MALINA SPORT DATA

YOUR 2018 WFC DATA ANALYTICS GUIDE

Your 2018 WFC Data Analytics Guide
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created on order of Marek Chlumský, Czech Floorball chief methodologist

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Contents

Abbreviations used and definitions

The report uses analytical variables and its abbreviations. This is a place to make a list of them with their definitions. It is crucial to understand correct meaning of these variables and in appropriate sections of the report some are defined again.

BSA	Best scoring area
CP	(= clear path) is a situation in which an attacking player is located in BSA not defended well enough to prevent a chance with a clear path to the net
Corsi	Variable calculated as a difference between all shot attempts (goals, shots on goal, shots wide, shots blocked) for and against a team
CFP	(= cross field pass) is an opening for a pass crossing the axis connecting both goals on the offensive half of the pitch
Fenwick	Variable calculated as a difference between all unblocked shot attempts (goals, shots on goal, shots wide) for and against a team
GSD	Goal scoring data
KPI	Key performance indicators
OMR	(= odd man rush) is a possession type in which an offense outnumbers defense in an attack originating on defensive half of an attacking team
PBD	Possession-based data
PDO	Variable calculated as shooting percentage plus goalkeeping percentage of a team
QA	(= quick attack) is a possession type in which attacking team transitions the ball quickly from defensive half to the offensive one with an aim to score
SA	(= slow attack or also organized attack) is a possessions type in which attacking team is slowly advancing up the field in order to score
TO	(= turnover) is a possession type in which attacking team steals a ball on offensive half with an attempt to score
WFC	World floorball championships

Summary

Aim of this document is to present results of data analysis of the 2018 World Floorball Championships (WFC). There are three main areas of interest.

First is to compare different attributes on goals scored at the 2018 WFC and 2016 WFC. This goal scoring data contain all 48 games and 16 teams at the 2018 WFC.

The second is to offer a comprehensive analysis of possessions-based data that were tracked in all 24 games of elite 8 teams at the 2018 WFC. This attempts to better understand a recent state of an international floorball on its top level with its specifics.

Finally, third is to open a discussion on what presented data results mean and how can they be used for an actual game.

Key findings of the goal scoring data are as follows:

- The strongest (+0.91) correlation with tournament goal differentials of all 16 teams belongs to **shots on goal differential**. Teams that outshoot the opponent tend to outscore them.

- The strongest (+0.87) correlation with a win percentage of all teams belongs to **PDO**. At the end of the game it is an efficiency of teams that matters the most.

- **Shooting percentage** correlates stronger (+0.80) with a goal differential than **save percentage** (+0.68) but it is the opposite (+0.72 vs +0.78) when correlating with a win percentage. Goalkeeping plays less significant role than shooting when it comes to greater quality gap between opponents but it is goalkeeping with stronger significance when the game comes down to a close decision.

- Average goal differential per game was being reduced at each WFC from 2010 but in 2018 its value was higher (5.2) than in 2016 (4.2). This suggests that overall **quality gaps** among teams were **bigger in 2018** and less even games were to be seen than at the 2016 WFC.

- There were only 8.1% goals scored on power play at the 2018 WFC which was significantly less than in 2016 (14.5%). **Power plays did not play** that **big** of a **role** at the 2018 WFC.

Possession based data brought a new insight to the game recognizing which plays are more dangerous than others at even strength. These are key findings:

- The most dangerous aspect of possessions were **clear path opportunities**. Possession including them were 9 times more dangerous than common attack possessions and 53% even strength goals were scored after executed clear path opportunity

- **Cross field pass opportunities** were as important as clear path opportunities. They correlated slightly stronger (+0.86) with game by game goal differentials than clear paths (+0.84) and increased a goal percentage of every possession type.

- Giving special attention to shot attempts from the **best scoring area** would be wrong approach as simple shot differential (corsi) correlated stronger (+0.70 < +0.71) with a game by game goal differentials.

- Power-play analysis helped to **redefine cross field pass** opportunities and their real danger in cutting through the defensive formation.

Discussion focused on looking for ways how to melt results of data analysis into the game of floorball. Key findings of this part are summarized below:

- Focusing on creating and preventing turnover possessions and tracking shot attempts from the best scoring area proved to be **irrelevant** at the 2018 WFC

- Clear path and redefined cross field pass opportunities must continue **to be tracked** in floorball

- Shot blocking, odd man rushes and defensive mistakes seem to be an **interesting** area **to** study and **track** data on (with some question marks)

- **Examples** from real games at the 2018 WFC on how to create and prevent clear path opportunities are presented

- Need to explain and understand data results serves as a **stepping stone** to video analysis and usage of findings in the game of floorball

Introduction

Every two-year period the World Floorball Championships (WFC) takes place. With floorball progressing as a sport new ways to look at the game are explored. In 2018 the KIHU - Research Institute for Olympic Sports published "How to score Goals in Floorball! Analysis of Goal Scoring in the IFF Men´s World Floorball Championships 2016"[1]. The report attempted to describe goal scoring at the 2016 WFC using comprehensive data and statistical analysis.

Malina Sport Data launched data tracking and analyzing the game of floorball in 2016 with cooperation with the Czech Floorball Federation. The cooperation led to the project for the 2018 WFC in Prague (December 1-9, 2018). The project aimed to track 24 games from elite groups A and B and elite stage play-offs at the 2018 WFC using possessions-based data approach.

The report aims to both connect and compare data from the 2016 and 2018 WFC and offer comprehensive data analysis of the game studying each and every possession at the 2018 WFC games. Author believes this kind of analysis can bring not only new but also significant tool on how to analyze and understand the game of floorball. Furthermore, based on this analysis the stepping stone in form of a discussion is presented in order to connect data outputs with actual floorball plays and strategies used in the game.

Summarizing all stated above this report is divided into three main chapters:

- **Statistical comparisons of the 2016 and 2018 WFC goal scoring data**

- **Analytical insight and evaluation of the 2018 WFC possession based data**

- **Discussion on how to use data results in the actual game**

Here is to thank all contributing to the report. Czech Floorball Federation offered the opportunity to make this report possible and stayed open to support data analysis in floorball. I send my thanks mainly to Tomáš Janča the head of Marketing & Communications at the 2018 WFC for his continuous support of my work. I appreciate support from Marek Chlumský when designing data tracking and output portfolio as well as cooperating on finishing the report. I appreciate comments and advices from Petri Kettunen when reviewing the 2016 WFC report. Also for endless reflection on my work I thank to Susan Wairimu. Last but not least to my great data tracking team. Thank for your effort and support namely to Filip Brauner, Martin Filka, Jan Kropáček and Lukáš Kaďorek.

I, Petr Malina, am very excited to offer a new perspective on the game of floorball and hopefully many points for further discussion involving floorball and data usage in it.

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[1] Kauppi, Vänttinen, Häyrinen, Speldewinde, Kettunen, Liljelund, Ollikainen: Analysis of goal scoring in the IFF men´s world floorball championships 2016. KIHU´s publication serie, no. 60. Jyväskylä 2018. ISBN 978-952-5676-95-2 (pdf)

1. Goal scoring data (GSD)

1.1. Introduction to GSD

Goal scoring data (GSD) was tracked for all 505 goals scored in all 48 games of the 2018 WFC. For each goal scored following information were recorded:

- Length (in seconds) of the possession in which goal was scored

- Area from which the goal was scored

- Distance to goal where the goal was scored from

- Length of pass (assist) before the goal

- Number of passes before the goal (within the possession)

- Defensive mistake

- Pressure type of opponent

- Possession type

- Zone in which the possession started

- Cause of the possession

- Score (goal differential before the goal)

- Situation (even strength, power play, short handed, empty net)

These information (variables) were designed in order to fit the 2016 WFC design. Some variables and its categories were reduced and aggregated to allow comparisons. Some remained rather subjective but attempt to compare was executed with comments added.

The aim of this chapter is to compare the 2016 and 2018 WFC results of how goals were scored. This allows to point out important or interesting specifics of the game.

1.2. Tournament results

The 2018 WFC started with games in the group stage. Group A and group B contained both four teams to create elite 8 teams in total. Similarly group C and group D contained four teams per group. Each team played three group stage games. Based on group standings promotion games were played. Last two from group A and B played best two from group C and D (specifically A3 vs D2, B3 vs C2, A4 vs D1 and B4 vs C1). Winners of this promotion round entered elite quarterfinal round against best two teams from group A and B. Overall 48 games were played with Finland winning the gold, Sweden taking the silver and Switzerland being awarded the bronze.

Basic statistics compares final results, record, win percentage, goal differential, goals for and against per game scored of all teams from the 2018 (values in upper row per team) and 2016 WFC (values in lower row per team).

TABLE 1.1. TOURNAMENT RESULTS AND BASIC STATS

Team	WFC Results	Record	Win%	Goal differentials	Goals for per game	Goals against per game	Group stage level
Finland	1	6-5-0-1	83%	39-13	6.5	2.2	Top 8
	1	6-5-1-0	92%	43-14	7.2	2.3	Top 8
Sweden	2	6-4-1-1	75%	60-16	10.0	2.7	Top 8
	2	6-5-1-0	92%	44-14	7.3	2.3	Top 8
Switzerland	3	6-4-1-1	75%	35-18	5.8	3.0	Top 8
	3	6-4-0-2	67%	40-27	6.7	4.5	Top 8
Czech Republic	4	6-3-0-3	50%	33-25	5.5	4.2	Top 8
	4	6-3-0-3	50%	37-29	6.2	4.8	Top 8
Latvia	5	7-3-1-3	50%	28-38	4.0	5.4	Top 8
	10	6-1-2-3	33%	31-34	5.2	5.7	Top 8
Germany	6	7-3-0-4	43%	26-42	3.7	6.0	Top 8
	7	7-2-1-4	36%	26-55	3.7	7.9	Top 8
Norway	7	7-3-1-3	50%	37-34	5.3	4.9	Top 8
	6	7-2-1-4	36%	27-41	3.9	5.9	Top 8
Denmark	8	7-1-0-6	14%	15-66	2.1	9.4	Top 8
	5	7-5-1-1	79%	34-26	4.9	3.7	Top 16

Slovakia	9	6-5-0-1	83%	65-20	10.8	3.3	Top 16
	9	6-4-0-2	67%	36-23	6.0	3.8	Top 16
Estonia	10	6-4-0-2	67%	42-24	7.0	4.0	Top 16
	8	7-1-1-5	21%	40-47	5.7	6.7	Top 8
Canada	11	6-2-1-3	42%	31-39	5.2	6.5	Top 16
	12	6-2-0-4	33%	13-41	2.2	6.8	Top 16
Australia	12	6-2-0-4	33%	21-44	3.5	7.3	Top 16
	15	5-1-1-3	30%	19-31	3.8	6.2	Top 16
Poland	13	5-3-0-2	60%	25-13	5.0	2.6	Top 16
	13	5-2-1-2	50%	29-21	5.8	4.2	Top 16
Thailand	14	5-1-0-4	20%	14-32	2.8	6.4	Top 16
	14	5-2-0-3	40%	24-20	4.8	4.0	Top 16
Japan	15	5-1-0-4	20%	14-46	2.8	9.2	Top 16
	-	-	-	-	-	-	-
Singapore	16	5-1-1-3	30%	20-35	4.0	7.0	Top 16
	16	5-1-0-4	20%	18-38	3.6	7.6	Top 16

Latvia experienced the biggest jump when finished 5th at the 2018 WFC (comparing to 10th at the 2016 WFC). Australia was also able to finish significantly better in 2018 (12th) compared to 2016 (15th). On the other hand Denmark finished three places worse when comparing 2018 (8th place) and 2016 (5th place) results.

1.3. Key Performance Indicators (KPI)

The 2016 WFC report designed Key Performance Indicators in order to compare all 16 teams testing (using r-squared measure) significance of every KPI. This inspired to compile results from both 2016 and 2018 WFC results and test certain comparable variables (KPI´s).

TABLE 1.2. KEY PERFORMANCE INDICATORS FOR TEAMS

Team	Shots on goal for per game	Shots on goal against per game	Shots on goal differential per game	Shots on goal for%	Goal%	Save%	PDO	Goal differential per game	Win%
Finland	26.5	16.3	+10.2	60.6%	24.5%	86.7%	111.3	+4.3	83%
	27.3	14.7	+12.7	65.1%	25.6%	84.1%	109.7	+4.7	92%
Sweden	34.5	14.0	+20.5	71.1%	29.0%	81.0%	109.9	+7.3	75%
	37.3	18.8	+18.2	66.5%	19.6%	88.5%	108.1	+5.2	92%
Switzerland	22.2	21.8	+0.3	50.4%	26.3%	86.3%	112.6	+2.8	75%
	25.5	25.2	+0.3	50.3%	26.1%	82.1%	108.3	+2.2	67%
Czech Republic	26.8	15.2	+11.7	63.9%	20.5%	72.5%	93.0	+1.3	50%
	29.0	21.2	+9.5	57.8%	21.3%	77.2%	98.4	+1.3	50%
Latvia	18.0	23.3	-5.3	43.6%	22.2%	76.7%	98.9	-1.4	50%
	27.8	25.3	+2.5	52.4%	18.6%	78.3%	96.9	-0.3	33%
Germany	19.6	25.1	-5.6	43.8%	19.0%	76.1%	95.1	-2.3	43%
	24.1	35.0	-10.9	40.8%	15.4%	77.6%	92.9	-4.1	36%
Norway	23.3	26.1	-2.9	47.1%	22.7%	81.4%	104.1	+0.4	50%
	20.6	26.3	-5.7	43.9%	18.8%	78.3%	97.0	-1.9	36%
Denmark	15.6	36.1	-20.6	30.1%	13.8%	73.9%	87.7	-7.3	14%
	20.7	25.7	-5.0	44.6%	22.1%	85.6%	107.6	+0.9	79%
Slovakia	34.3	15.3	+19.0	69.1%	31.6%	78.3%	109.8	+7.5	83%
	22.2	21.7	+0.5	50.6%	27.1%	82.3%	109.4	+2.2	67%

Estonia	31.2	21.0	+10.2	59.7%	22.5%	81.0%	103.4	+3.0	67%
	25.3	30.0	-4.7	45.7%	22.6%	77.6%	100.2	-1.0	21%
Canada	21.8	27.7	-5.8	44.1%	23.7%	76.5%	100.2	-1.3	42%
	22.7	29.3	-6.7	43.6%	9.6%	76.7%	86.3	-4.7	33%
Australia	16.5	28.2	-11.7	36.9%	21.2%	74.0%	95.2	-3.8	33%
	22.4	31.6	-7.7	41.5%	17.0%	80.4%	97.3	-2.4	30%
Poland	23.4	15.2	+8.2	60.6%	21.4%	82.9%	104.3	+2.4	60%
	31.4	20.0	+11.4	61.1%	18.5%	79.0%	97.5	+1.6	50%
Thailand	17.8	21.0	-3.2	45.9%	15.7%	69.5%	85.3	-3.6	20%
	23.4	25.2	-1.8	48.1%	20.5%	84.1%	104.6	+0.8	40%
Japan	15.4	34.8	-19.4	30.7%	18.2%	73.6%	91.7	-6.4	20%
	-	-	-	-	-	-	-	-	-
Singapore	24.6	27.4	-2.8	47.3%	16.3%	74.5%	90.7	-3.0	30%
	23.0	27.4	-4.4	45.6%	15.7%	72.3%	87.9	-4.0	20%
USA	-	-	-	-	-	-	-	-	-
	21.5	23.2	-1.7	48.1%	20.9%	80.6%	101.5	0	50%

Last two columns (Goal differential per game and Win percentage) serve as dependent variables in correlation testing with other KPI´s. These included per game values such as shots on goals for, shots on goals against, shots on goal differential (shots on goal for percentage), shooting percentage, save percentage and PDO (=sum of shooting percentage and save percentage).

Correlations for the **Goal differential per game** dependent variable are:

+0.91 for Goal differential per game and Shots on goal differential per game (or Shots on goal for percentage)
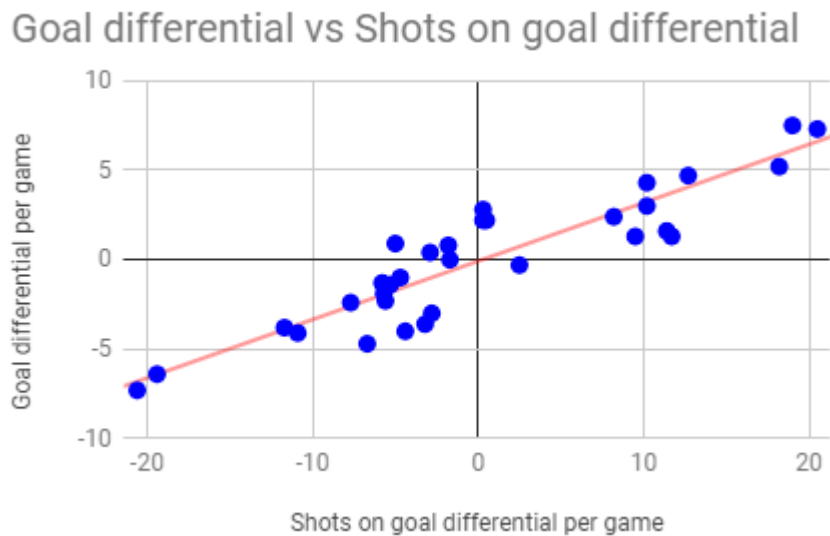
+0.86 for Goal differential per game and PDO

-0.85 for Goal differential per game and Shots on goal against per game

+0.80 for Goal differential per game and Shooting efficiency (=Shooting percentage)

+0.79 for Goal differential per game and Shots on goal for per game

+0.68 for Goal differential per game and Save efficiency (=Save percentage)

FIGURE 1.1. CORRELATION OF GOAL DIFFERENTIAL AND SHOTS ON GOAL DIFFERENTIAL

Goal differential vs Shots on goal differential

Correlations for the **Win percentage** dependent variable are:

+0.87 for Win percentage per game and PDO

+0.78 for Win percentage and Save efficiency (=Save percentage)

+0.75 for Win percentage and Shots on goal differential per game (or Shots on goal for percentage)
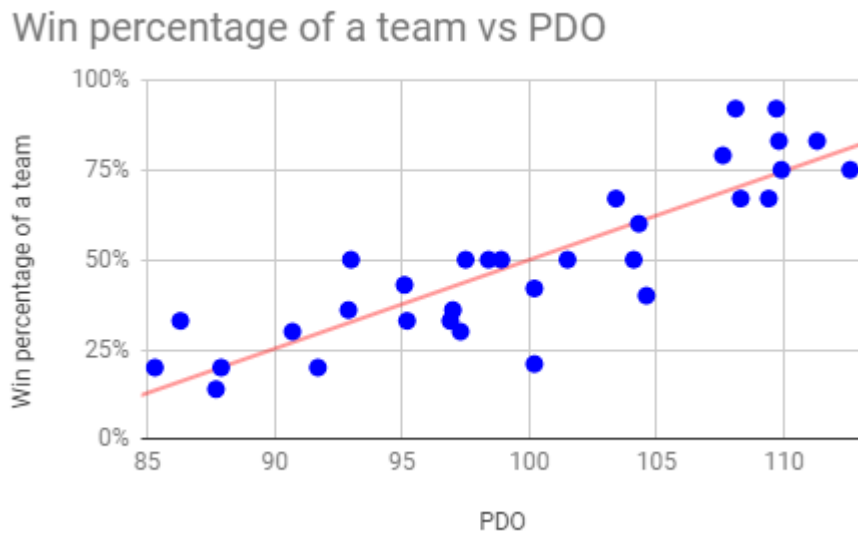
-0.74 for Win percentage and Shots on goal against per game

+0.72 for Win percentage and Shooting efficiency (=Shooting percentage)

+0.61 for Win percentage and Shots on goal for per game

FIGURE 1.2. CORRELATION OF WIN PERCENTAGE AND PDO

Win percentage of a team vs PDO

These are very interesting findings for a discussion. Let´s attempt to summarize and discuss:

- Overall there are **higher correlations** found for **Goal differential per game** than for Win percentage. This makes sense as Goal differential brings more detailed information from each game than simple win x draw x loss data assignment.

- **Strongest** correlation (+0.91) found for **Goal differential per game** and **Shots on goal differential**. Simply put teams that outshoot the opponent tend to outscore them.

- **Shooting percentage** correlates **stronger** (+0.80) **with Goal differential** per game than **Save percentage** (+0.68). This tells us that goalkeeping plays less significant role than shooting when it comes to a goal differential.

- However when testing **Win percentage** the **strongest** correlation (+0.87) belongs to **PDO**. It means at the end of the game it is a team´s efficiency that matters the most. PDO might be slightly worse indicator than shots on goal differential when it comes to more wilder but when accounting for winner of the game PDO brings the best results.

- **Save percentage** correlates stronger than **Shooting percentage** with **Win percentage**. Again if the quality gap is bigger shooting and offence leads the way to determine the final goal differential but it is goalkeeping with stronger significance when it comes down to decide the winner more often. So in close games it might be your goalkeeper as a deciding factor.

- **Shots on goal against** have **stronger** correlation with both Goal differential and Win percentage **than Shots on goal for**. Quality teams can keep opponent with lower numbers in terms of shots against.

It is important to note that data sample is still limited (16 teams each with data from 5-7 games) and further testing on other levels should be done to revisit findings stated above.

In **2016** independent variables such as tournament ranking, goals for, goals against and goal differential were used for correlation testing. Goal differential (selected as independent variable in 2018) correlated the strongest with corsi percentage (+0.87) and with PDO much less (+0.64) in 2016. While corsi (or shot on goal differential in 2018) proved to be significant in case of PDO variable this is much less than in 2018 (+0.86). Relative importance of both corsi and PDO should be of interest to continue evaluating in floorball.

