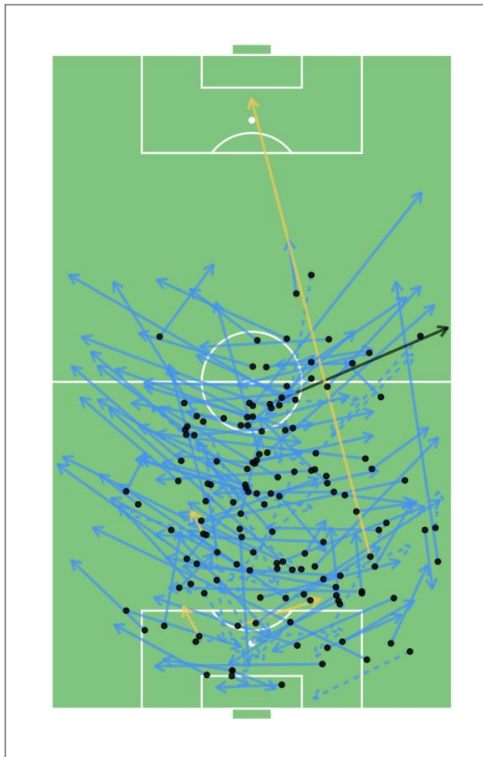
Data provided by StatsBomb

ANALYZING CLUSTERS: PASSING SPREADS



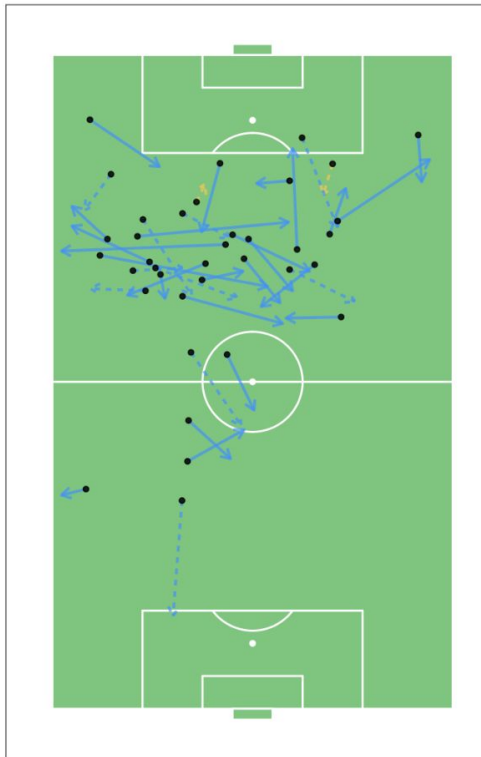
CLUSTER 4

Elena Linari
Italian Right Center Back



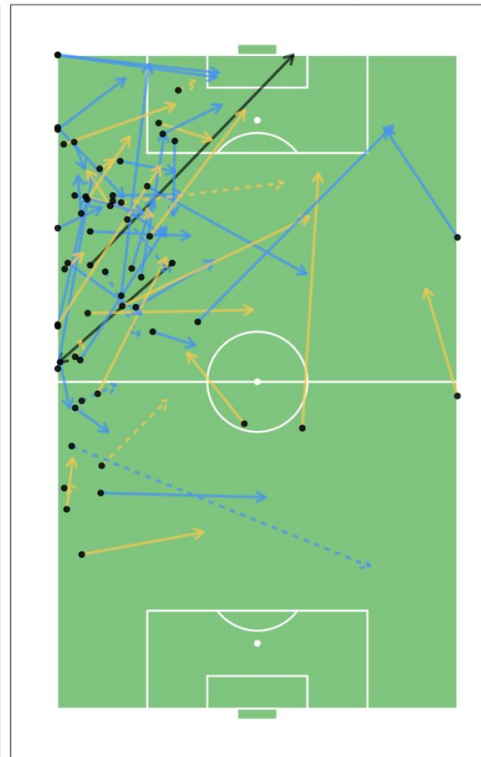
CLUSTER 3

Wieke Hendrikje Maria Kaptein
Dutch Left Center Midfielder



CLUSTER 1

Megan Anna Rapinoe
American Left Winger



Under Pressure?