1.4. Goals

There were 505 goals scored (10.5 goals per game) in the 2018 WFC which is 17 more than in the 2016 WFC. Considering only 24 games of top 8 teams here are goals per game and goal difference per game rates comparing last five tournaments.

FIGURE 1.3. GOALS AND GOAL DIFFERENTIAL PER GAME FOR TOP 8 TEAMS COMPARISON
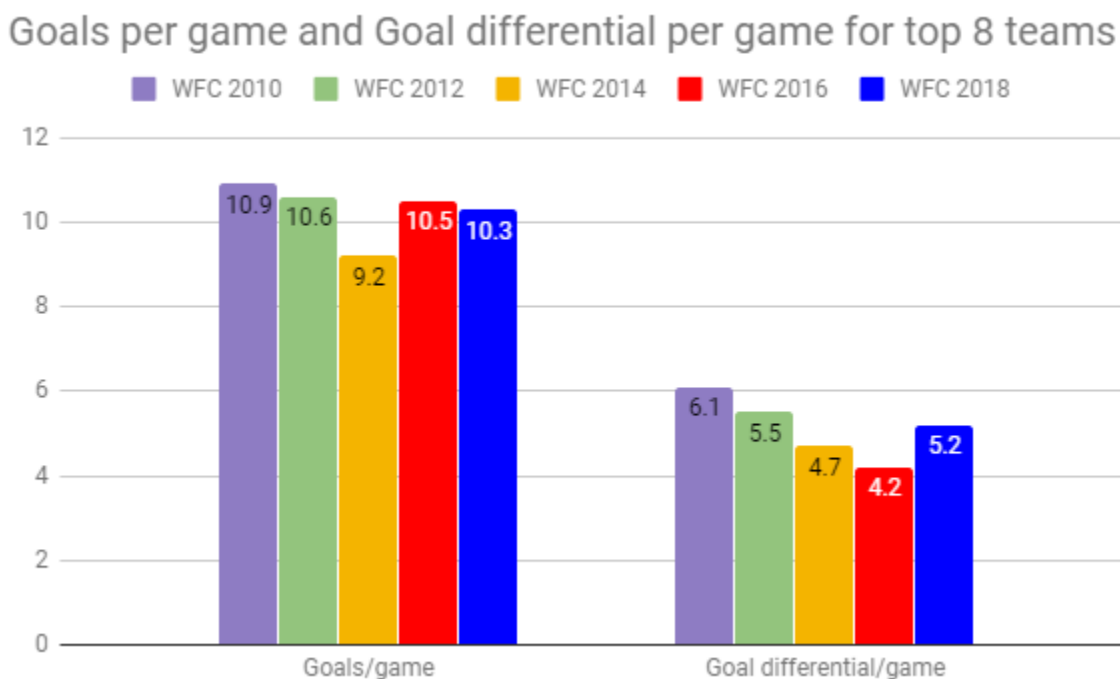
Goals per game for top 8 team games was only 10.3 which is less than in 2016, 2012 and 2010. Decreasing trend of goal differential per game in time does not continue. Yes, score 25-0 in the Sweden vs Denmark game had significant influence but even with removing it the 2016 goal difference per game still remains the lowest one.

Next figure focused on categorized goal differential comparing the 2018 and 2016 WFCs. It evaluates 0-2, 3-4 and 5+ goal differentials and its occurence in both last two WFCs.

Goal differentials at the WFC 2016 and WFC 2018
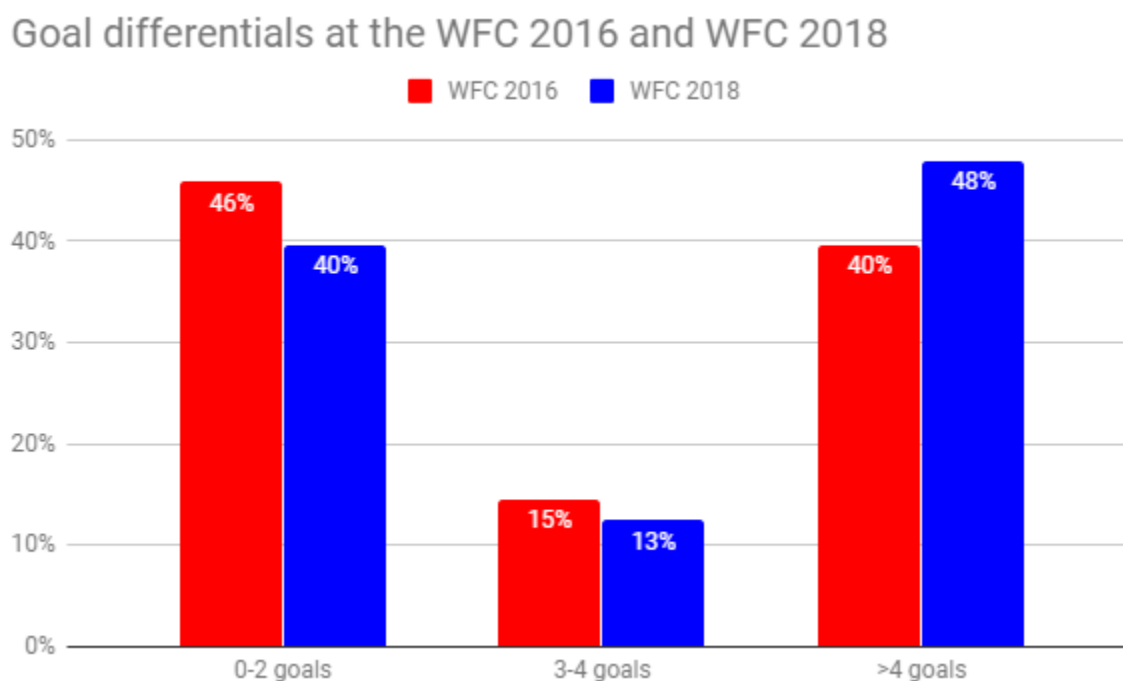
There were more (22 vs 19) games that ended with 0-2 goal differential in the 2016 WFC and even more 3-4 goal differential results (7 vs 6).

Overall games of top 8 teams at the 2018 WFC were less exciting (less goals scored and greater goal differential) than these at the 2016 WFC.

1.3.1. SCORE EFFECT

Four basic questions are studied:

- How many goals lead is safe from the winning point of view?

- How important is the first goal?

- How important is to lead after period 1?

- How important is to lead after period 2?

When removing 3 draws that happened studying of 45 games at the 2018 WFC was proceeded.

From these 45 games in 17 games (**38%**) the **winner** had to **came back** from a goal deficit in the game. One team (Canada) came back from a three goal deficit in the game against Australia. Another five teams were able to win after losing by two goals in the game. That leaves 11 cases in which the winner overcame one goal deficit.

Winners of the game scored the **first goal** in 29 cases (**64%**) while **losers** of the game scored the first goal in 16 cases (**36%**). These are results of lesser importance to score first than in the 2016 WFC. In 2016 winners scored the first goal in 75% of cases, conceded the first goal in 19% and there were no winner in 6% of games. Next graph compares these shares (from all games) in the 2018 and 2016 WFC.

FIGURE 1.5. IMPORTANCE OF THE FIRST GOAL COMPARISON

Importance of the first goal in the 2018 and 2016 WFC
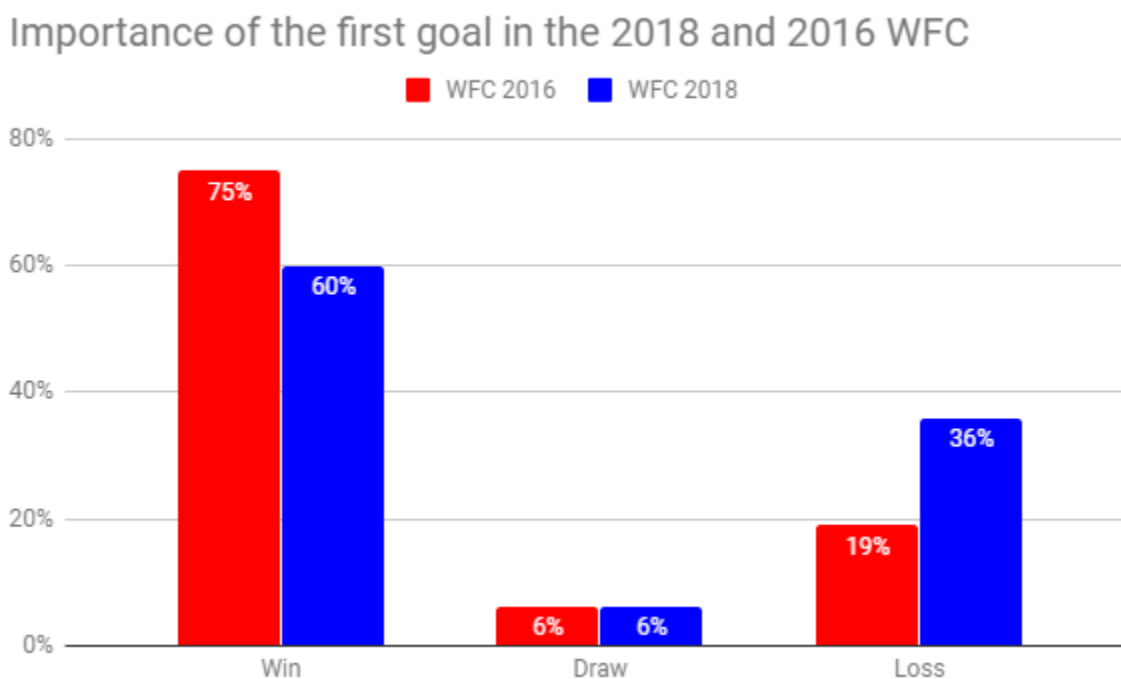
Winners led after period 1 in 31 cases (out of 45) which makes it **69%** share. In 4 cases (**9%**) the **score was tied** after period 1 and in 10 cases (**22%**) it was a **losing team leading** after period 1.

Winners led after period 2 in 37 cases (**82%**), the **score was tied** in 5 cases (**11%**) and the **losing team led** after period 2 in 3 cases (**7%**).

1.3.2. TIMING OF GOALS

Firstly overall figures compare the 2018 and 2016 WFC results representing number of goals scored by different periods including overtime and penalty shootout deciding goals.

FIGURE 1.6. SHARE OF GOALS SCORED BY PERIODS AT THE 2018

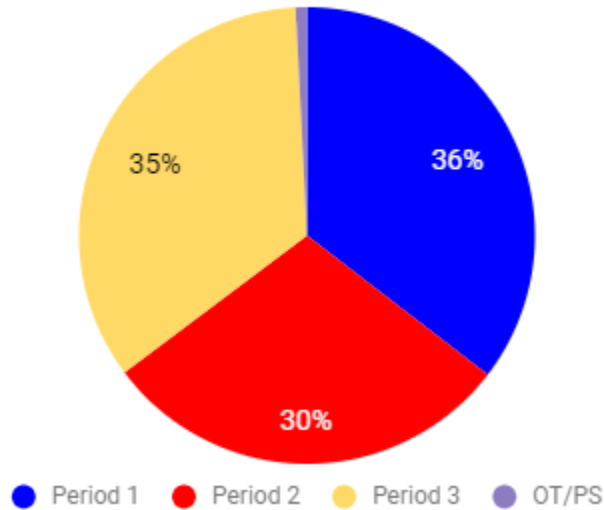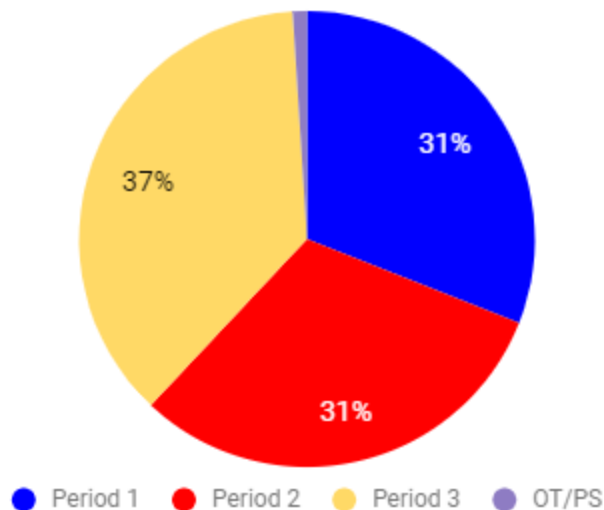Goal shares by periods at the WFC 2018

FIGURE 1.7. SHARE OF GOALS SCORED BY PERIODS AT THE 2016

Goal shares by periods at the WFC 2016

Much bigger share of goals (36% vs 31%) was scored in period 1 at the 2018 WFC than at the 2016 one. For both tournaments it was period 2 with the lowest share of goals scored comparing to other two periods. There was one overtime goal scored (Switzerland over Norway in the quarterfinal game) and three penalty shootout decisions in 2018.

Going deeper inside of each period next figure visualizes goal shares in five minute intervals during the games in both 2018 and 2016 WFCs.
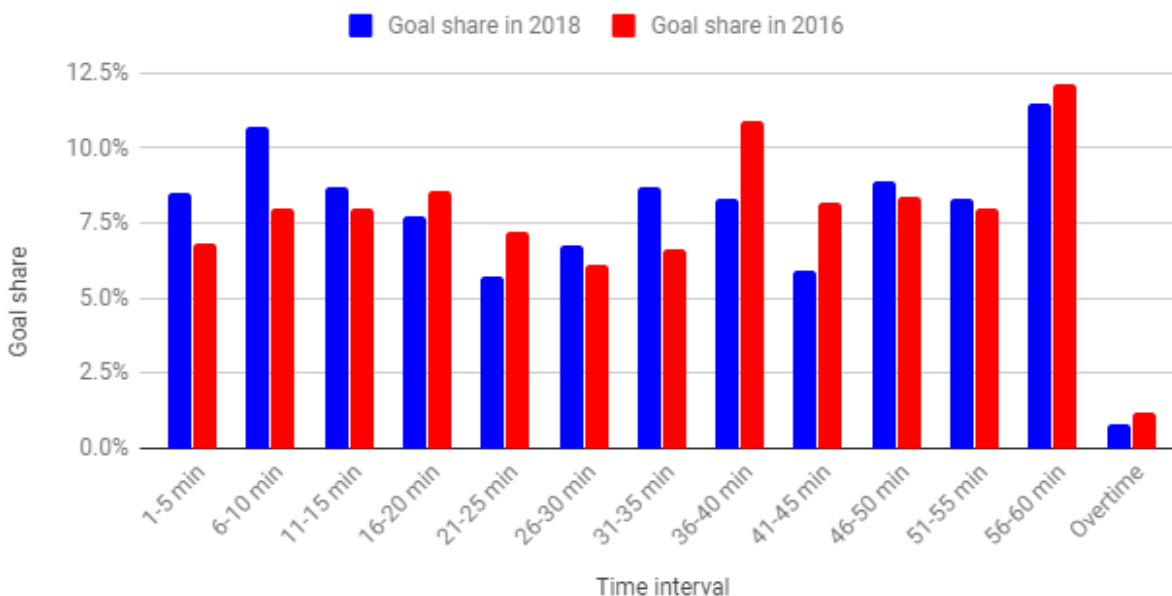

Not surprisingly (trailing teams are trying to tie the game) it is last 5 minutes of games with the highest share of goals scored in both of last two tournaments. Also interval between minutes 21 and 30 seemed to be more conservative one for teams producing low shares of goals scored. Also much higher share of goals was scored in the first 10 minutes of the game in 2018 comparing to 2016.

There were 12 goals scored in empty net situations. 3 goals were scored by teams with empty net (none of these was an equalizing goal) and 9 were scored to the empty net.

1.3.3. SHOOTING POSITION AND DISTANCE

Best scoring area is located in front of the net and naturally the highest share of goals are scored from there. Next figure compares the 2018 WFC results (blue color) and the 2016 WFC ones (red color).

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## FIGURE 1.6. SHARES OF GOALS FROM DIFFERENT SHOOTING AREA COMPARISON
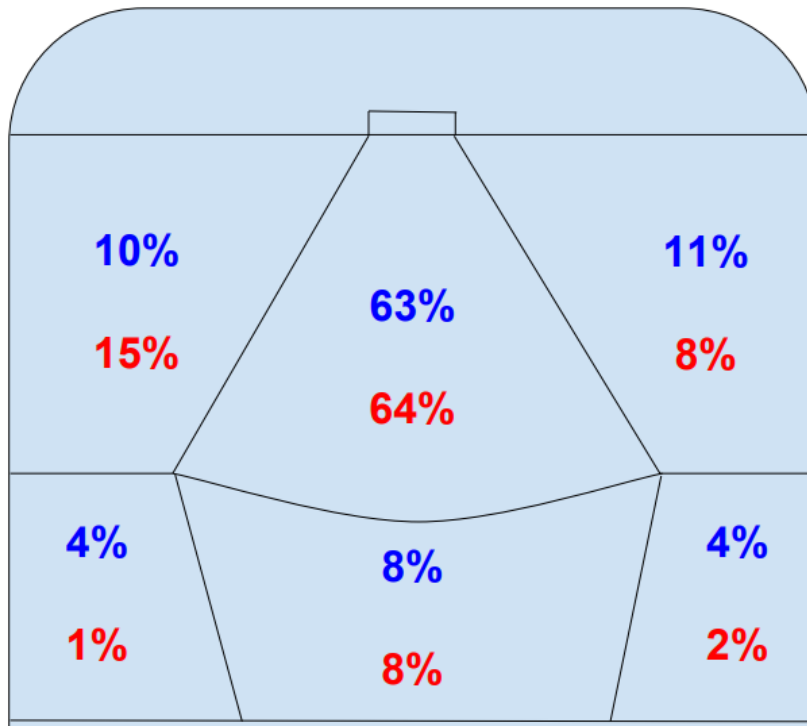
Very similarly to 2016 63% of all goals were scored from the best scoring area. Other comparisons are fitting the 2016 WFC quite well. There was a higher share of goals (8% vs 3%) scored from the most distant areas on sides close to the center line in the 2018.

Next topic focuses on scoring distance at the 2018 WFC. Average distance of a shooter is higher by 0.9 meters in 2018 with a value of 6.6 meters. These result might be skewed by subjective evaluation of a person tracking the data. Comparison within teams is very much possible though. Next figure compares the average scoring distance of teams at the 2018 WFC.

1.7. Scoring distance of all teams at the 2018 WFC

Scoring distance by team at the WFC 2018
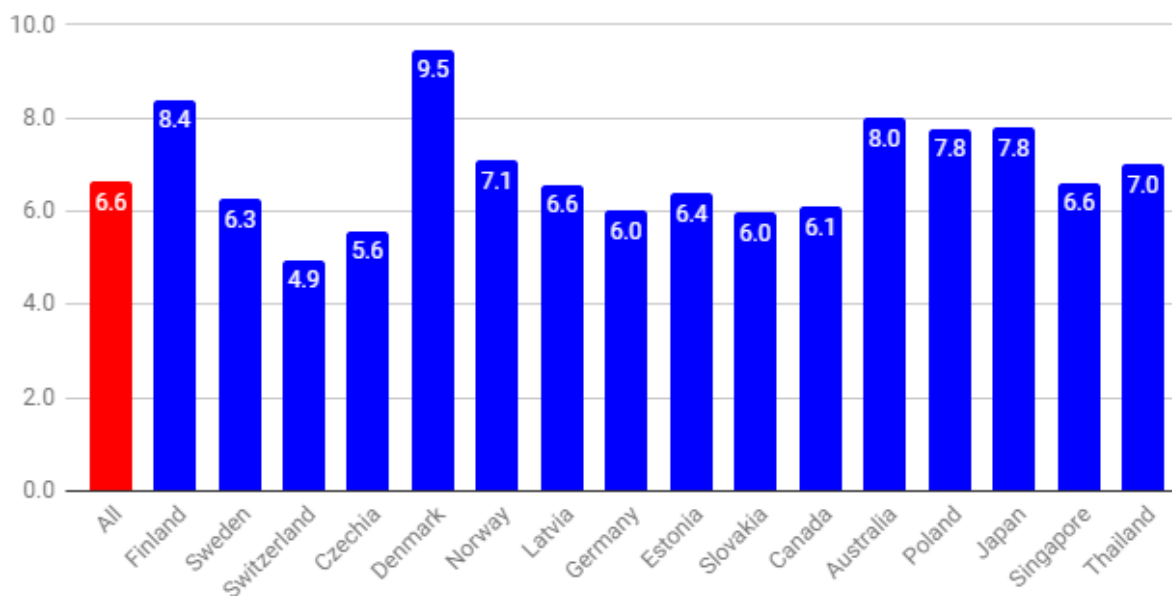
It was Switzerland scoring from the smallest distance and Denmark with the biggest distance. Next table compares the 2018 and 2016 WFC results.

Table 1.3. Team´s scoring distance comparison

Team	2018 average scoring distance	2016 average scoring distance	2018 rank	2016 rank
Switzerland	4.9	6.3	1	14
Czechia	5.6	5.6	2	7
Slovakia	6.0	7.4	3	16
Germany	6.0	5.9	4	12
Canada	6.1	5.2	5	5
Sweden	6.3	6.4	6	15
Estonia	6.4	5.0	7	4

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Latvia	6.6	5.7	8	9
Singapore	6.6	4.5	9	1
Thailand	7.0	6.0	10	13
Norway	7.1	4.6	11	2
Poland	7.8	5.8	12	11
Japan	7.8	-	13	-
Australia	8.0	4.6	14	3
Finland	8.4	5.7	15	8
Denmark	9.5	5.5	16	6
USA	-	5.8	-	10

There is no consistency found (correlation of -0.31) for teams scoring from further or closer distances on both last two tournaments.

1.3.4. SITUATIONAL EFFECT

It depends in what situation goals are scored accounting for number of players on both sides as well as if the net is empty. These are shares of goals at the 2018 WFC depending on situation they were scored in:

87.7% of goals scored in 5 on 5 even strength play

7.9% of goals scored in 5 on 4 power play situation

2.0% of goals scored in 5 on 6 situation to the empty net

1.0% of goals scored in 4 on 5 shorthanded situation

0.6% of goals scored in 6 on 5 situation with the empty net

0.4% of goals scored in 4 on 4 even strength situation

0.2% of goals scored in 6 on 4 power play situation with the empty net

0.2% of goals scored in 5 on 3 power play situation

It is easy to summarize into following categories:

- 88.1% of goals scored in even strength situation

- 8.1% of goals scored in common power play situation

- 1.0% of goals scored in common shorthanded situation

- 2.0% of goals scored to the empty net

- 0.8% of goals scored with the empty net

Shifting focus to two main situations (even strength and common power play) that goals are scored from it is possible to compare the effect of the power play itself. **7.5 meters** was an average scoring distance in **even strength** situations and **6.7 meters** was an average scoring distance in **power play** situations. Data sample is limited (only 40 power play goals scored) but the scoring distance differential hints it is understandably more common to score from shorter distance. More insight will be given when analyzing even strength and power play situations with possessions-based data (Chapter 2.4.4.).
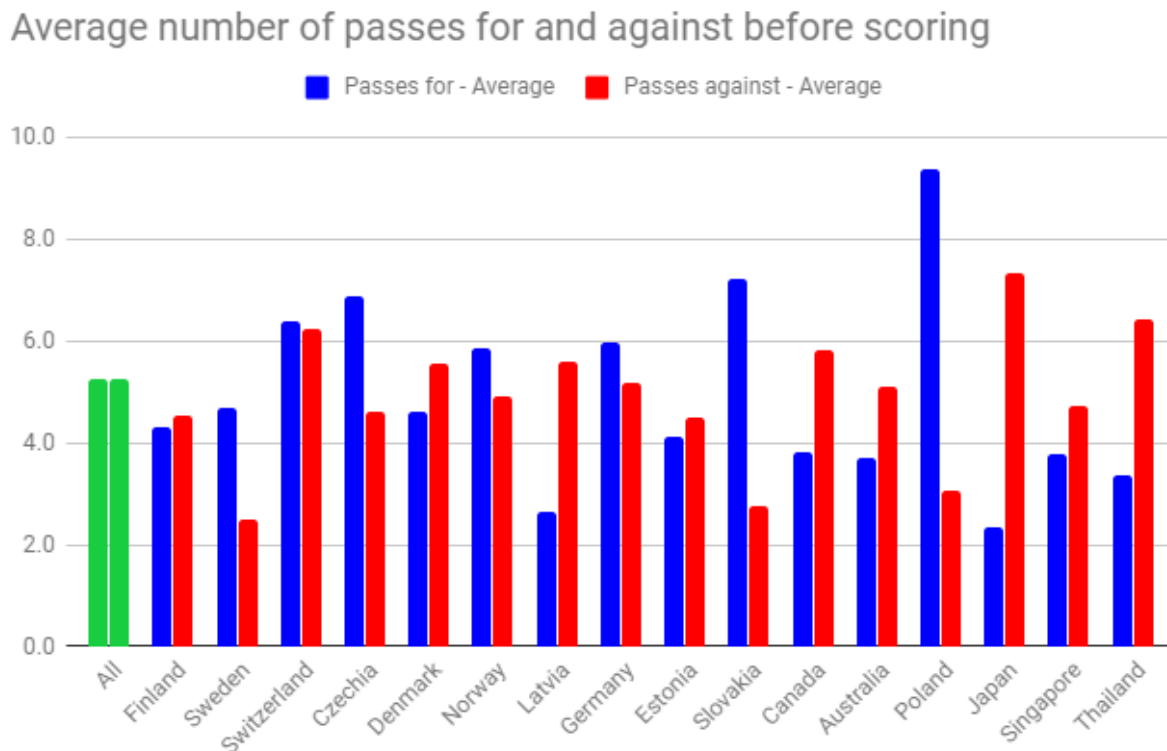
1.3.5. ASSISTS

There are two kinds of information presented in this chapter:

- Number of assists before goals

- Length of final pass before the goal

Next graph visualizes average number of passes before scoring goals both for and against teams at the 2018 WFC.

Average number of passes for and against before scoring

5.3 is an average number of passes before a goal is scored.

- Japan and Latvia were usually scoring with the least number of passes

- Sweden, Slovakia and Poland were teams that were scored against with the least passes executed

- Poland, Slovakia, Czechia used the most passes before scoring

- Japan, Thailand and Switzerland were team who were scored on using the most passes before scoring by opponents

- Fun fact: The most 37 passes were executed before Slovakia scored to extend their lead to 7-0 against Canada in the group stage game

If aggregated for all teams different shares of number of passes is presented comparing the 2018 and 2016 WFCs.

FIGURE 1.9. SHARE OF DIFFERENT NUMBER OF PASSES COMPARISON

Share of number of passes in the 2018 and 2016 WFC
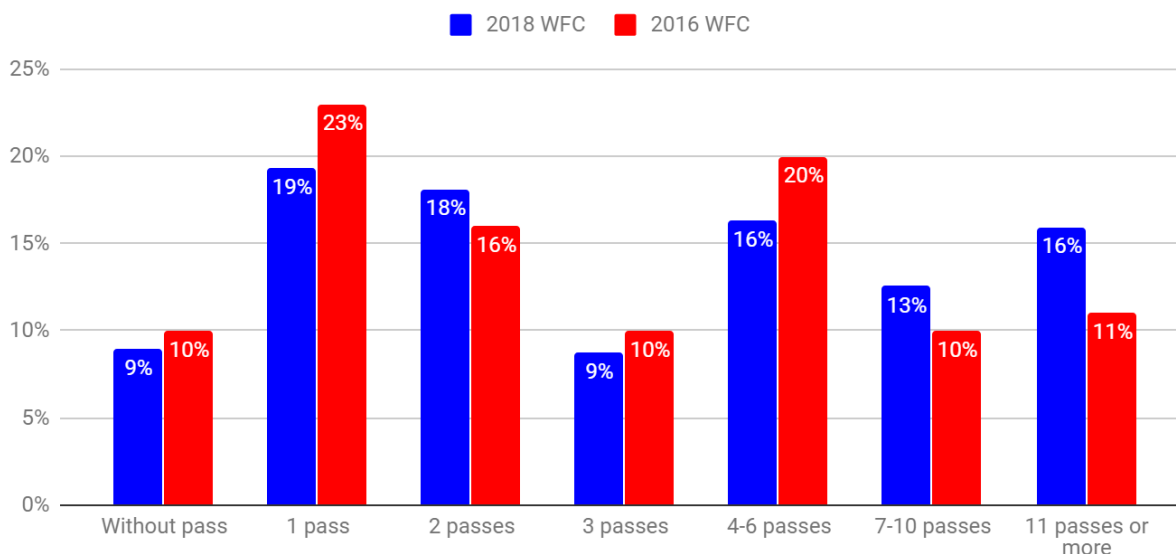
Overall goal scoring possessions with more passes (7 and more) occurred more often in 2018 than in 2016 (29% vs 21%). Also no or one pass was executed more often (28% vs 33%) in 2016 than in 2018.

Focusing on the final pass before scoring it is possible to compare the 2018 and 2016 WFC average passing distances. Comparison among teams and their average passing distance is presented in following figure.

FIGURE 1.10. AVERAGE PASSING DISTANCE FOR TEAMS COMPARISON

Passing distance by team at the WFC 2018
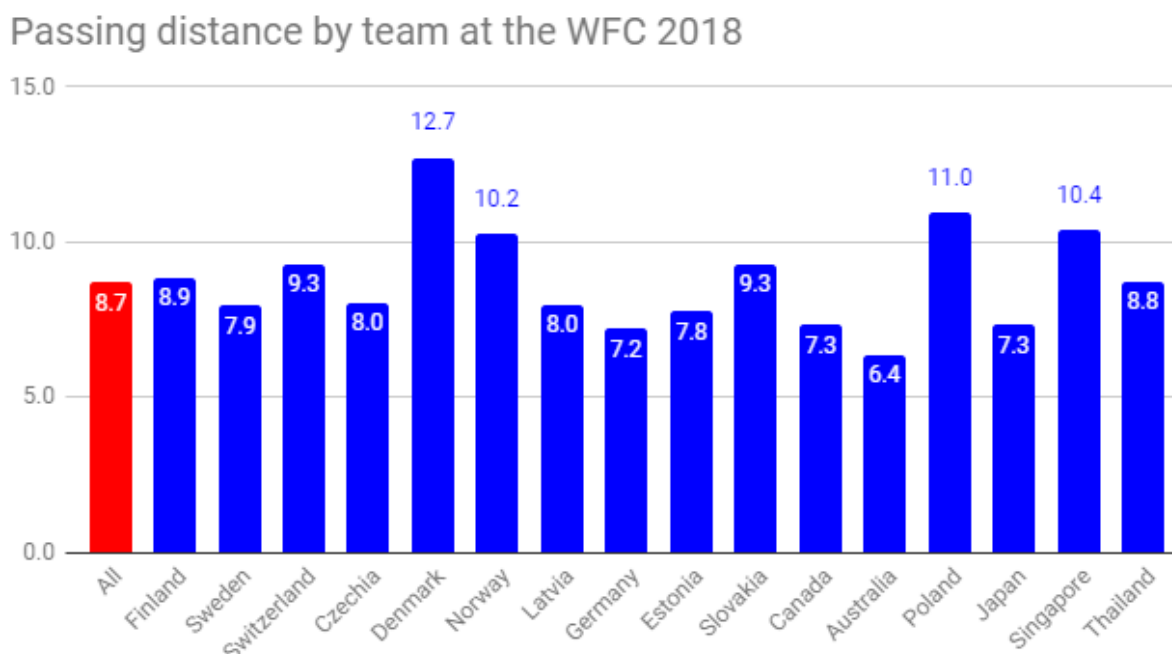
Average passing distance before scoring at the 2018 WFC was 8.7 meters which is by 0.4 meters more than in 2016. The longest average passing distance belongs to Denmark (12.7 meters) and the shortest one to Australia (6.4 meters).

Following table compares average passing distances among teams at the 2018 and 2016 WFCs.

TABLE 1.3. AVERAGE PASSING DISTANCE AMONG TEAMS COMPARISON

Team	2018 average assist distance	2016 average assist distance	2018 rank	2016 rank
Australia	6.4	6.8	1	2
Germany	7.2	8.6	2	10
Japan	7.3	-	3	-
Canada	7.3	12.1	4	16
Estonia	7.8	8.7	5	11

Sweden	7.9	8.2	5	7
Latvia	8.0	7.9	7	5
Czechia	8.0	8.2	8	8
Thailand	8.8	5.7	9	1
Finland	8.9	8.1	10	6
Switzerland	9.3	9.2	11	14
Slovakia	9.3	8.8	12	12
Norway	10.2	7.7	13	4
Singapore	10.4	9.5	14	15
Poland	11.0	7.3	15	3
Denmark	12.7	8.9	16	13
USA	-	8.2	-	9

There is no consistency found (correlation of -0.02) for teams scoring after longer or shorter passing distances on both last two tournaments.

1.3.6. TYPES OF ATTACK

Similarly to the 2016 WFC designed categories there were types of attacks assigned to each goal scored at the 2018 WFC:

- Slow (organized) attack = attack in which attacking team is slowly advancing up the field in order to score

- Quick (fast) attack = attack in which attacking team transitions the ball quickly from defensive half to the offensive one with an aim to score

- Turnover = attack in which attacking team steals a ball on offensive half with an attempt to score

- Odd man rush = attack in which offence outnumbers defence in an attack originating on defensive half of attacking team

- Power play = all attacks of a team on power play

- Shorthanded = all attacks of a team being short handed

- Free hit = goals originated from free hit situation

- Penalty shot

- Without goalie = all goals scored with no goalie on one side

TABLE 1.4. GOAL DISTRIBUTION BASED ON TYPES OF ATTACKS AND GOAL DIFFERENTIAL COMPARISON

Types of attack	WFC 2018 0-2 goals	WFC 2016 0-2 goals	WFC 2018 3+ goals	WFC 2016 3+ goals	WFC 2018 All	WFC 2016 All
Slow attack	31.5%	29.4%	41.9%	27.3%	35.0%	28.5%
Quick attack	19.8%	16.5%	14.0%	15.3%	17.8%	16.0%
Turnover	13.5%	14.7%	14.5%	16.7%	13.9%	15.6%
Power play	9.0%	14.3%	6.4%	14.8%	8.1%	14.5%
Odd man rush	9.0%	9.9%	8.7%	16.7%	8.9%	12.9%
Free hit	11.7%	10.7%	8.7%	6.0%	10.7%	8.6%
Penalty shot	2.4%	1.8%	1.2%	1.9%	2.0%	1.8%
Short handed	0.9%	1.5%	1.7%	1.4%	1.2%	1.4%
Without goalie	2.1%	1.1%	2.9%	0.0%	2.4%	0.6%
Total	333	272	172	216	505	488

Results from the 2016 and 2018 WFCs looks very comparable even though issues of subjectivity (categorizing types of attack) arise.

Overall there were significantly more (14.5% vs 8.1%) power play goals scored at the 2016 WFC as well as odd man rush goals (defined as counter attacks in 2016, 12.9% vs 8.9%). . Bykov[2] reported that for the 2012 WFC 9.9% of goals were scored during power play. Importance of power play goals appeared to be great specifically in 2016.

More (35% vs 28.5%) goals from slow attacks were scored at the 2018 WFC. Also more (2.4% vs 0.6%) goals without a goalie were scored in 2018.

1.3.7. ZONES OF GOAL SCORING POSSESSION STARTS

To measure areas (or zones) where an origin of possession is located these were defined for both the 2016 and the 2018 WFCs.

FIGURE 1.11. DEFINED ZONES IN THE FIELD

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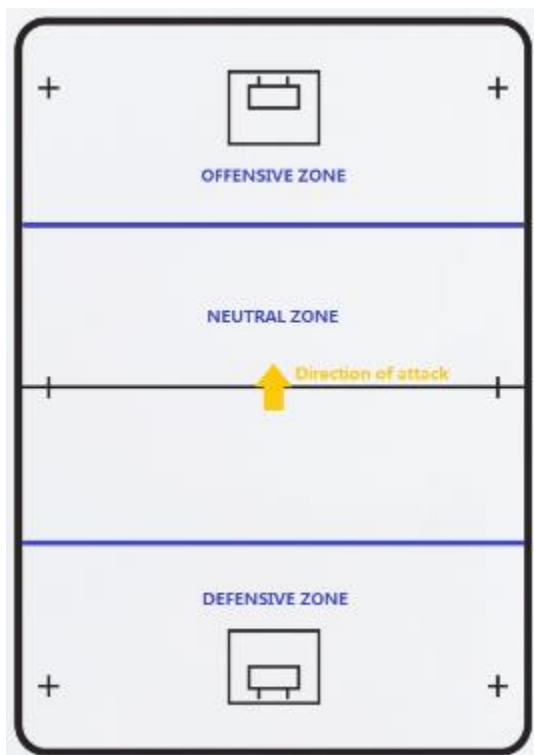
[2] Bykov: Modern trends in Finish of Offensive Actions in Men´s Floorball. Theory and practice of physical culture, 2 (66-69). 2015.

In 2016 these were zonal distributions of where possessions started prior to goal scoring:

- 36% of goals scored with a possessions starting in the offensive zone

- 32% of goals scored with a possessions starting in the neutral zone

- 32% of goals scored with a possessions starting in the defensive zone

To compare the 2018 WFC results differ quite a bit:

- 23% of goals were scored with a possessions starting in the offensive zone

- 45% of goals scored with a possessions starting in the neutral zone

- 32% of goals scored with a possessions starting in the defensive zone

There are identical shares for goal scoring possessions originating in the defensive zone (32%) in both 2016 and 2018. However in 2016 possessions of the most goals originated in the offensive zone (36%) while this share was only 23% in 2018. Subjectivity (on when and how possession starts) could be a factor influencing the comparison.

Chapters 1.3.9. and 1.3.10. brings more detailed look as it combines zones and two other categories - causes of possession starts and defensive mistakes.

1.3.8. POSSESSION DURATION PRIOR TO GOAL SCORING

It was revealed that 20% of all goals scored at the 2018 WFC were scored within 1-3 seconds. Next 25% of goals were scored within 4-6 seconds, 13% within 7-10 seconds and finally 42% of goals with more than 10 seconds. When comparing to the 2016 WFC results goal scoring possessions lasted longer at the 2018 WFC. Next table compares stated duration intervals.

TABLE 1.5. GOAL SCORING POSSESSION DURATIONS COMPARISON

Possession duration intervals	Share of goal scoring possessions at the 2018 WFC	Share of goal scoring possessions at the 2016 WFC
1-3 s	20%	32%
4-6 s	25%	17%
7-10 s	13%	16%
11+ s (31+ s)	42% (13%)	35% (8%)

Breakdown of possession durations among teams is presented below. The graph compares teams at the 2018 WFC and their shares of goal scoring possessions based on their length.

FIGURE 1.12. GOAL SCORING POSSESSION DURATIONS OF TEAMS COMPARISON AT THE 2018 WFC

Time taken to score at the WFC 2018
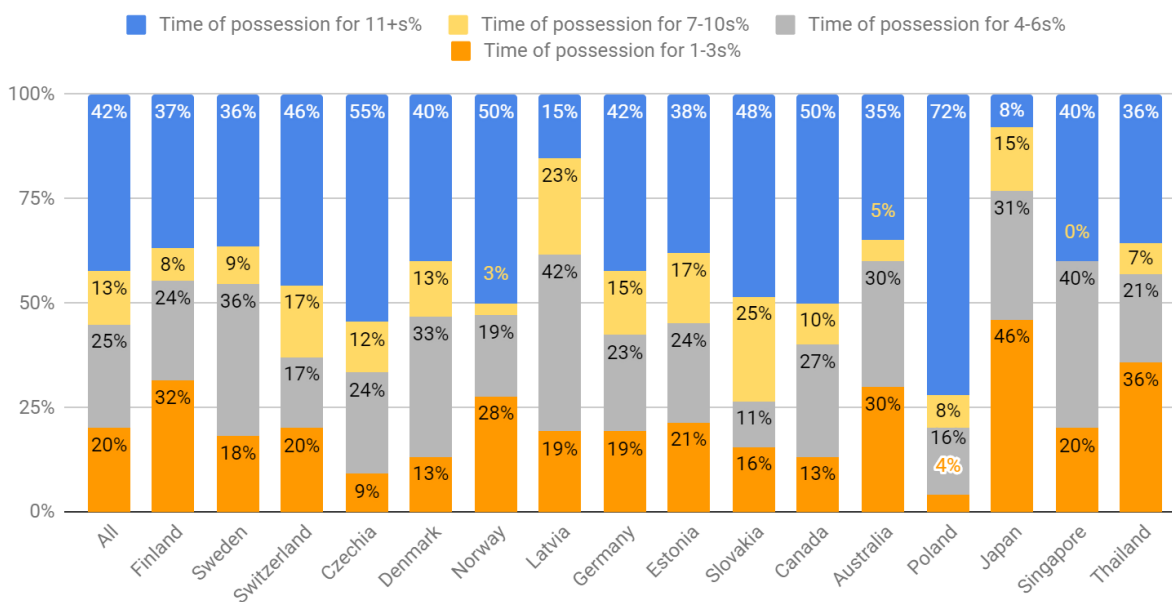
Japan was able to score often very quickly and almost half of their goals were scored within 3 seconds from gaining the ball possession. Latvia was also very quick in scoring from their possessions. On the other hand Poland scored majority of their goals from possessions lasting over 10 seconds.

Next table brings average possession durations for teams when scoring. It also compares the 2018 WFC and the 2016 WFC results by estimating average value in 2016 from known distributions similar to Figure 1.12.

Table 1.6. Average goal scoring possession durations among teams comparison

Team	2018 average goal scoring possession duration	2016 average goal scoring possession duration estimated	2018 rank (fastest is ranked as no. 1)	2016 rank (fastest is ranked as no. 1)
Japan	6.3 s	-	1	-
Latvia	8.3 s	8.5 s	2	3
Thailand	10.0 s	8.4 s	3	2
Estonia	11.2 s	13.3 s	4	12
Singapore	11.7 s	8.8 s	5	5
Australia	12.0 s	8.1 s	6	1
Finland	12.1 s	10.7 s	7	7
Sweden	12.5 s	13.1 s	8	11
Canada	12.7 s	9.4 s	9	6
Denmark	13.5 s	10.7 s	10	8
Norway	14.1 s	13.4 s	11	13
Germany	14.6 s	8.7 s	12	4
Switzerland	16.6 s	15.8 s	13	15
Czechia	17.7 s	13.0 s	14	10
Slovakia	19.3 s	12.6 s	15	9
Poland	22.6 s	17.3 s	16	16
USA	-	15.0 s	-	14

There was a correlation found (+0.74) comparing 2016 and 2018 results for all teams and their average goal scoring duration of possessions. There are teams who were scoring much quicker in their possessions at both the 2016 and 2018 WFC like Latvia, Thailand, Singapore or Australia. Other teams recorded longer goal scoring possession times and these were Poland, Slovakia, Czechia, Switzerland or Norway.

Two teams had different results in 2016 and 2018 such as Estonia (important to note that Estonia played in elite groups in 2016 while in 2018 dominated weaker competition and was scoring after longer possessions) and Germany. In case of Germany their style changed as they tried to play more fearless style of a game at the recent championships (see Chapter 2.5.).

Furthermore it is possible to study goal scoring possession duration against teams. Next table summarizes which teams were scored on after longer possessions and which after rather short ones.