→ FALSE

- -> TRUE

Pass Outcome

→ Complete

→ Incomplete

→ Out

LIMITATION: POSITIONAL CHANGES

- Players change positions throughout games
- Can we determine the best passers by position?
 - With more data (games played), we can better determine which position a player should be evaluated in

Chloe Kelly (England) passing completion per position

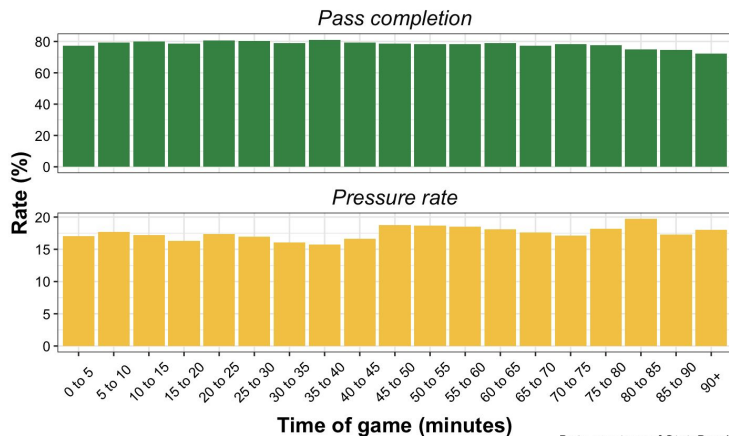


POSITION NAME	PASS COMPLETION RATE (%)
Center Forward	42.86
Left Center Forward	75.00
Left Wing	60.00
Left Wing Back	25.00
Right Center Forward	66.67
Right Midfield	75.00
Right Wing	63.75

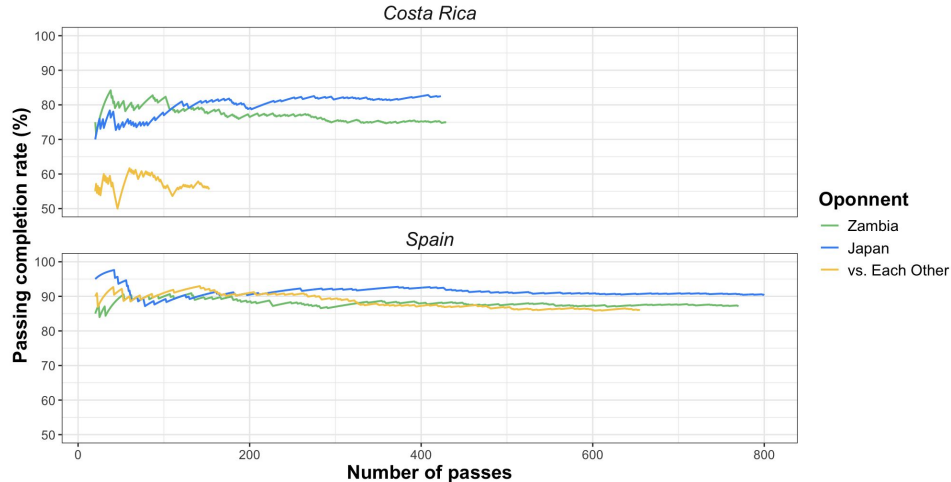
HOW CAN WE USE THIS DATA?

- Answering these questions can better prepare coaches and players for games
- More robust player valuation across team playstyle and strength

Passing rates in 2023 WWC games fluctuate depending on time of game



Spain (2-0-1) is consistent in passing completion percentage through group stage compared to Costa Rica (0-0-3)



A decorative vertical bar on the left side of the slide. It consists of several colored sections: a teal wavy pattern at the top, a purple solid rectangle, an orange wavy pattern, a yellow solid rectangle, and a red wavy pattern at the bottom. A soccer ball is positioned in the bottom red section. To the left of these sections is a light purple background with a darker purple wavy pattern.

THANK YOU!