TABLE 1.7. AVERAGE GOAL SCORING POSSESSION DURATION AGAINST AT THE 2018 WFC

Team	2018 average goal scoring possession duration against	2018 rank (fastest is ranked no. 1)
Sweden	8.4 s	1
Poland	8.9 s	2
Slovakia	9.3 s	3
Finland	12.5 s	4
Germany	13.1 s	5
Czechia	13.3 s	6
Australia	13.3 s	7
Singapore	13.5 s	8
Norway	13.8 s	9
Latvia	14.0 s	10
Denmark	14.1 s	11

Canada	14.3 s	12
Estonia	14.6 s	13
Switzerland	17.1 s	14
Thailand	17.3 s	15
Japan	19.7 s	16

Goals against Sweden were scored in a quick fashion. This might be influenced by an active approach of Sweden to the game (see Chapter 2.5.) pushing opponents to act quickly. Poland that had the longest possession duration when scoring had second shortest possession durations when scored against. Slovakia was the third one with short possession duration when being scored. These might also be connected with an active approach without the ball. On the other side of a spectrum Switzerland, Thailand and Japan were teams who were often scored against while opponent possessed the ball for a long time.

1.3.9. CAUSES FOR START OF GOAL SCORING POSSESSIONS

Challenging category to compare the 2016 and 2018 data results deals with causes (or reasons) of possession start prior to goal scoring. Both subjectivity and definitions (on how to measure) made it hard to fit both categories so that they would be comparable. Therefore next table summarizes only the 2018 WFC results on which reasons were behind goal scoring possessions and where these possessions originated.

TABLE 1.8. CAUSES OF POSSESSIONS PRIOR TO GOAL SCORING AT THE 2018 WFC

Cause of possession start	Offensive zone start of a possession	Neutral zone start of a possession	Defensive zone start of a possession	Total
Free hit	61%	17%	14%	26%
Forced error	19%	28%	15%	22%
Unforced error	13%	21%	8%	15%
First to the ball	5%	18%	16%	14%
Possession change	1%	5%	20%	9%

Save	0%	0%	21%	7%
Face off	2%	19%	0%	4%
Block	0%	2%	5%	3%
Total	109	219	157	486

Free hits were a cause of a possession on 26% of goals scored (the most). Next category was forced errors with a share of 22% followed by unforced errors (15%) and first to the ball (14%) category. Free hits dominated as a more frequent cause of possession start in the offensive zone. For neutral zone starts the most 28% of goals were scored after forced error as a cause of possession start. When starting possession from a defensive zone distribution of different causes was more even with 21% of goals scored after possessions started with a save from goalkeeper.

1.3.10. DEFENSIVE MISTAKES

There were 16 categories defined for the 2016 WFC defensive errors which led to a goal. Also they were categorized by its severity as big, moderate and minor. This level of a detail was not kept for the 2018 WFC data and only five categories were defined with no level of severity of defensive mistakes. This allowed to gain bigger data sample. At the same time subjectivity and uncertain definitions made it impossible to fully compare the 2016 and 2018 WFC data. Therefore only the 2018 WFC data results of defensive mistakes are summarized in this table.

TABLE 1.9. DEFENSIVE MISTAKES AT THE 2018 WFC

Mistake type	Offensive zone start of a possession	Neutral zone start of a possession	Defensive zone start of a possession	Total
Unforced mistake to lose the ball	6%	10%	2%	7%
Forced mistake to lose the ball	5%	8%	4%	6%
Individual mistake while defending	30%	30%	31%	30%
Tactical mistake while defending	44%	34%	47%	40%
No mistake	23%	18%	16%	18%
Total	109	221	161	491

88% of goals at the 2016 WFC could have been avoided (mistake made) according to authors. At the 2018 WFC it was 82% of goals where defensive mistake was recognized.

The biggest share of 40% are goals scored due to tactical mistake of a defending team. Better communication and positioning should attempt to lower this share but mistakes like this will always happen. 30% of goals were scored after individual mistake of a defending player. This includes bad marking, being beaten 1 on 1, poor block etc. Both forced and unforced mistake when the ball was lost were a direct cause for a goal in 13%.

Differentiating among teams next table provides shares of teams at the 2018 WFC and their defensive mistake categories.

TABLE 1.10. DEFENSIVE MISTAKES SHARES AMONG TEAMS AT THE 2018 WFC

Team	Unforced mistake to lose the ball	Forced mistake to lose the ball	Individual mistake while defending	Tactical mistake while defending	No mistake	Unknown	Goals against (excluding penalty shots)
Finland	0%	17%	25%	8%	42%	8%	12
Poland	8%	8%	25%	33%	25%	0%	12
Sweden	0%	19%	31%	31%	19%	0%	16
Switzerland	11%	0%	17%	50%	17%	6%	18
Slovakia	10%	0%	45%	15%	30%	0%	20
Estonia	13%	0%	33%	38%	17%	0%	24
Czechia	4%	12%	28%	36%	20%	0%	25
Thailand	6%	13%	19%	44%	19%	0%	32
Norway	0%	9%	30%	42%	19%	0%	33
Singapore	6%	15%	28%	36%	15%	0%	33
Latvia	11%	5%	30%	40%	13%	0%	37
Canada	10%	3%	28%	49%	10%	0%	39
Germany	5%	5%	31%	45%	14%	0%	42

Australia	2%	2%	37%	42%	16%	0%	43
Japan	15%	0%	30%	43%	11%	0%	46
Denmark	3%	3%	30%	37%	25%	2%	63

Interesting results to be seen as what share of what type of mistakes each team committed during the tournament. It was Finland, Sweden and Norway who were not scored on unforced mistake at the 2018 WFC. Accounting for individual mistakes Switzerland and Thailand had only 17% and 19% shares belonging to this category. Finland dominated other teams tactically when only one goal against was scored after their tactical mistake. Also Slovakia was strong in this regard with a share of only 15% and 3 goals scored against after their tactical mistake. It was Finland again with the highest share (42%) of no mistake on goals against. These results support a strong tactical quality of the 2018 WFC champions.

2. Possession based data (PBD)

2.1. Introduction to PBD

Chapter 2 makes a jump from statistical analysis describing the goal scoring at the 2018 WFC into deeper game data analysis. Aim of the analysis is to use statistics to describe, organize, evaluate and interpret data that are representing real events happening on the field. The analysis is based on possession type of data where each possession (there are 7244 data rows consisting of possessions and shot attempts) in 24 elite games at the 2018 WFC is studied (six games for all Czechia, Denmark, Germany, Finland, Latvia, Norway, Sweden, Switzerland). This allows us to study relevancy of each variable tracked. It is possible to give answers on following questions:

- How often does team create an odd man rush? How much more dangerous is it comparing to other possessions? And finally how relevant is it for the game?

- In what areas are stronger teams better than the weaker ones? In other words what makes winners successful?

- What type of plays raise a chance to score a goal and by how much?

The goal of the analysis should be to provide a tool to support decision-making leading to success of a team. Naturally an analytical work never ends. The game itself and its level is continuously developing. Any new approach or game strategy changes everything we knew before. A true data analyst should be always working with an critical eye towards her/his own work and verify her/his own hypothesis including these once accepted. This is not to discourage potential users of data analysis but to bring more understanding to this area of study. Complexity of the analysis attempts to describe complexity of the game. There is nobody who will ever know all details and contexts of the game and no analysis can ever replace a decision-maker be it manager or coach of a team. Being open and patient to understand how to use data analysis in floorball will lead to better results long-term. It might be a future winner of one of national leagues or a team at the WFC who will have thousands of data rows, hundreds of calculations and statistical models behind its success.

2.2. Variable definitions

It is critical to understand correctly which variables were tracked during games and what do they mean. They were designed with an aim to distinguish more relevant and less relevant events that happen on the field while measuring magnitudes of its importance.

2.2.1. SHOT RESULT DATA

All shot attempts were tracked during games and were categorized by its result:

- Shot on goal = goal or shot saved by a goalie

- Shot wide = shot going wide of the net including hitting post

- Shot blocked = shot being blocked by body or stick of other player

2.2.2. SHOT ATTEMPT ZONES

Six different zones on offensive half of the pitch were categorized as areas from where shot is taken. They are defined and visualized in the figure 1.6. that is a part of the chapter 1.3.3.

2.2.3. POSSESSION TYPES

Five different possession types were categorized:

- No attack = one team possesses a ball with no attempt to create offence

- Slow (organized) attack = one team possesses a ball advancing slowly forward to create offence

- Quick (fast) attack = one team possesses a ball trying to transition the play (by pass, run or its combination) quickly from defensive half of the pitch to the offensive one with an aim to finish the play

- Turnover = one team possesses a ball after a steal on offensive half of the pitch with an aim to (quickly) finish the play

- Odd man rush = quick attack in which offence outnumbers defence

Note 1: Possession type changes in cases of three events:

A) Team possessing the ball changes its attack (possession) type, e.g. from odd man rush to slow attack

B) Players substitute

C) Change of team that is possessing the ball (change exists when possession lasts at least 2-3 seconds)

Note 2: Forechecking type of a team without a ball was observed and categorized depending on where applied pressure starts. Low forechecking starts around the half of the pitch, medium forechecking starts around ¾ of the pitch and high forechecking starts beyond ¾ of the pitch.

2.2.4. POSSESSION QUALITY ASPECTS

Two other quality aspects were designed to be tracked during each possession:

- Clear path situation = shooter unmarked properly is located in the "best scoring area" that has a real chance to receive the ball and finish the play

- Cross field pass situation = opportunity (spatial opening) for a pass on offensive half of the pitch that crosses an imaginary axis that connects both goals

2.3. Context of games

Floorball and its version played at the WFC have their own specifics. This chapter attempts to highlight these that are important for analysis output presentation.

2.3.1. TEAM QUALITY

Luck effect on a result of floorball game is significantly lower than it is in football or ice hockey. Therefore there are not that many upsets in floorball. At the same time a quality distribution among nations in the world is still very broad and a group of elite teams is still very small. From extreme point of view one can state there are only two strong teams in the world, from less extreme point this number could be four. Both statements are rather closer to be true than false when we highlight that:

- Among the last 12 WFC champions there are only two nations - Sweden and Finland

- If we account only for 24 WFC finalist spots this is an occurence of all nations: Sweden 12x, Finland 10x, Switzerland 1x, Czechia 1x

- Lastly if we count for 48 semifinal spots at last WFCs this is occurence of all nations: Sweden 12x, Finland 12x, Switzerland 11x, Czechia 9x, Denmark 2x, Norway 1x, Germany 1x

Argument of the small elite group of teams is apparent also when looking at all teams and their results at WFCs.

TABLE 2.1. SUMMARY OF NATIONS RESULTS AT LAST 12 WFCS

Team	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	Years
Australia	-	-	-	-	-	-	-	14th	-	14th	15th	12th	4
Austria	-	-	-	-	10th	-	-	-	-	-	-	-	1
Canada	-	-	-	-	-	-	-	11th	13th	12th	12th	11th	4
Czech Republic	4th	6th	6th	4th	2nd	4th	4th	3rd	7th	3rd	4th	4th	12
Denmark	7th	4th	4th	6th	9th	6th	9th	13th	-	7th	5th	8th	11
Estonia	11th	-	-	-	-	-	8th	7th	9th	8th	8th	10th	7
Finland	2nd	3rd	2nd	2nd	3rd	2nd	1st	1st	2nd	2nd	1st	1st	12
Germany	8th	8th	-	8th	8th	10th	-	10th	4th	9th	7th	6th	10
Hungary	10th	-	-	-	-	-	-	-	14th	-	-	-	2
Italy	-	-	-	-	-	8th	10th	12th	-	-	-	-	3
Japan	-	-	-	-	-	-	-	15th	15th	15th	-	15th	4
Latvia	9th	-	7th	7th	6th	5th	5th	5th	6th	5th	10th	5th	11
Norway	3rd	5th	5th	5th	5th	7th	6th	6th	5th	6th	6th	7th	12
Poland	-	-	-	-	-	-	-	9th	11th	-	13th	13th	4
Russia	6th	7th	8th	-	7th	9th	7th	8th	10th	13th	-	-	9
Singapore	12th	-	-	-	-	-	-	16th	16th	-	16th	16th	5
Slovakia	-	-	-	-	-	-	-	-	8th	10th	9th	9th	4
South Korea	-	-	-	-	-	-	-	-	-	16th	-	-	1
Sweden	1st	1st	1st	1st	1st	1st	2nd	2nd	1st	1st	2nd	2nd	12
Switzerland	5th	2nd	3rd	3rd	4th	3rd	3rd	4th	3rd	4th	3rd	3rd	12
Thailand	-	-	-	-	-	-	-	-	-	-	14th	14th	2
United States	-	-	-	-	-	-	-	-	12th	11th	11th	-	3

Argument stating that quality among teams in the world is slowly evening out might take other beatings in next chapters.

2.3.2. TOURNAMENT EFFECT

All presented data comes from one tournament played in 9 days during which performances of teams and players were evaluated.

There are specific aspects influencing performance that were not taken into account. These aspects include chemistry on both team and player levels, applying designed strategy into the game, cooperation and harmony inside of a team, current streaks or injuries.

Some of these aspects are not measured for teams and for some it is not possible to measure them. All these aspects might played its role when presenting and interpreting results.

2.4. Analytical results of the game

As author believes this is the core chapter of the document. The game was analyzed to better understand which events have significant influence on final result and in what areas are winners usually better than losers. The chapter is divided into four parts:

- Possession type analysis - which possessions happen more, which are the most dangerous?

- Possession quality analysis - what types of actions are the decisive one in floorball?

- Success of winners - in what areas are winners dominating their opponents?

- Summary of the game analysis - highlighting the most important findings from previous three parts

If not written otherwise only even strength data are evaluated.

2.4.1. POSSESSION TYPE ANALYSIS

Next table brings a summary of categorized possession types and its results at the 2018 WFC.

TABLE 2.2. POSSESSION TYPE DATA RESULTS IN EVEN STRENGTH SITUATIONS

Possession type	Occurrence	Share	Goals	Goals in attack
No attack	724	15.6%	0	0.0%
Slow attack	2394	51.7%	118	4.9%
Quick attack	1006	21.7%	51	5.1%
Turnover	278	6.0%	20	7.2%
Odd man rush	219	4.7%	26	11.9%

Odd man rush and turnover are two most dangerous possession types in the game. Each odd man rush has a roughly 12% of a chance to end with the ball in the net. At the same time it is not easy to generate these possessions as they both (odd man rushes and turnovers) occur in less than 11% of all cases. Quick attacks have 5.1% of a chance for scoring a goal and slow

attack have a chance of 4.9%. Slow attack is the most common possession type that occurs in almost 52% of all cases.

Following figure represent differences among defined possession types in its durations.

Duration distribution of different possession types at even strength
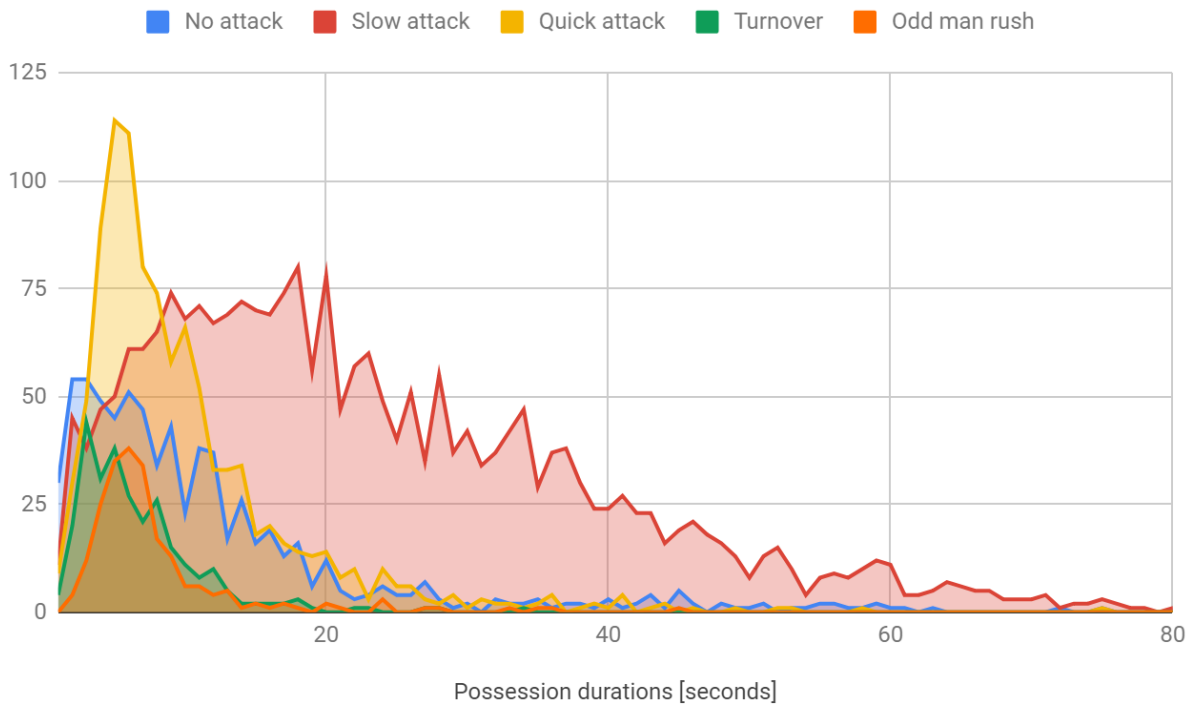
Longer possession durations are logically assigned to slow attacks (average duration of 23.8 seconds). Other possession types lasted usually much shorter. No attacks lasted 11.9 seconds on average, quick attacks 10.1 seconds. Fastest possession types were odd man rushes (7.9 seconds on average) and turnovers (6.7 seconds).

Accounting only for odd man rushes next table shows different types of them that happened during all 24 games at the 2018 WFC.

TABLE 2.3. ODD MAN RUSH DATA RESULTS IN EVEN STRENGTH SITUATIONS

Odd man rush type	Occurrence	Share	Goals	Goal percentage
1 on 0	36	15.6%	6	16.7%
2 on 1	66	28.6%	7	10.6%
3 on 2	93	40.3%	11	11.8%
other	36	15.6%	4	11.1%

Logically 1 on 0 situation was the most dangerous one with around 17% of a goal percentage. Bigger data sample is much needed to refine presented values.

Next part is dedicated to study the effect of **forechecking**. Forechecking type influenced opponent´s possession type. When forechecking was high or medium (for definitions see chapter 2.2.3.) opponent possessing the ball generated more quick attacks. With described forechecking 86% of quick attacks were generated (and only 14% with low forechecking). Low forechecking pushes possessing team to go for slow attack more often. 33% of all slow attacks were executed against low forechecking (67% with high or medium forechecking).

Interesting question could be: How efficient are teams possessing against high forechecking and how efficient is high forechecking team to force turnover possessions? There were 980 possessions (no attack, slow attack, quick attack or odd man rush) registered against high forechecking and a total of 13 goals were scored from them. This creates only 1.3% of a goal percentage! On the other hand only 66 turnover possessions were created from opponents and only 3 goals scored from them (goal percentage of only 4.5%). High forechecking generated around 7% of turnover possessions but these were not very effective at the end.

It might appear as a paradox but high forechecking worked as preventing a goal scoring at the 2018 WFC in all possession types (by 65% in slow attacks, by 59% in quick attacks and by 100% in odd man rushes, 0 goals scored from 33 odd man rushes with high forechecking by opponent). Critical contextual aspect could very well played its role here though. It were usually stronger teams forechecking higher and their level of defending could have worked as a preventing danger possession against (see chapter 2.3.1.). There might be no logical argument for low efficient turnover possessions from high forechecking as a counter argument though.

2.4.2. POSSESSION QUALITY ANALYSIS

Odd man rushes were the most dangerous possession type. Outside of studying different possession types, quality aspects such as clear path situations and cross field pass situations were observed as well. They all proved to be more than an interesting object to study. In following sequences of figures it will be explained why.

First figure reveals how often each of defined possessions happened during games at even strength.

FIGURE 2.2. OCCURRENCE DISTRIBUTION OF DIFFERENT QUALITY POSSESSIONS AT EVEN STRENGTH
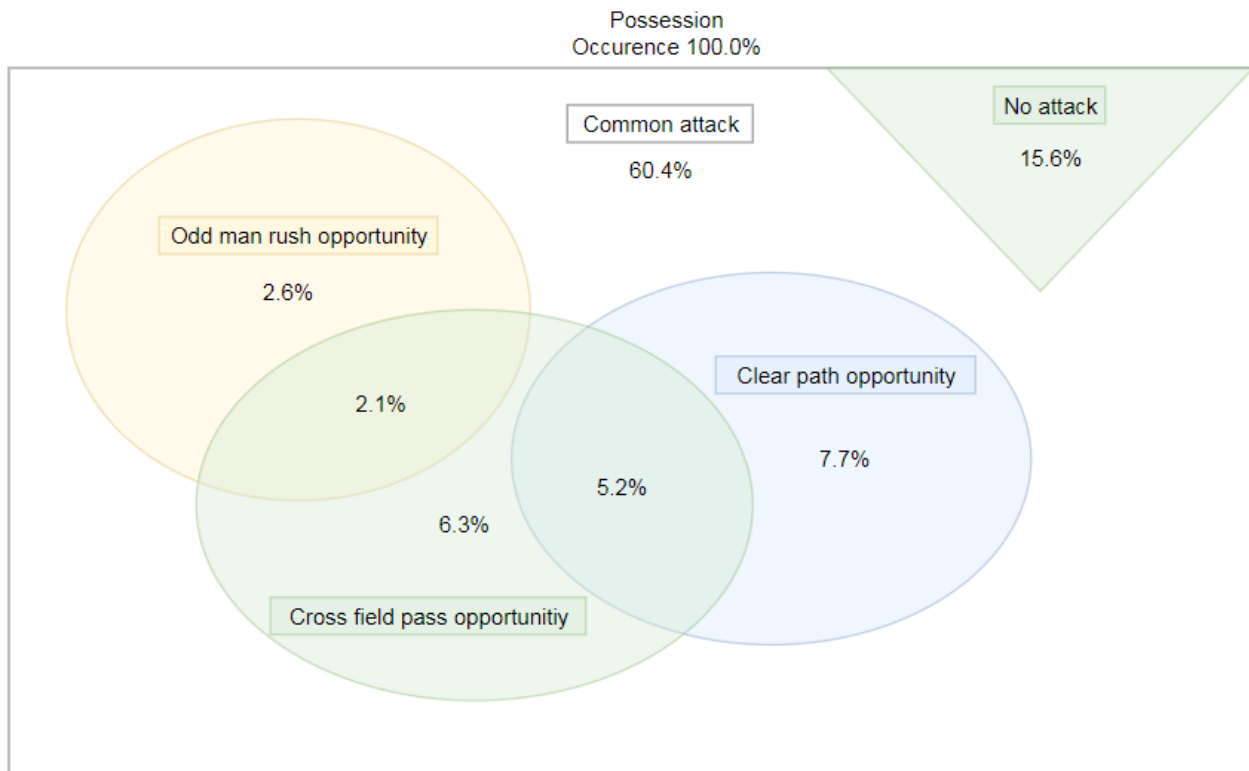
More than 60% of all attacks were common attacks without odd man rush, clear path and cross field pass situations. Almost 16% of all possessions were those with no attempt to attack. The rest 24% belonged to specific possessions (in bubbles).

Next figure brings goal distribution among defined possessions.

Logically there was no goal scored from no attack possession. Common attacks that occurred the most (more than 60%) yielded only 27% of goals in total. It was all other specific possessions with a goal share bigger than its occurrence share. More than 30% of all goals were scored from simple clear path opportunity and other almost 23% of goals were scored from combination of clear path and cross field pass opportunity. Around 8% of goals were scored from simple cross field pass opportunity and also from combination of odd man rush and cross field pass opportunity. Lastly more than 4% of goals were scored from simple odd man rush.

All these findings lead to the final figure in which a danger level of each defined possession is displayed in form of goal percentage per possession type. Bright minds could have already estimated that the most dangerous possessions were ones with the biggest ratio between goal distribution (Figure 2.3.) and occurrence distribution (Figure 2.2.).

The most dangerous possession was the one in which both clear path opportunity and cross field pass opportunity presented itself (goal percentage of 20.3%). Simple clear path opportunity was the second most dangerous situation and it yielded goals in 18.1% cases. Next with still very high 17.5% goal percentage was odd man rush situation combined with cross field pass opportunity. Numbers took a drop after and simple odd man rush had a 7.4% chance of being a goal. Possession with simple cross field pass opportunity was still significantly more dangerous (with 5.8% goal percentage) than common attack (goal percentage of only 2.1%).

The value of creating a simple clear path opportunity equals to 9 common attacks. Clear path situations were lethal at the 2018 WFC and 53% of all goals were scored from them.

Furthermore existence of cross field pass opportunity increases goal percentages in all clear path opportunities (from 18.1% to 20.3%), odd man rush opportunities (from 7.4% to 17.5%) and common attacks (from 2.1% to 5.8%). In other words an opening for cross field pass increases the chance of scoring 2.5 times in odd man rush opportunity and 3 times in common attack.

Goal percentages of quality possessions with clear path and/or cross field pass situation in different possession types (slow attacks, quick attack and turnovers) are visualized in the following table.

TABLE 2.4. GOAL PERCENTAGES OF DIFFERENT POSSESSION TYPES AND QUALITY ASPECTS OF POSSESSIONS AT EVEN STRENGTH

Possession type	Common	Cross field pass opportunity only	Clear path opportunity only	Clear path and cross field pass opportunity	Clear path opportunity
Slow attack	2.1%	5.3%	17.2%	25.0%	20.6%
Quick attack	2.0%	8.0%	21.6%	16.4%	19.6%
Turnover	2.1%	6.7%	15.8%	10.0%	13.8%
Shaded cells represents plays with too small data sample (less than 60)!					

An opening for a cross field pass increases a danger of the situation in all possession types but especially on quick attacks (4x). As discussed earlier clear path opportunity situations were the most dangerous possessions. Even more dangerous they were on slow attacks (goal percentage of 20.6% from simple clear paths and 25.0% from clear path and cross field pass situation). To prepare a scoring chance in slower fashion seems to be a way to create a damage to opponents.

2.4.3. SUCCESS OF WINNERS

Both shot and possession related variables are examined in this chapter for its relevance to success. The success is described as a goal differential in each game. Correlations of different variables and goal differentials in all 24 games tracked are tested to see which events led to outscoring opponents.

+0.87 goal differential and **sum of clear paths, cross field passes and odd man rushes differential**

+0.86 goal differential and **cross field pass differential**

FIGURE 2.5. GOAL DIFFERENTIAL (GDIFF) AND CROSS FIELD PASS OPPORTUNITY DIFFERENTIAL (CFOP) CORRELATION GRAPH
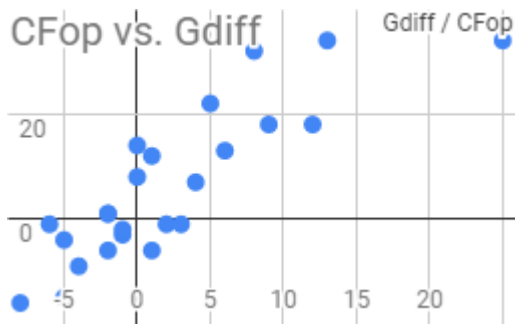
+0.85 goal differential and **sum of clear paths and cross field passes differential**

+0.84 goal differential and **clear path differential**

FIGURE 2.6. GOAL DIFFERENTIAL (GDIFF) AND CLEAR PATH OPPORTUNITY DIFFERENTIAL (CPOP) CORRELATION GRAPH
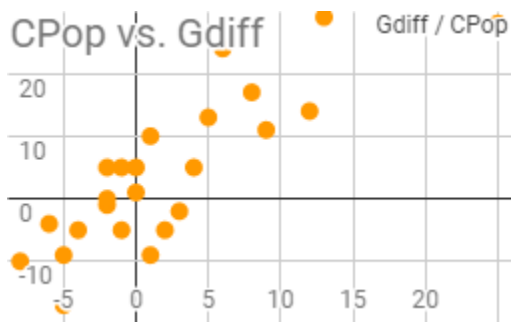
+0.71 goal differential (Gdiff) and **slow attack differential**

+0.71 goal differential and **corsi** (shot attempt differential)

+0.70 goal differential and **best scoring area corsi** (shot attempts from best scoring area differential)

+0.68 goal differential and **shot attempts differential from slow attacks**

+0.54 goal differential and **turnover differential**

+0.52 goal differential and **shot attempts differential from turnovers**

-0.51 goal differential and **quick attack differential**

+0.41 goal differential and **block share differential**

+0.28 goal differential and **shot attempts differential from odd man rushes**

+0.19 goal differential and **odd man rush differential**
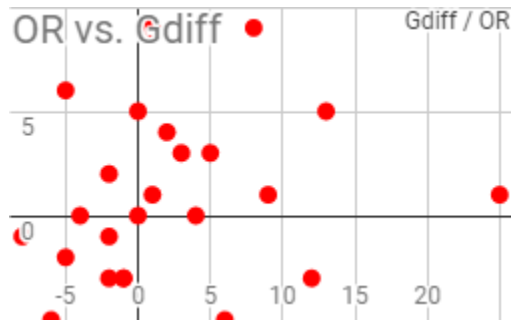
-0.08 goal differential and **shot attempts differential from quick attacks**

How to read values above? Closer to value 1 or -1 the stronger a correlation between variables is. In this case closer to 1 or -1 the more significant it is for outscoring opponent.

The highest value of +0.87 belongs to a combination of all clear paths, cross field passes and odd man rushes and so the more of these a team has the more likely is the team winning. It were cross field pass (+0.86) and clear path (+0.84) opportunities that were the most important for the winners when having an advantage over opponents. However odd man rushes isolated had little to no significance (+0.19) for winning (more precisely outscoring opponent).

Another strong observation was that corsi correlated with a goal differential rather strongly (+0.71). At the same time positioning of a shooter into "best scoring area" did not matter. Why? The correlation of a goal differential and best scoring area corsi was lower (+0.70) than simple corsi.

2.4.4. POWER PLAY ANALYSIS

Presented data in other chapters inside the Chapter 2 are even strength data. This is due to remove any contextual aspects that would influence performance. Uneven situations are power

plays (5 on 4, 5 on 3 or 4 on 3) and empty net situations (6 on 5 or other). In these the play itself is shifted in favour of one team who usually keeps the ball more in order to score.

Chapter 2.4.4. deals with a power play data. To incorporate for a reasonable data sample both power play and empty net situations are included and compared to even strength data. By this comparison it is possible to quantify the advantage having more players on the field than opponent.

There were 23 goals scored on the man advantage in all 24 tracked games and 6 goals scored while being short of a player or players. These goals include empty net goals as well. Following table compares quality aspects of possessions at even strength and power play.

TABLE 2.5. POWER PLAY AND EVEN STRENGTH POSSESSION-BASED DATA COMPARISON

Situation	Even strength data			Power play data		
Possession type	Occurrence	Goal occurrence	Goal percentage	Occurrence	Goal occurrence	Goal percentage
No attack	15.6%	0.0%	0.0%	3.2%	0.0%	0.0%
Clear path opportunity (CP)	7.7%	30.2%	18.1%	9.6%	26.1%	25.0%
Cross field pass opportunity (CF)	6.3%	7.9%	5.8%	21.1%	8.7%	3.8%
Odd man rush	4.7%	4.2%	7.4%	1.2%	4.3%	33.3%
CP + CF	5.2%	22.8%	20.3%	12.0%	43.5%	33.3%
Common attack	60.4%	27.0%	2.1%	52.2%	17.4%	3.1%
Total	4633	215	4.6%	251	23	9.2%

Possessions on power play were twice as dangerous as those at even strength (9.2% vs 4.6%). Clear path opportunities were more dangerous on power play than at even strength as well.

Also common attacks were more dangerous (power play allows teams to get closer to opponent´s net without facing a heavier pressure).

Simple cross field pass was less dangerous on a power play though. This can be explained by understanding of a deep positioned defence on a power play. Definition of a cross field pass (for purpose of the 2018 WFC data tracking) allows to count passes crossing the field axis but on outside of defending players (passes are close to the half line). These passes are naturally not that dangerous if you do not cut the defence by a cross field pass. Chapter 3.3. comes back to this topic with an aim to redefine the cross field pass opportunity in further usage.

The main reason why power plays are more dangerous is because an offence creates more dangerous possession types more often. When on power play 33.1% of possessions include cross field pass (to compare with only 11.5% at even strength) and 21.6% of them have clear path opportunity (to compare with only 12.9% at even strength).

2.4.5. SUMMARY OF THE GAME ANALYSIS

The most important findings from chapters 2.4.1. to 2.4.4. are summarized in following bullets:

- **Odd man rush** was the **most dangerous** type of possession with a goal percentage of 11.9%; goal percentages of turnover possessions (7.2%), quick attacks (5.1%) and slow attack (4.9%) were not that far behind though

- **High forechecking lowered** the chance of **scoring** during possessions

- There was a **clear path** executed in **53%** of all even strength **goals** while a share of only 13% clear path opportunities were created from all possessions

- **Clear path** possessions were about **9x more dangerous** than **common attack** possessions

- Existence of a **cross field pass increases** significantly the **goal percentage** of all possession types

- **Winners** at the 2018 WFC were very successful outnumbering opponents in both **cross field pass** (correlation of +0.86 to goal differential) and **clear path** opportunities (+0.84)

- It was **not relevant** to give more attention to shot attempts from the **best scoring area** as simple shot differential (corsi) correlated even stronger (+0.70 < +0.71) with becoming a winner

- Power-play analysis helped to **redefine cross field pass** opportunities and their real danger in cutting through the defensive formation

2.5. Team analysis

The whole chapter focuses on a team level data analysis. Below is a list of all tracked games during the 2018 WFC. Results and scores of different important categories are added into the table.

TABLE 2.6. LIST OF THE 2018 WFC GAMES

Date	Winner vs Loser	Result	Shot attempts	Clear path opportunities	Odd man rushes	Cross field pass opportunities
1.12.	Switzerland vs Latvia	7:3	41:33	11:6	6:6	14:7
1.12.	Sweden vs Finland	5:4	42:28	14:9	7:4	15:12
1.12.	Czechia vs Germany	10:5	60:30	23:6	4:10	18:3
2.12.	Norway vs Denmark	9:3	40:46	14:10	6:1	11:10
2.12.	Switzerland vs Germany	13:1	50:25	28:14	3:6	31:13
2.12.	Latvia vs Czechia	4:3	34:60	9:18	12:3	12:18
3.12.	Germany vs Latvia	5:4	38:38	5:10	6:3	9:7
3.12.	Finland vs Denmark	7:1	66:25	31:7	4:9	27:14
3.12.	Sweden vs Norway	9:1	68:18	20:3	13:4	34:2
4.12.	Finland vs Norway	9:1	48:26	11:1	3:2	18:2
4.12.	Sweden vs Denmark	25:0	67:16*	30:2*	5:4*	36:2*
4.12.	Czechia vs Switzerland	6:4	30:22	11:16	5:1	11:12
6.12.	Switzerland vs Norway	3:2 ot	63:30	16:6	4:3	19:7
6.12.	Czechia vs Denmark	10:1	51:25	18:7	4:3	25:7
7.12.	Sweden vs Latvia	14:1	83:25	36:7	10:5	39:5

7.12.	Finland vs Germany	6:1	52:31	21:8	6:3	28:6
8.12.	Latvia vs Norway	6:5 ps	63:26	13:12	1:1	14:6
8.12.	Germany vs Denmark	4:2	48:23	8:7	5:4	10:4
8.12.	Finland vs Czechia	7:2	24:35	12:3	3:1	8:4
8.12.	Sweden vs Switzerland	5:4 ps	65:41	15:10	6:1	21:7
9.12.	Norway vs Denmark	9:5	72:47	24:19	4:4	23:14
9.12.	Latvia vs Germany	5:3	30:25	9:9	5:2	3:4
9.12.	Switzerland vs Czechia	4:2	33:42	7:12	6:7	10:12
9.12.	Finland vs Sweden	6:3	31:40	9:11	7:4	7:8
*data tracked for only 50 minutes (video missing)						

2.5.1. KPI

KPI stands for Key Performance Indicators. Efficiency of teams represented by PDO metrics, shooting activity represented by corsi and defensive abilities represented by shot blocking are selected as KPI variables in this chapter.

PDO has a strong +0.85 correlation with a goal differential on team level at the 2018 WFC (see chapter 1.3.). That is why it is a significant variable for measuring a success of a team. Next graph reveals PDO values for all eight elite teams during the tournament.

FIGURE 2.8. PDO OF EIGHT ELITE TEAMS DURING THE WFC 2018

PDO during the WFC 2018
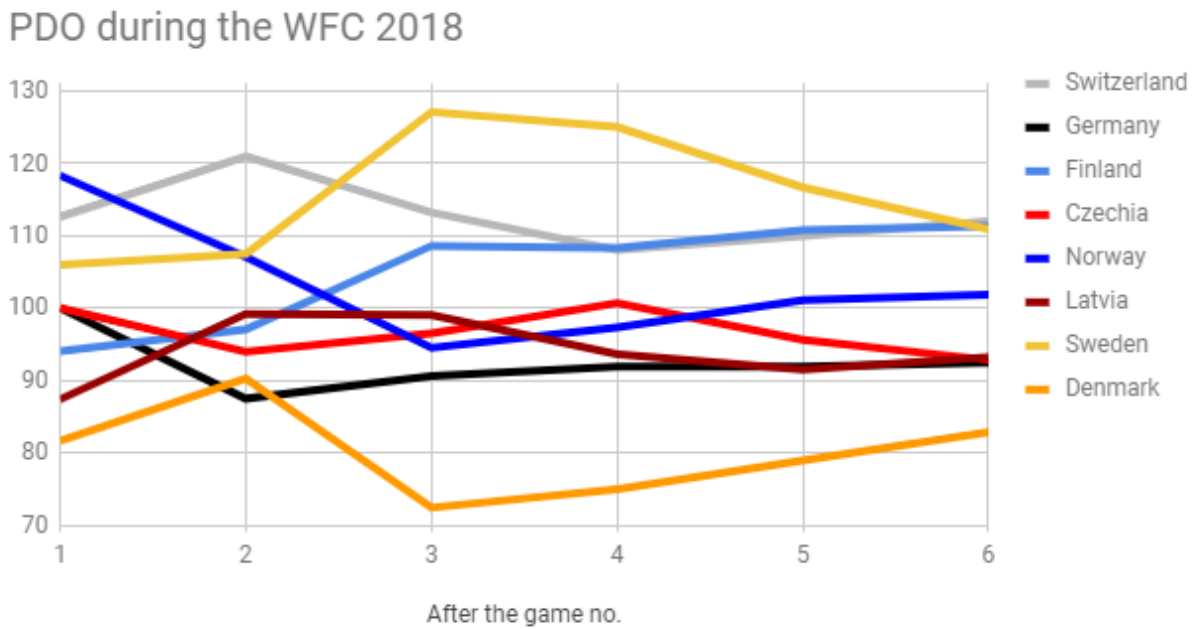
Sweden recorded the highest values during the tournament. It was Finland and Switzerland who had the best PDO at the end of the tournament with Finland steadily improving during the WFC. The fourth best value at the end belonged to Norway. On the other hand Latvia, Germany and maybe surprisingly Czech republic had very low PDO values (around 93). Denmark has the worst values during and at the end of the tournament.

Corsi complements PDO for an evaluation on a team level as it expresses ability to outshoot an opponent. It has a significant correlation with a goal differential of +0.71 suggesting that winners are more likely to outshoot their opponents. Next graph compares elite 8 teams with their share of even strength corsi for.

Share of corsi for (shot attempts for)
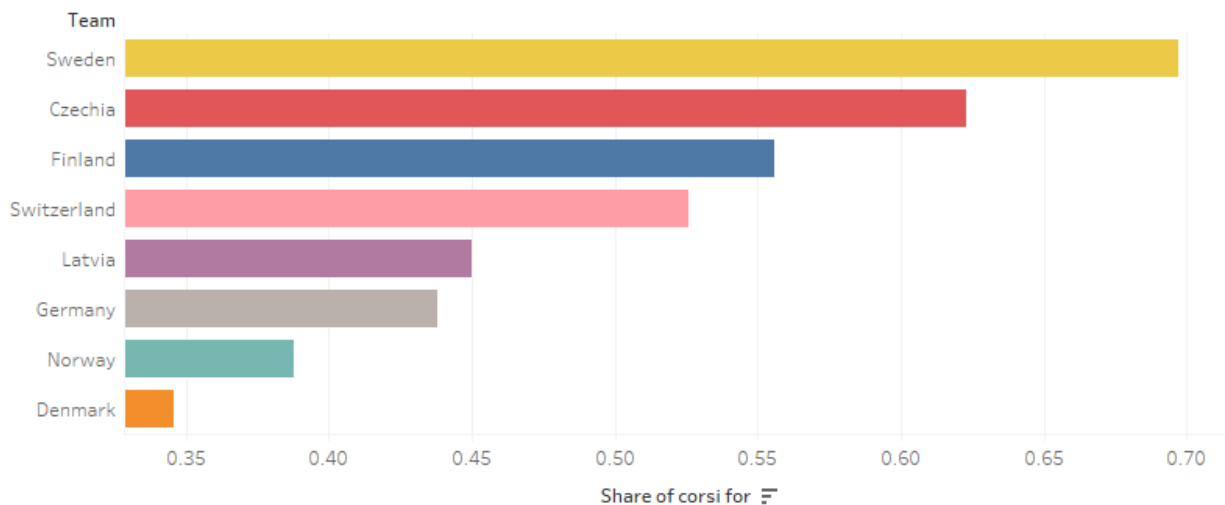
Sweden generated the biggest advantage in shot attempts over their opponents in the tournament. Active in shot attempt differential was also Czech team followed by Finland and Switzerland.

Shot blocking is the last topic the chapter focuses on. Past research[3] suggested it could play a significant role in floorball. However this was not proved at the WFC level. Share of block differential correlated with a goal differential positively at +0.41 and this rather belongs to a random interdependency of variables. Still it was the 2018 WFC winner Finland with the most impressive shot blocking results.