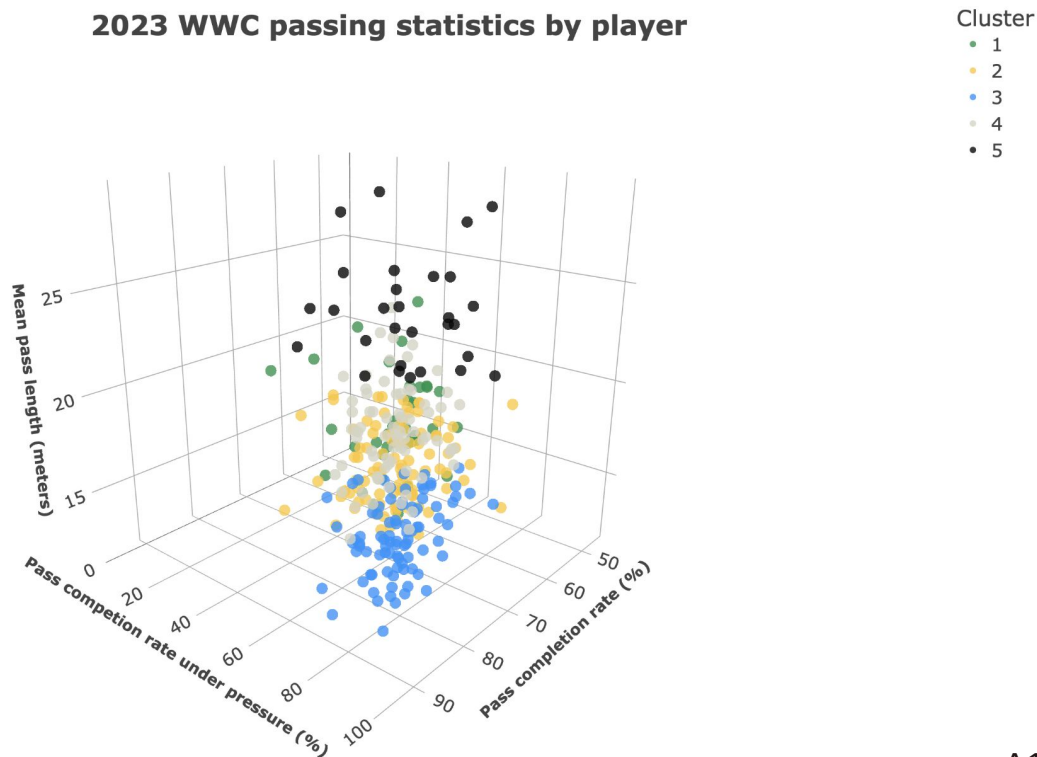
QUESTIONS?

APPENDIX

APPENDIX: 3D CLUSTERING VISUALIZATION

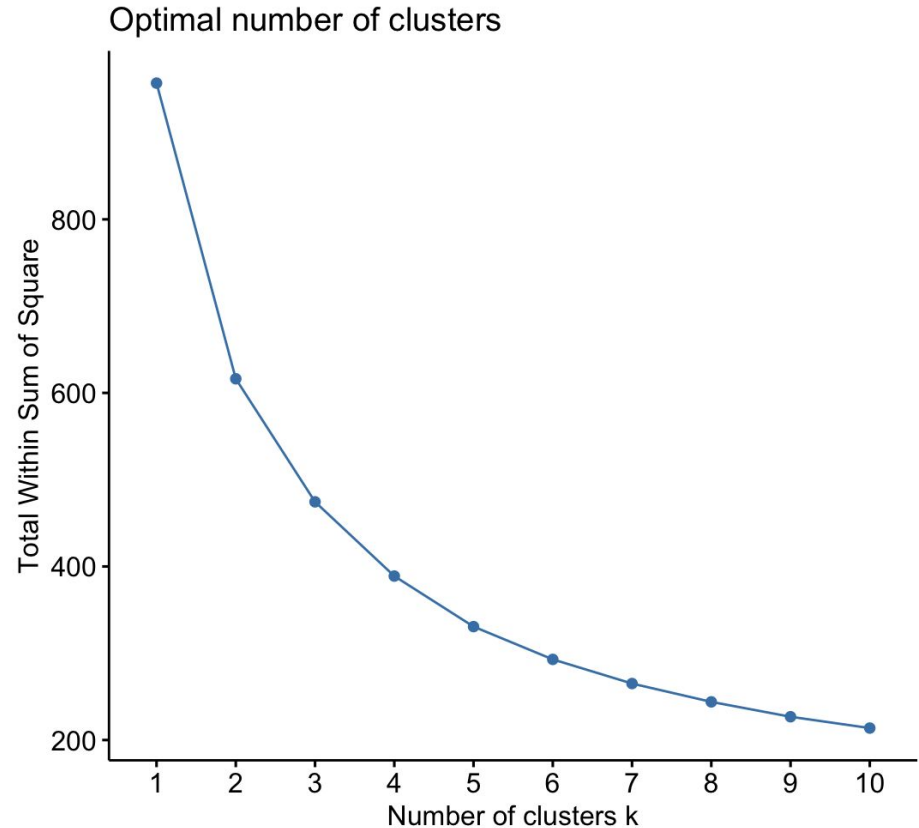
- 3D Render
- 320 players clustered
 - Eliminated GKs
 - Minimum 24 passes attempted
 - Minimum pressure rate of 12%
- Original data
 - 612 players
 - 56,710 passes