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[3] http://www.floorball.org/wfc2018/news.asp?offset=&kieli=826&tyyppi=&id_tiedote=5270

Share of blocks for a team and its opponent
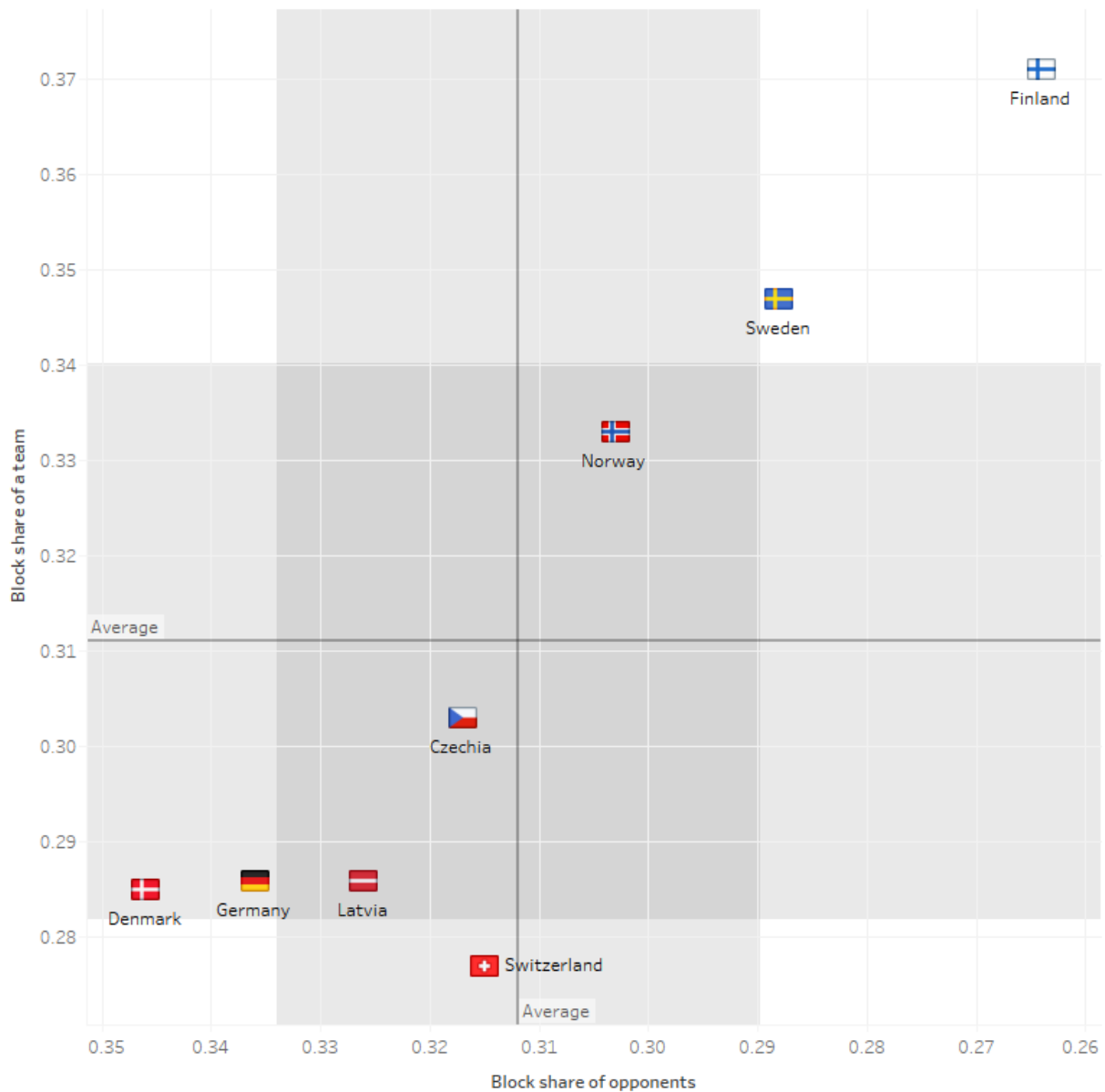
Finland was able to block more than 37% of shot attempts from opponents and offensively had only about 26% of shot attempts blocked. Sweden had the second best differential of share of blocks for and against followed by Norway.

PDO and share of block differentials correlates (note lack of data - only 8 teams included) with each other nicely (+0.74) and it overall expresses efficiency of a play by all teams. It is not only about outshooting opponents but also and mainly about the quality of situations to shoot from (higher goal percentage, lack of blocks) both offensively and defensively.

2.5.2. TEAM SPECIFIC RESULTS

This chapter compares eight elite teams at the 2018 WFC according to variables expressing different playing styles. It includes overall number of possessions, different possession types for and against and forechecking.

Overall number of even strength possessions for and against teams can give a contextual understanding of what playing styles of eight teams were.

FIGURE 2.11. NUMBER OF EVEN STRENGTH POSSESSIONS FOR AND AGAINST FOR TEAMS AT THE 2018 WFC

Number of possessions for and against
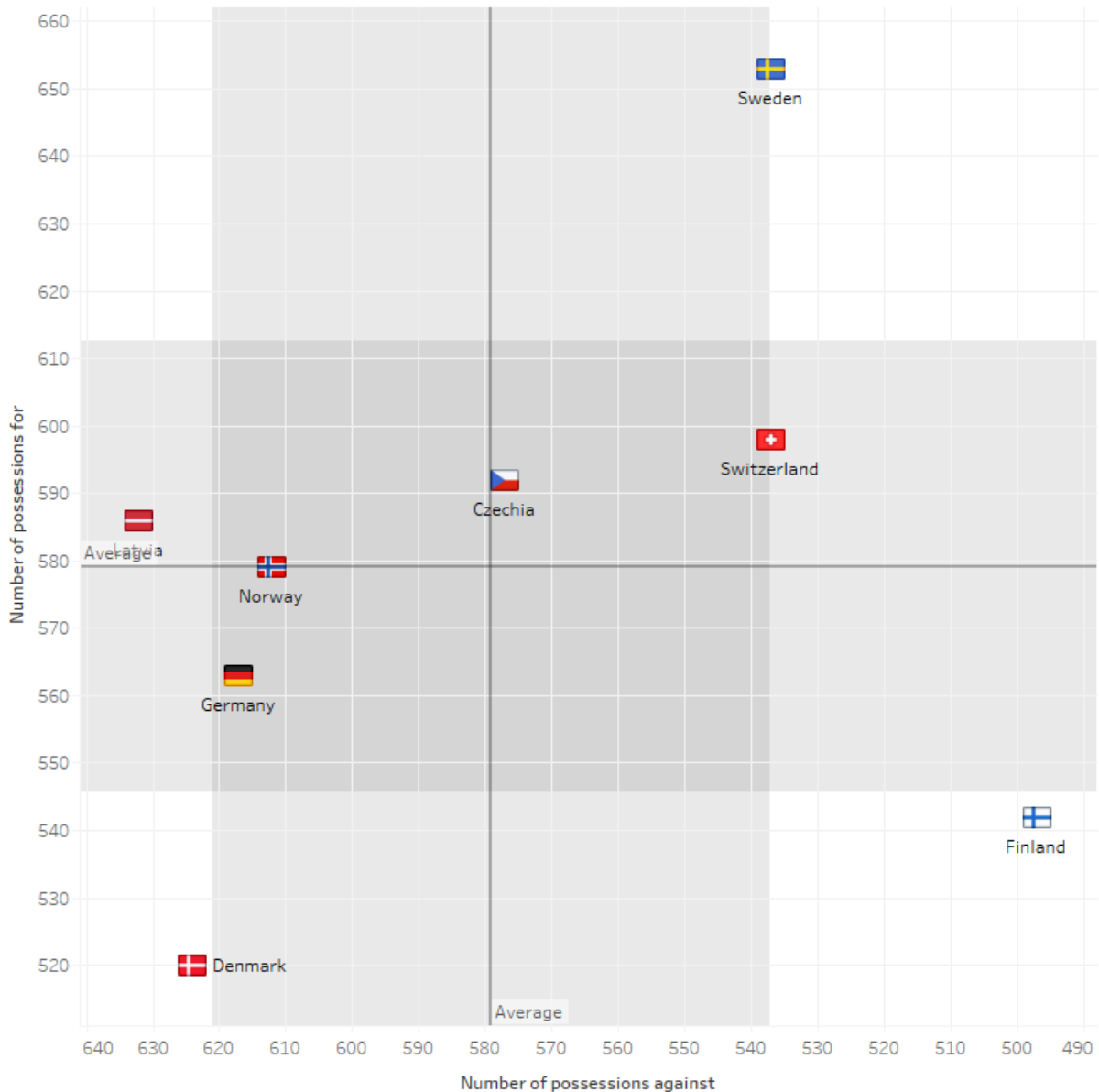
It was Latvian team with the most possessions overall (1218) in their games. It indicates an active approach with shorter possessions and higher rate of ball exchanges. Norway, Sweden and Germany produced a high number of possessions as well with Sweden having a significant advantage in possession for vs against. There was one team having the least number of possessions overall in a significant fashion, Finland. Strategy of Finland was not to play open game but to rather maintain longer possessions in order to prevent opponent from having high number of possessions against (less than 500).

As defined in the chapter 2.2.3. there were five different possession types measured during games at the 2018 WFC. This is a distribution of them at even strength for all eight elite teams.

FIGURE 2.12. DIFFERENT TYPES OF POSSESSIONS FOR TEAMS AT THE 2018 WFC

Top 4 teams had higher share of slow attacks which was connected to more defensive style of their opponents. Also turnover possessions were more frequent for top 4 teams. Sweden had the biggest share of them along with odd man rushes. Germany was a team who deviated the most from other four teams as they were able to create a good share of odd man rushes (along with Latvia) but were also solid in turnover possessions compared to Denmark, Latvia and Norway.

Next graph shows the same distribution but for even strength possessions against teams.

FIGURE 2.13. DIFFERENT TYPES OF POSSESSIONS AGAINST TEAMS AT THE 2018 WFC

Share of different types of possessions
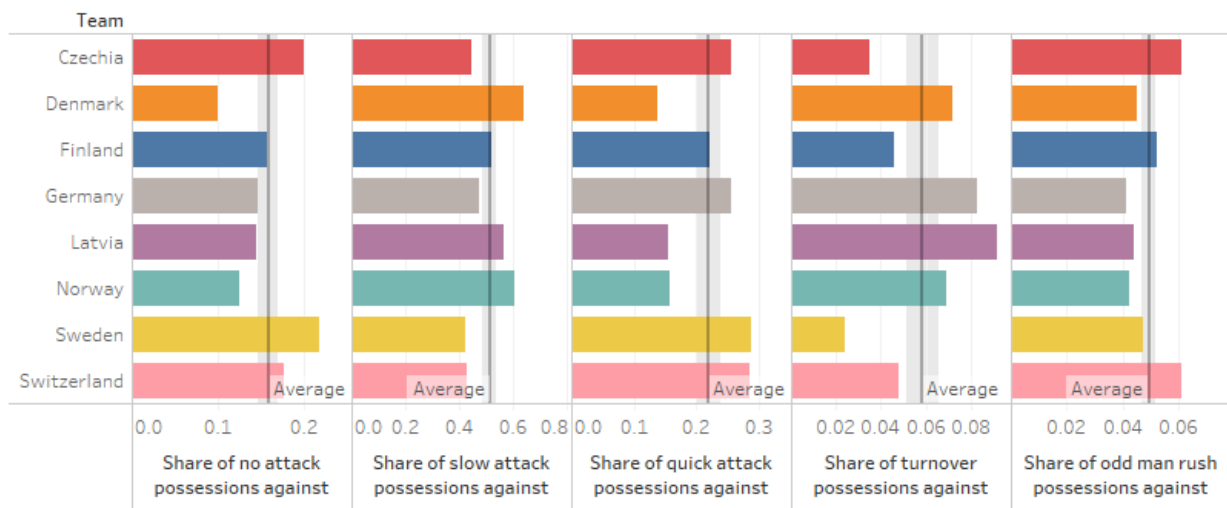
Latvia and Germany suffered the highest share of turnover possessions against. Against Sweden and Switzerland there were the most quick attacks generated which was influenced by high forechecking of both teams (see Figure 2.14.). Czechia and Switzerland were prone to giving up a lot odd man rushes against.

When without the ball these are distributions of pressure applied (or forecheck) by teams to ball possessing opponents.

FIGURE 2.14. FORECHECKING TYPES OF TEAMS AT THE 2018 WFC

Pressure used
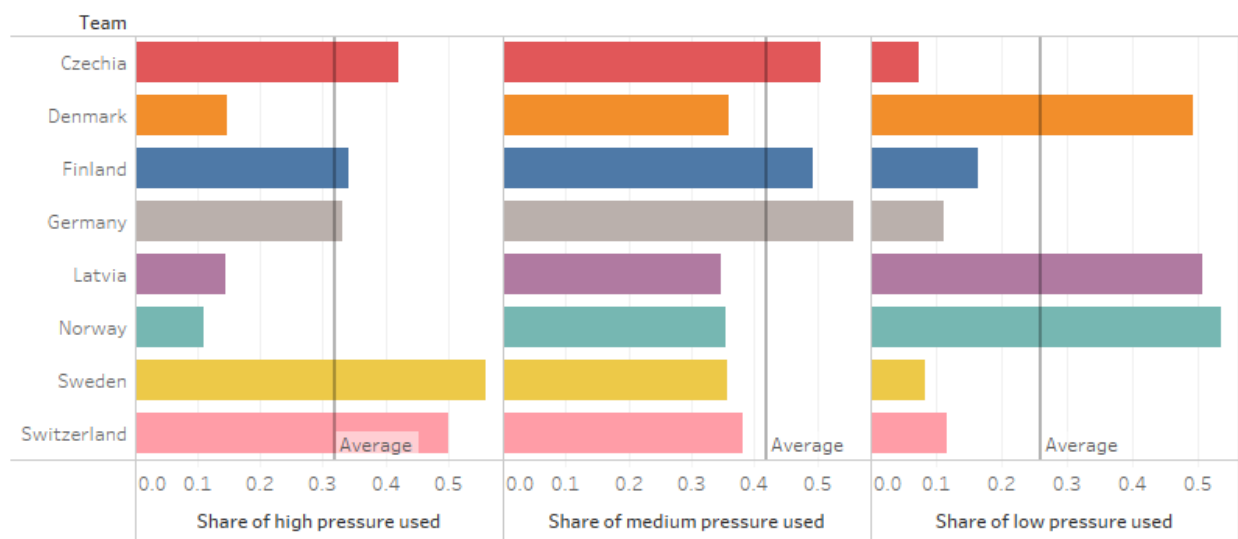
Sweden and Switzerland forechecked high against opponents. Czechia, Finland and Germany applied mostly medium pressure and Denmark, Latvia and Norway elected rather deeper defending with low forechecking.

2.5.3. POSSESSION QUALITY OF TEAMS

Clear path and cross field pass opportunities were identified earlier (see Chapters 2.4.2. and 2.4.3.) as dangerous aspects of possessions. Next series of graphs visualize not only ability to create or prevent them for teams but also ability to execute them. Number of clear path situations created for and against is below.

Number of clear path opportunities for and against
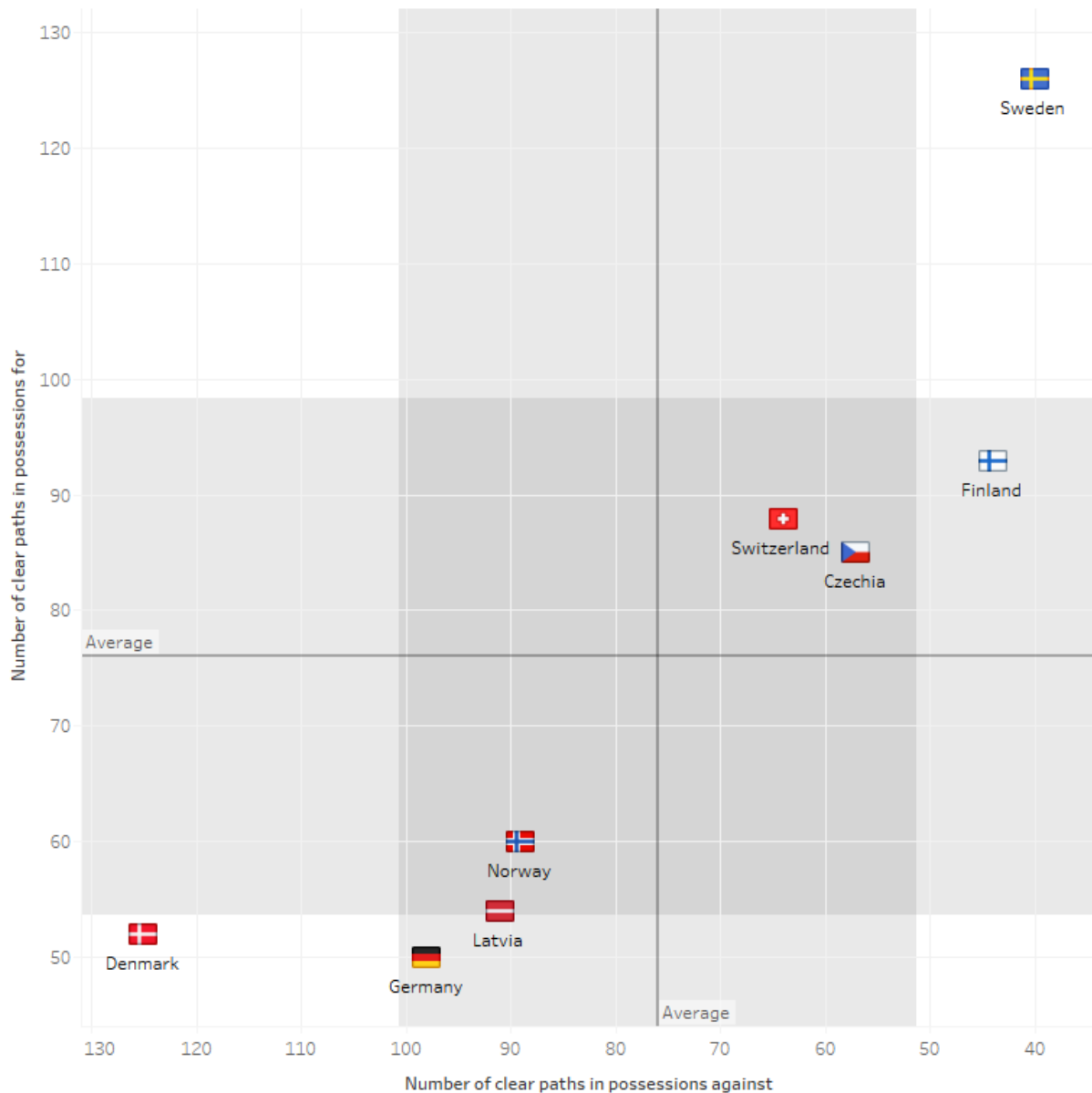
Sweden dominated the rest in both creating (126) and preventing (40) clear path opportunities. Finland had the quality in preventing high number of clear paths in particular (44). Denmark recorded the worst numbers especially due to a big number (126) of clear paths against.

Next graph focuses on clear path execution (clear path opportunity finished with a shot attempt) shares both for and against teams at the tournament.

FIGURE 2.16. SHARE OF CLEAR PATHS EXECUTED FOR AND AGAINST TEAMS AT THE 2018 WFC

Share of clear path opportunities executed for and against
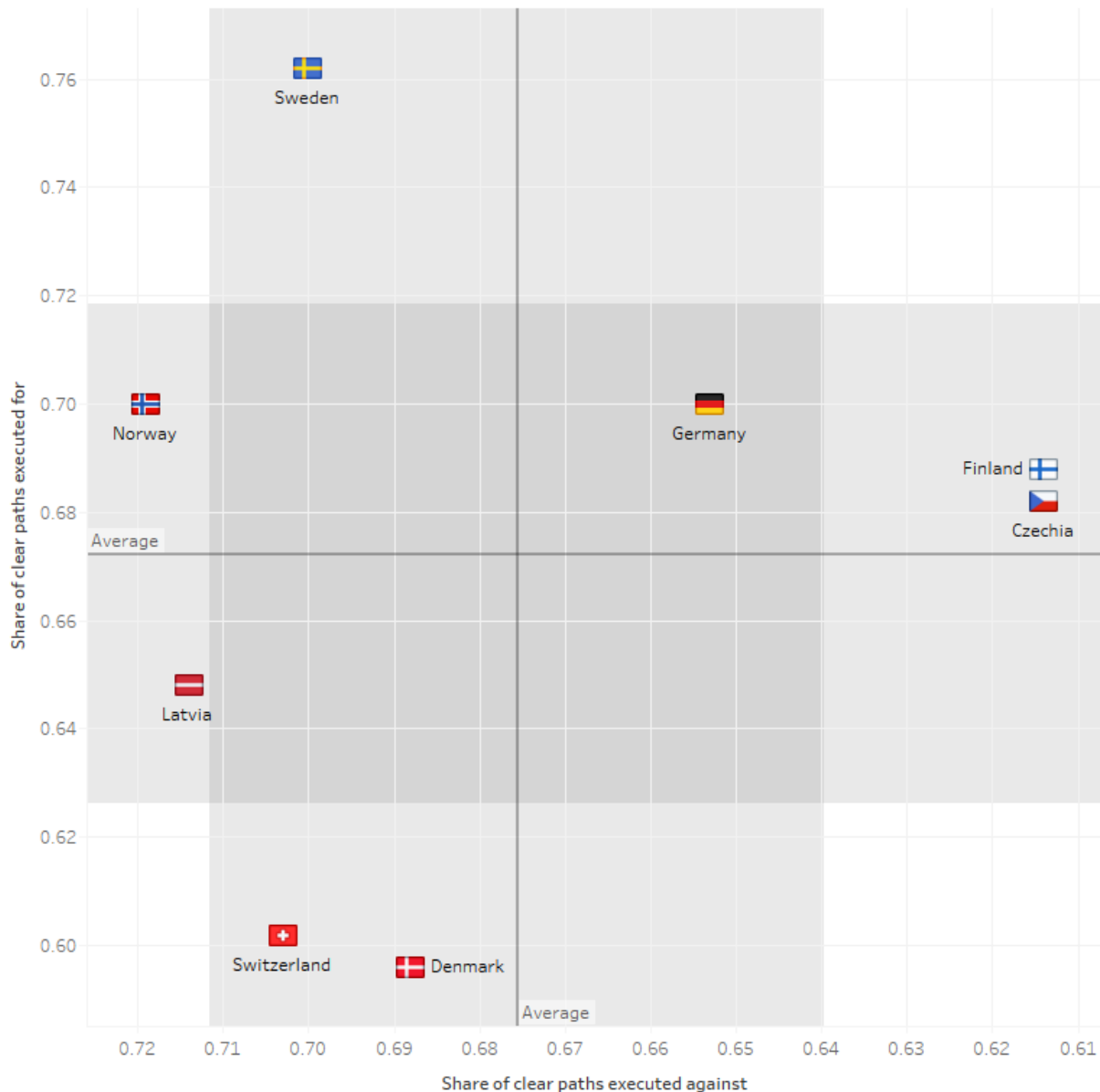
Sweden was able to execute (finish) the highest share (76%) of their created clear path opportunities, at the same time even their opponents were able to execute often against Sweden (70%). Finland and Czechia had the lowest share of clear path opportunities executed against (over 61%). Also Germany was above average in both executing (70%) clear paths and preventing of executing (65%) them against. On the other hand bronze team Switzerland executed much lower share of clear paths (60%) than was prevented (70%).