2023 WWC passing statistics by player



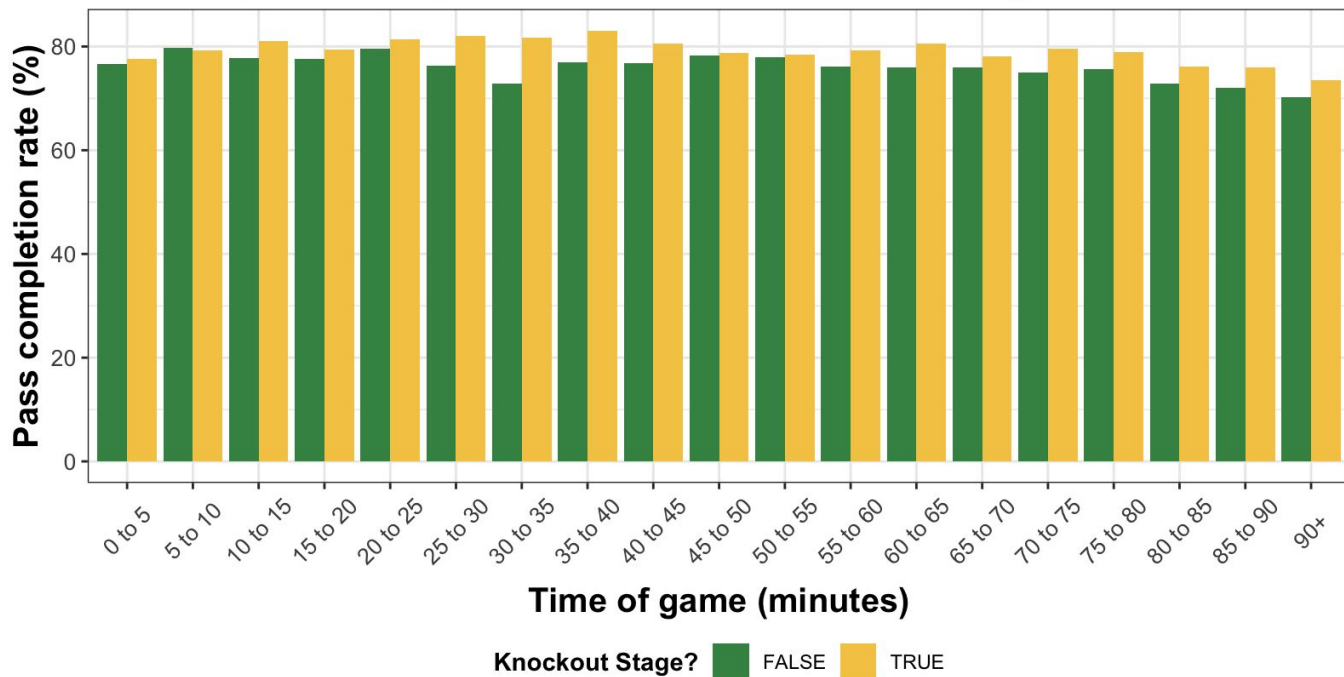
APPENDIX: CHOOSING CLUSTER NUMBER

- Utilized elbow plot
 - Felt elbow was at 5
 - Gave sufficient, logical results
 - Consistent with general passing patterns



APPENDIX: KNOCKOUT VS NON-KNOCKOUT TEAMS

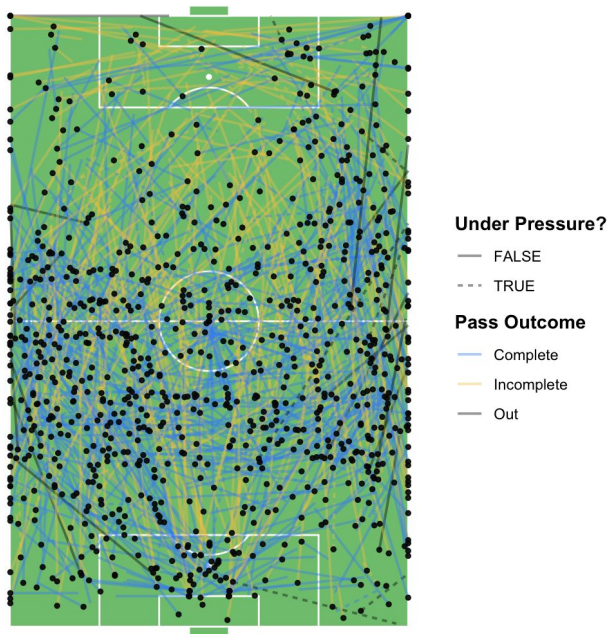
Knockout stage teams maintain better passing completion percentages than non-knockout stage teams



APPENDIX: GOOD PLAYER, BAD SYSTEM

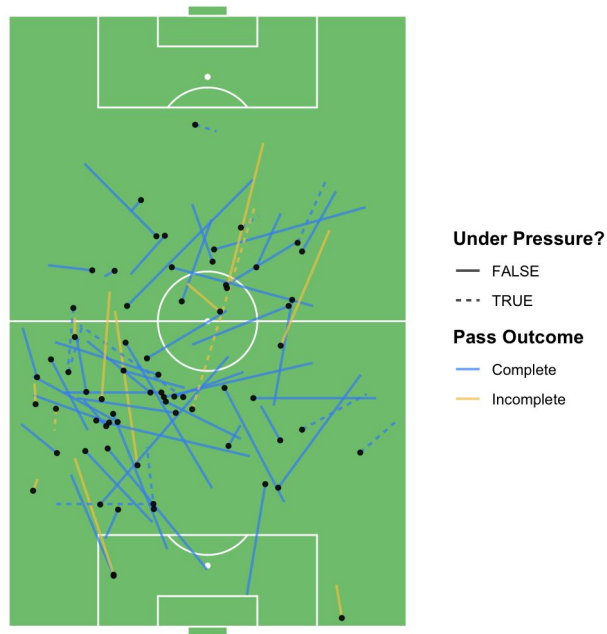


Haitian National Team passing spread
Over three group stage games (0-0-3)