Similarly next graph compares cross field pass opportunities at even strength for and against teams at the 2018 WFC.

FIGURE 2.17. NUMBER OF CROSS FIELD PASS OPPORTUNITIES FOR AND AGAINST TEAMS AT THE 2018 WFC

Cross field pass opportunities for and against
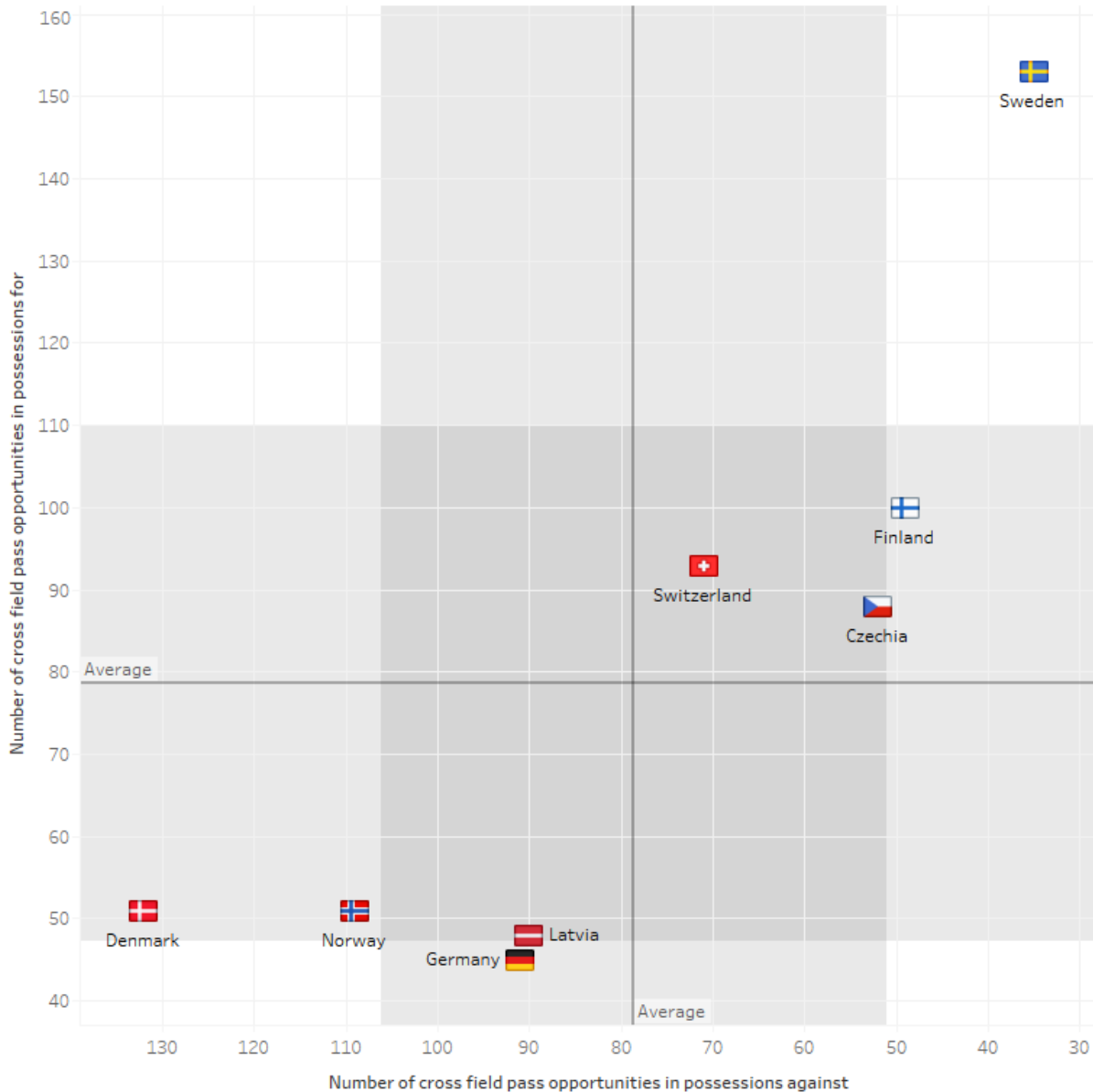
The graph is very similar to the one with clear path opportunities for and against teams. This proves how much correlation do clear paths and cross field passes have (on game by game basis it is a positive correlation of 0.92). This does not come as a surprise as 40% of clear paths co-exist with cross field pass and 38% of cross field passes co-exist with clear paths on the field.

But how efficient were teams in executing cross field passes? Next graph is here to reveal that.

Share of cross field pass opportunities executed for and against
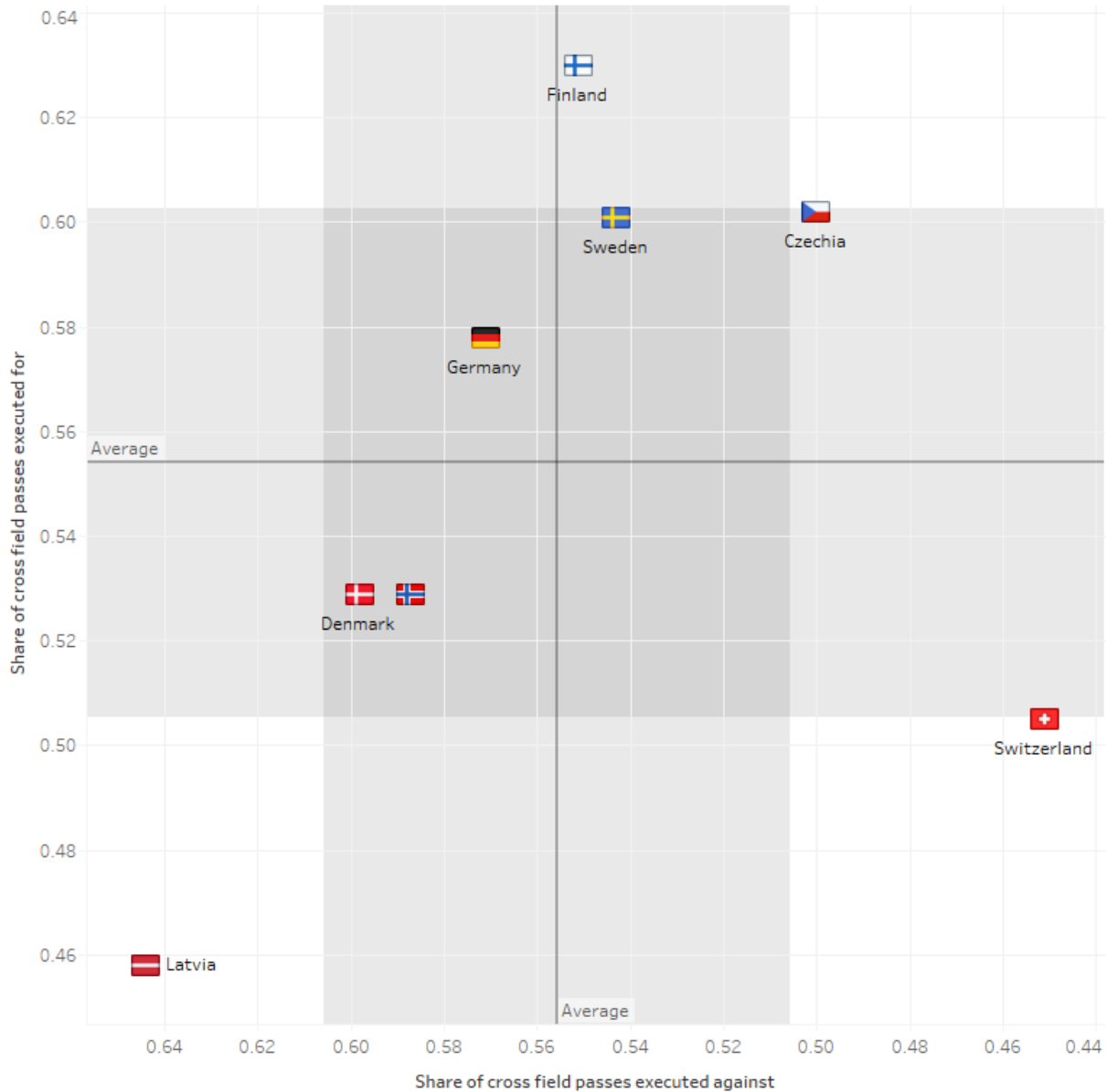
Finland was able to execute cross field pass opportunities at the highest rate (63%). It tells that they actively looked for cross field passes and were able to make them happen. Both Czechia and Sweden executed 60% of cross field pass opportunities with Czech team having the smaller share of cross field pass execution against (50%). Switzerland was an interesting case. Their share of cross field pass executed was rather low (over 50%), at the same time their opponents were not successful in executing them against them (only 45%). Latvia had the lowest share of

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cross field passes executed (46%, this might be connected with having the highest share of quick attacks where precision of execution decreases) while having the highest share of cross field passes executed against (64%).

2.6. Analysis of team Czechia

Team and player analysis of Czechia is presented here.

2.6.1. TEAM ANALYSIS OF CZECHIA

This chapter focuses on strong and weak aspects as well as specifics of performances of Czechia at the 2018 WFC. At first important variable differentials for Czechs and their opponents are visualized game by game.

FIGURE 2.19. IMPORTANT STATISTICS FOR CZECHIA DURING TOURNAMENT GAMES
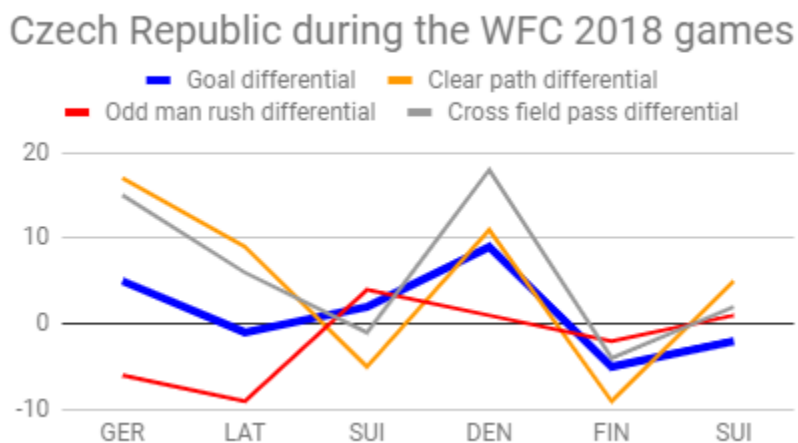
Czechia had a problem with odd man rushes during first two games at the tournament against Germany (10:5) and Latvia (3:4). The most dominant performance and win (10:1) came in the quarterfinal game against Denmark. On the other hand there was not much of chance to win in the semifinal game against Finland (2:7). Finally Czech team deserved better fate in the bronze game but fell short (2:4) against Switzerland.

Following table summarizes strong aspects, weak aspects and specifics about the play of the Czech team.

TABLE 2.7. STRONG, WEAK AND SPECIFIC ASPECTS OF PERFORMANCES OF CZECHIA AT THE 2018 WFC

Strong aspects
- The second best corsi (shooting activity) of 62.5% (correlates with winning at 71%)   - Good prevention values of turnover possessions against (turnover possession with a 7.2% goal percentage and correlates at 54% with winning)   - The third best in clear path and cross field pass opportunities created (Switzerland behind, Finland and in particularly Sweden with significant distance on top)   - Low execution share of clear path opportunities (61%) against   - Good ratio of execution of cross field passes for (60%, the second best) and against (50%, the second best)
Weak aspects
- Effectivity with PDO value of only 93 was too low and during the tournament never went over the average (100)   - Low share of odd man rushes for (odd man rush with a 11.9% goal percentage)   - The highest share of odd man rushes against
Specific aspects
- Low share of no attack possessions (second behind Sweden) and opponents with a high share (again second behind Sweden) of no attack possession; this indicates the active approach with an aim to control the ball more than opponents   - High share of slow attack possessions   - The second highest share of turnover possessions   - Overall rather lower numbers of clear path and cross field pass opportunities created both for and against

2.6.2. PLAYER ANALYSIS OF CZECHIA

In order to create one unified variable to measure performance of players goal estimation differential per 100 possession is presented. How is this variable calculated?

Goal estimation differential = odd man rush differential * 0.119 + clear path from slow attack differential * 0.208 + clear path from quick attack differential * 0.193 + clear path from turnover differential * 0.132

Clear path situations and odd man rushes are taken here into account as a quality aspects of possessions with its proven significance (see Chapter 2.4.). In following graphs values are adjusted per 100 possessions. Czech players are ordered according to goal estimation differential per 100 possessions in the next graph and a break down to clear paths and odd man rushes is added in the lower part.

Czech Republic´s Player Performance Indicators
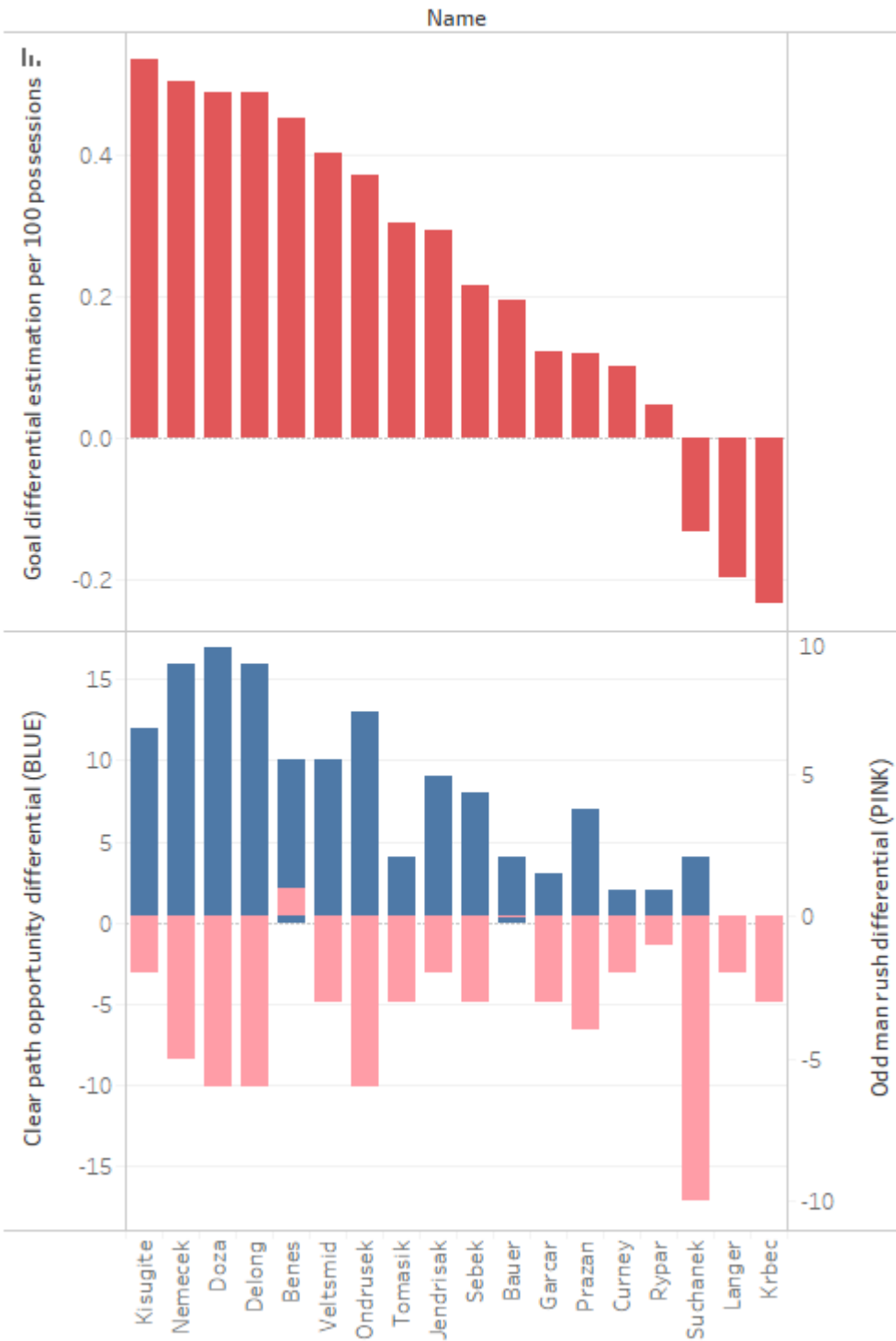
Most of the players ended the tournament with a positive differential and it was Kisugite, Nemecek, Doza, Delong and Benes leading the way. Doza, Delong and Nemecek had the best clear path differential from the team and Benes was the only one with a positive differential of odd man rushes.

To better understand contextual aspects of performances of players it is important to consider other variables. Next graph brings a complex tool for evaluating players as it incorporates both quality of teammates and quality of competition (opponents). These are calculated the same way as the goal estimation differential per 100 possessions and consider amount of shared possessions with all teammates as well as opponents at the 2018 WFC. Lastly the size of a mark corresponds to number of even strength possessions for each player.
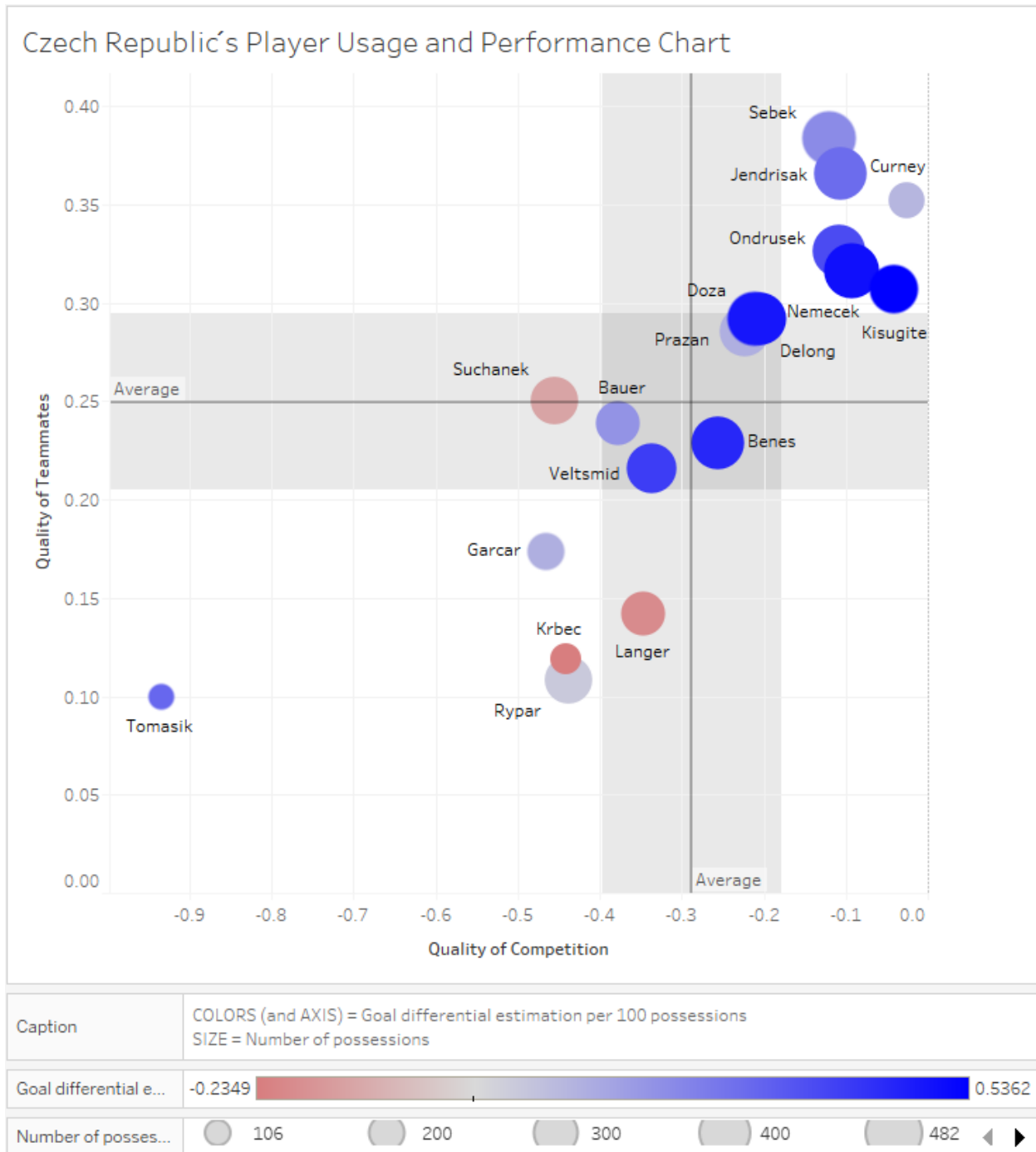
It were Sebek, Jendrisak and Curney who played with the best performing teammates (upper positioned on the vertical axis) and so they had their work easier in this regard. On the other hand Tomasik, Rypar, Krbec or Langer shared their time usually with relatively worse performing teammates.