CLUSTER 3

Dayana Pierre-Louis passing spread
Haitian Left Defensive Midfielder



APPENDIX: TEAM CLUSTER COMPOSITION

Spanish National Team Cluster Composition

CLUSTER	NUMBER OF PLAYERS	PROPORTION OF CLUSTERED PLAYERS
2	3	0.20
3	9	0.60
4	2	0.13
5	1	0.07

Data provided by StatsBomb

English National Team Cluster Composition

CLUSTER	NUMBER OF PLAYERS	PROPORTION OF CLUSTERED PLAYERS
1	1	0.08
2	3	0.23
3	4	0.31
4	5	0.38

Data provided by StatsBomb

Italian National Team Cluster Composition

CLUSTER	NUMBER OF PLAYERS	PROPORTION OF CLUSTERED PLAYERS
1	1	0.09
2	1	0.09
3	3	0.27
4	6	0.55

Data provided by StatsBomb

Moroccan National Team Cluster Composition

CLUSTER	NUMBER OF PLAYERS	PROPORTION OF CLUSTERED PLAYERS
1	3	0.23
2	5	0.38
3	3	0.23
5	2	0.15

Data provided by StatsBomb

APPENDIX: NUMBER OF PLAYERS IN EACH CLUSTER

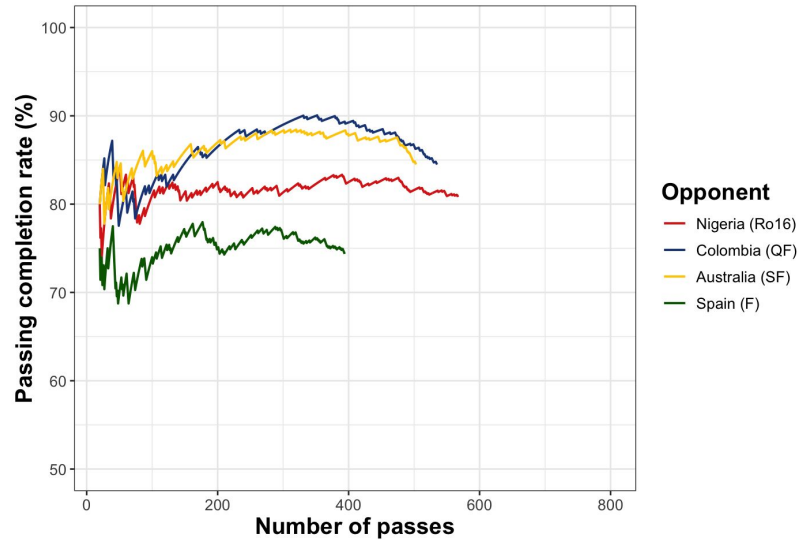
Number of players per cluster

CLUSTER	NUMBER OF PLAYERS
1	37
2	94
3	87
4	73
5	29

Data provided by StatsBomb

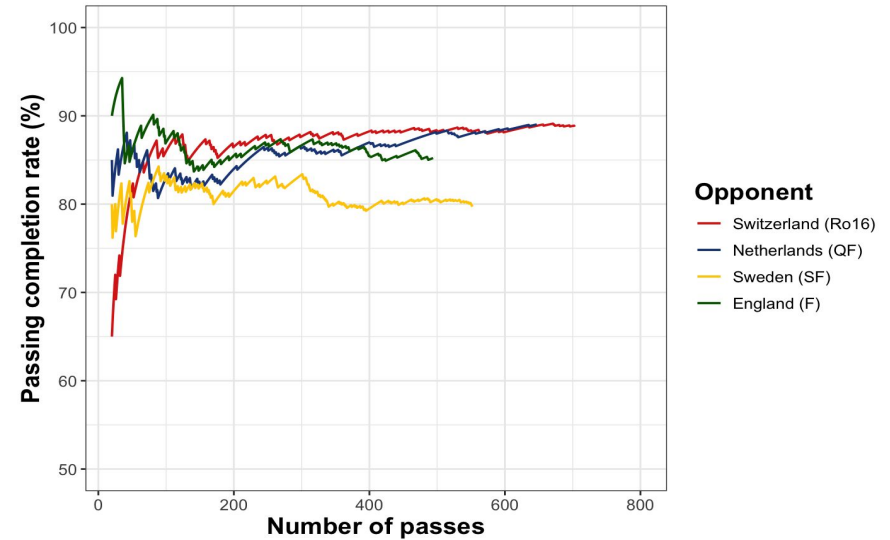
APPENDIX: SPAIN'S PASSING IN THE KNOCKOUT STAGES

English National Team Passing Performance in Knockout Stages



Data courtesy of StatsBomb

Spanish National Team Passing Performance in Knockout Stages



Data courtesy of StatsBomb