Similarly the horizontal axis shows differences in opponents faced. It makes a difference if a player sits certain games against either stronger or weaker competition. Kisugite, Curney or Nemecek played against the strongest competition (usually starting against a top line of an opponent) and so had their work harder in this aspect. It was Tomasik who played much more against lesser competition.

The color represents performance of players shown already in Figure 2.20. Accounting for context following statements corrects preliminary evaluation of players:

- Kisugite and Nemecek had a really strong tournament posting strong performance numbers while playing against the strongest competition

- Next it was Delong, Doza, Benes or Veltsmid who had overall harder context comparing him to the similarly well performing teammates

- Suchanek was struggling and recorded a negative goal estimation differential while having rather favourable context

- Performances of Langer or Krbec ended also in negative values but their quality of teammates was lower

Offensively it were Veltsmid (3.4), Delong (3.3), Garcar (3.2), Kisugite (3.1) and Benes (3.1) with the strongest goal estimation for values per 100 possession. If your team needs to score a goal these might be some of your choices of who to put on the field.

Defensively it were Krbec (1.7), Bauer (1.9), Nemecek (2.0), Doza (2.1) and Tomasik (2.1) with the best goal estimation against per 100 possession values. If a priority is not to be scored on these players proved to have a good goal prevention results.

At the same time data sample from six games is not sufficient to judge players with a big significance. It was just a display of their performances during the nine day tournament in a specific environment with other factors likely playing its role (see Chapter 2.3).

Lastly even strength shot attempts data are presented on a player level. Who was active in finishing plays and who was rather passing instead of shooting? This can be found by looking at the next graph.

Czech Republic's Shot Attempts and Assists per 100 Possessions for

| Caption | COLOR = Corsi for percentage
SIZE = Number of possessions |

Corsi for percenta... 0.4819 ▬▬▬▬▬▬ 0.7007

Number of posses... ◯ 106 ◯ 200 ◯ 300 ◯ 400 ◯ 482
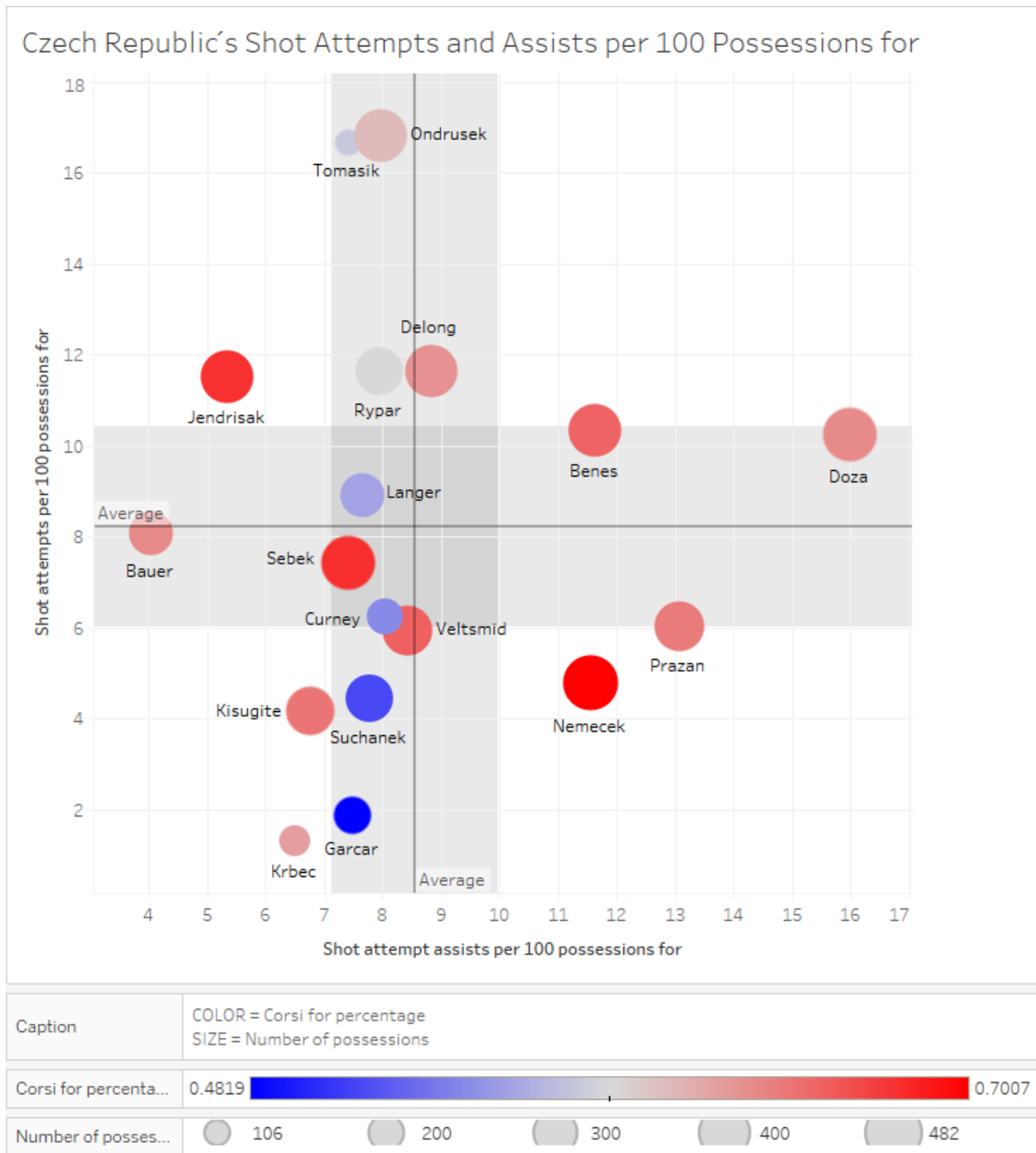
Doza belonged to a group of the most active passers at the 2018 WFC as he averaged 16 assists per 100 possessions for. Similarly Ondrusek and Tomasik (with lower data sample = smaller mark) belonged to a group of the most active shooters with around 17 shot attempts per 100 possessions for. The most active defender in finish was Prazan with the most assists (13) per 100 possessions for from all defenders at the 2018 WFC.

The color represents an ability to outshoot opponents at even strength (corsi for) and Jendrisak, Nemecek and Sebek recorded the highest values.

2.7. Analysis of team Denmark

Team and player analysis of Denmark is presented here.

2.7.1. TEAM ANALYSIS OF DENMARK

This chapter focuses on strong and weak aspects as well as specifics of performances of Denmark at the 2018 WFC. Important variable differentials for Denmark and their opponents are visualized game by game below.

FIGURE 2.23. IMPORTANT STATISTICS FOR DENMARK DURING TOURNAMENT GAMES
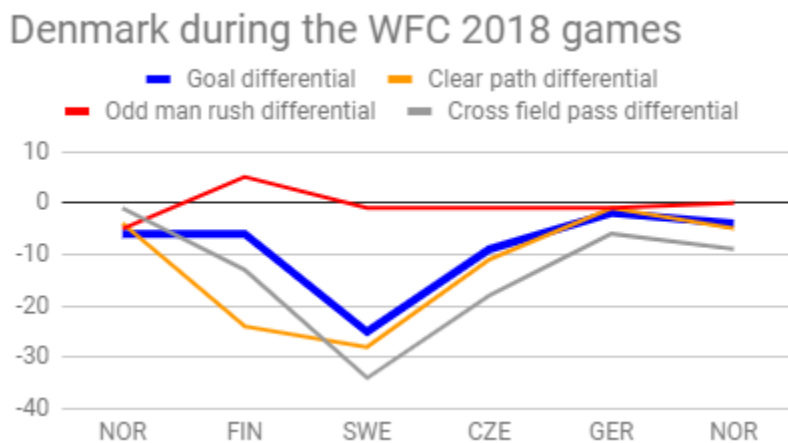
Denmark was not able to have an advantage in both clear paths and cross field passes against any opponent and lost all of their six games. Some light comes from looking at positive odd man rush differential in the group game against Finland (1:7). The deepest waters were hit in the group game against Sweden (0:25).

Following table summarizes strong aspects, weak aspects and specifics of play of Denmark.

Strong aspects
● No relevant record found that would compare favourably Denmark against other elite teams

Weak aspects
● The lowest effectivity and weak PDO results (83)
● The lowest corsi for percentage (35%)
● Low shot blocking numbers for (28.5%) and high shot blocking numbers against (35%)
● The lowest share (3%) of turnover possessions for
● The worst clear path and cross field pass differentials due to high values against (125 clear path situations created against and 132 cross field pass opportunities against)
● The lowest clear path execution share of 60%

Specific aspects
● The lowest share of quick attack possessions against (13%)
● Using the low forechecking the most (around 50%)
● Average odd man rush created values both for (25) and against (28)

2.7.2. PLAYER ANALYSIS OF DENMARK

Goal estimation differential per 100 possession as presented in Chapter 2.6.2. is used to evaluate performances of players. Next graph puts in order Danish players according to their performance results. Clear path and odd man rush differentials are added in the lower part of the graph.

Denmark's Player Performance Indicators
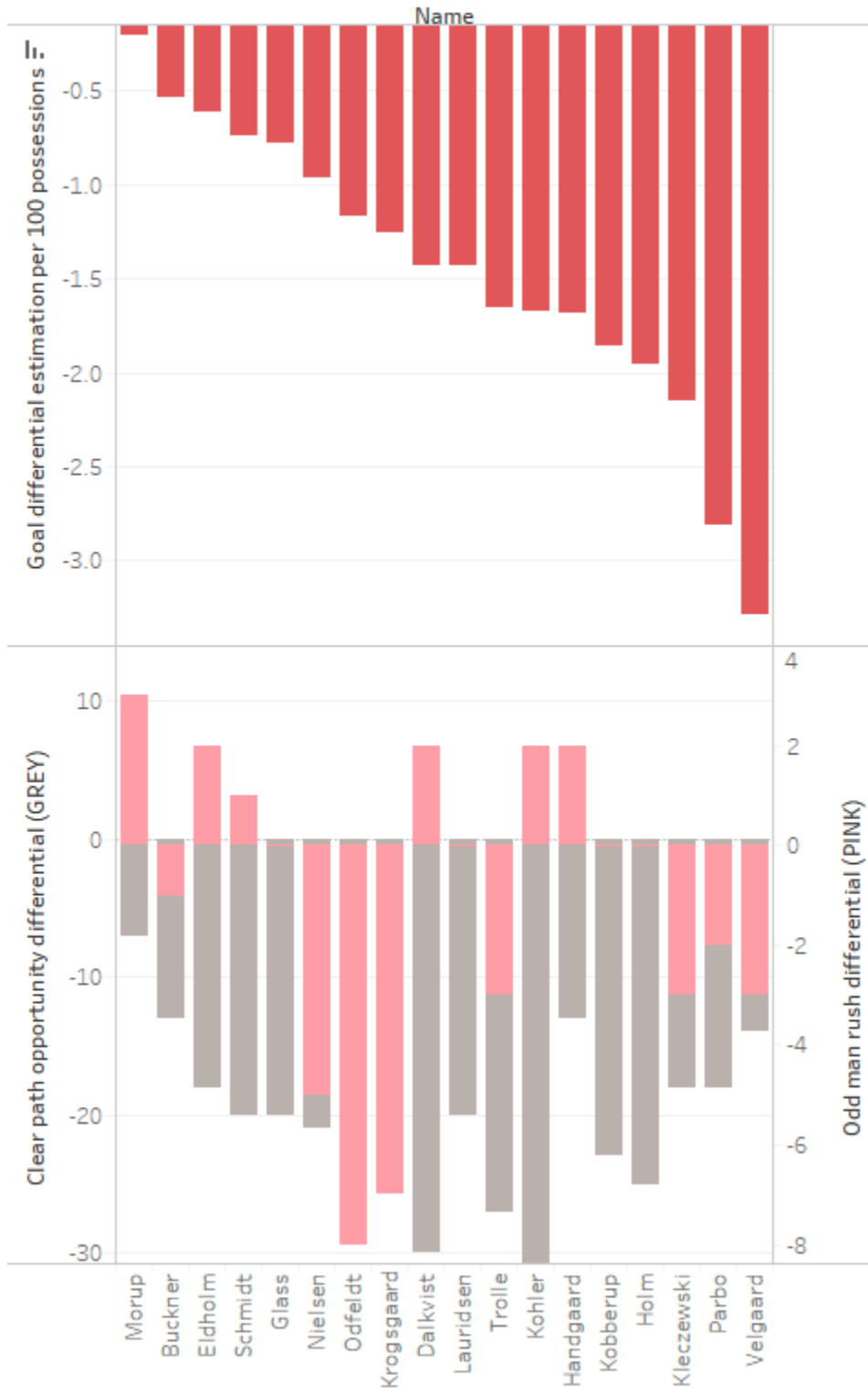
Morup recorded the best overall results as he had the best differentials of both odd man rushes and clear path opportunities on the team. Next in line were Buckner, Eldholm, Schmidt and Glass.

To add context to the evaluation quality of teammates and quality of competition is included in the next graph.

Denmark's Player Usage and Performance Chart

| Caption | COLORS (and AXIS) = Goal differential estimation per 100 possessions |
| | SIZE = Number of possessions |

| Goal differential e... | -3.289 | -0.200 |

| Number of posses... | 92 | 200 | 300 | 400 | 513 |
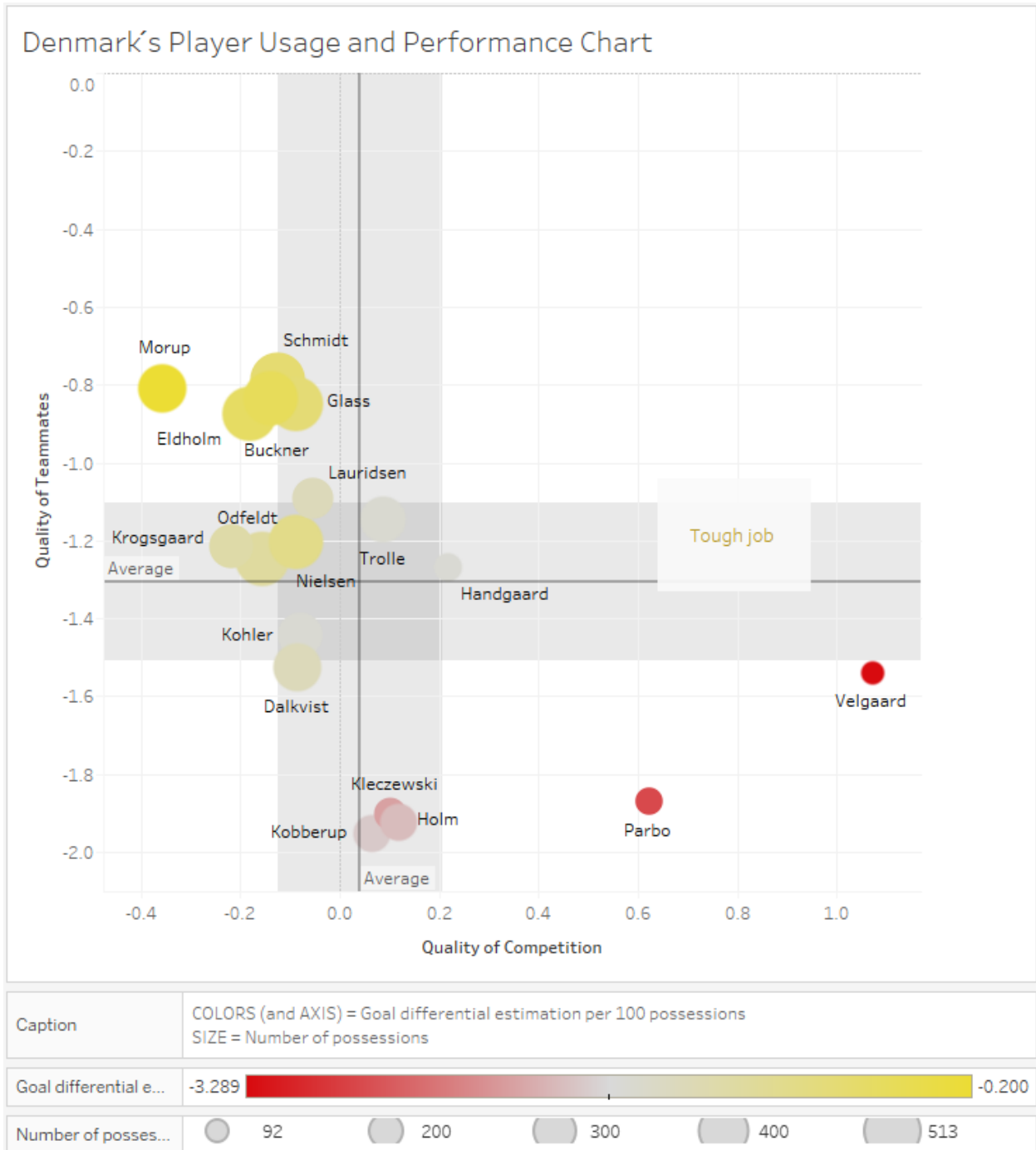
Already mentioned Schmidt, Morup, Buckner, Glass, Eldholm enjoyed to play alongside teammates with better performance results. On the other hand Kobberup, Holm, Kleczewski or Parbo played a lot with weaker teammates and had their work harder in that regard.

Velgaard and Parbo had to face the best quality of competition meanwhile Morup had his life easier playing against weaker competition.

This helps to summarize evaluations of players with added context:

- The easiest context supported a strong performance for Morup as well as for Schmidt, Eldholm, Buckner and Glass that created a first line for Denmark

- Solid performance of Skov Nielsen stands out among a group (mostly second line) with very similar context

- Velgaard and Parbo ended the tournament with the weakest performances, these were strongly influenced by playing against very tough competition (they sat against easier opponents)

Offensively it were Morup (3.2), Schmidt (2.8), Buckner (2.6), Glass (2.6) and Eldholm (2.6) with the best goal estimation for per 100 possessions. They might be a good choices for coach when Denmark needs to score a goal.

Defensively it were Morup (3.3), Buckner (3.5), Eldholm (3.6), Krogsgaard (3.7) and Skov Nielsen (3.7) with the best goal estimation against per 100 possessions values. If a priority is not to be scored on these players proved to have a good goal prevention results.

At the same time data sample from six games is not sufficient to judge players with a big significance. It was just a display of their performances during the nine day tournament in a specific environment with other factors likely playing its role (see Chapter 2.3).

Lastly even strength shot attempts dat are presented on a player level. Who was active in finishing plays and who was rather passing than shooting? These can be revealed by looking at the next graph.

Buckner was one of the most active passers in the whole tournament averaging 14 assist per 100 possessions for. Kleczewski was active on a shooting side with an average of 15 shot attempts per 100 possessions for. He was followed by a defender Schmidt who was not shying away from shooting (12 shot attempts per 100 possessions for).

The color represents ability to outshoot opponents at even strength (corsi for) and Morup, Buckner, Glass, Schmidt and Eldholm recorded the highest values.

2.8. Analysis of team Finland

Team and player analysis of Finland is presented here.

2.8.1. TEAM ANALYSIS OF FINLAND

This chapter focuses on strong and weak aspects as well as specifics of performances of Finland at the 2018 WFC. Important variable differentials for Finland and their opponents are visualized game by game below.

FIGURE 2.27. IMPORTANT STATISTICS FOR FINLAND DURING TOURNAMENT GAMES
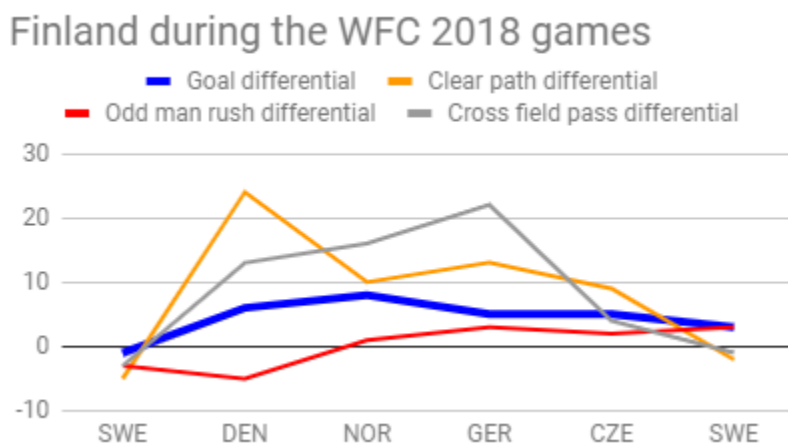
Finland improved from negative odd man rush differentials from first two games (4:5 vs Sweden and 7:1 against Denmark). Finland created the strongest clear path differential against Denmark and the strongest cross field pass differential against Germany in the quarterfinal game (6:1).

Following table summarizes strong aspects, weak aspects and specifics about the play of Finland.

Strong aspects
• Steadily improving PDO during the tournament (111.3 at the end mainly due the best goalkeeping percentage of 86.7%)
• Solid shooting advantage (corsi) over opponents (over 55%)
• Best share of blocks both for (37%) and against a team (26%)
• Second best differentials of clear path and cross field pass created
• Good prevention of clear path executed against (61%)
• The biggest share of cross field passes executed (63%)

Weak aspects
• Relatively higher percentage of odd man rush possessions against

Specific aspects
• The least number of even strength possessions and possessions against
• Relatively higher share of slow attack possessions for and lower share of quick attacks for
• Forechecking with rather medium or high pressure used

2.8.2. PLAYER ANALYSIS OF FINLAND

Goal estimation differential per 100 possessions presented in Chapter 2.6.2. is used to evaluate performance of players. Next graph puts in order Finnish players according to their performance results. Clear path and odd man rush differentials are added in the lower part.

Finland's Player Performance Indicators
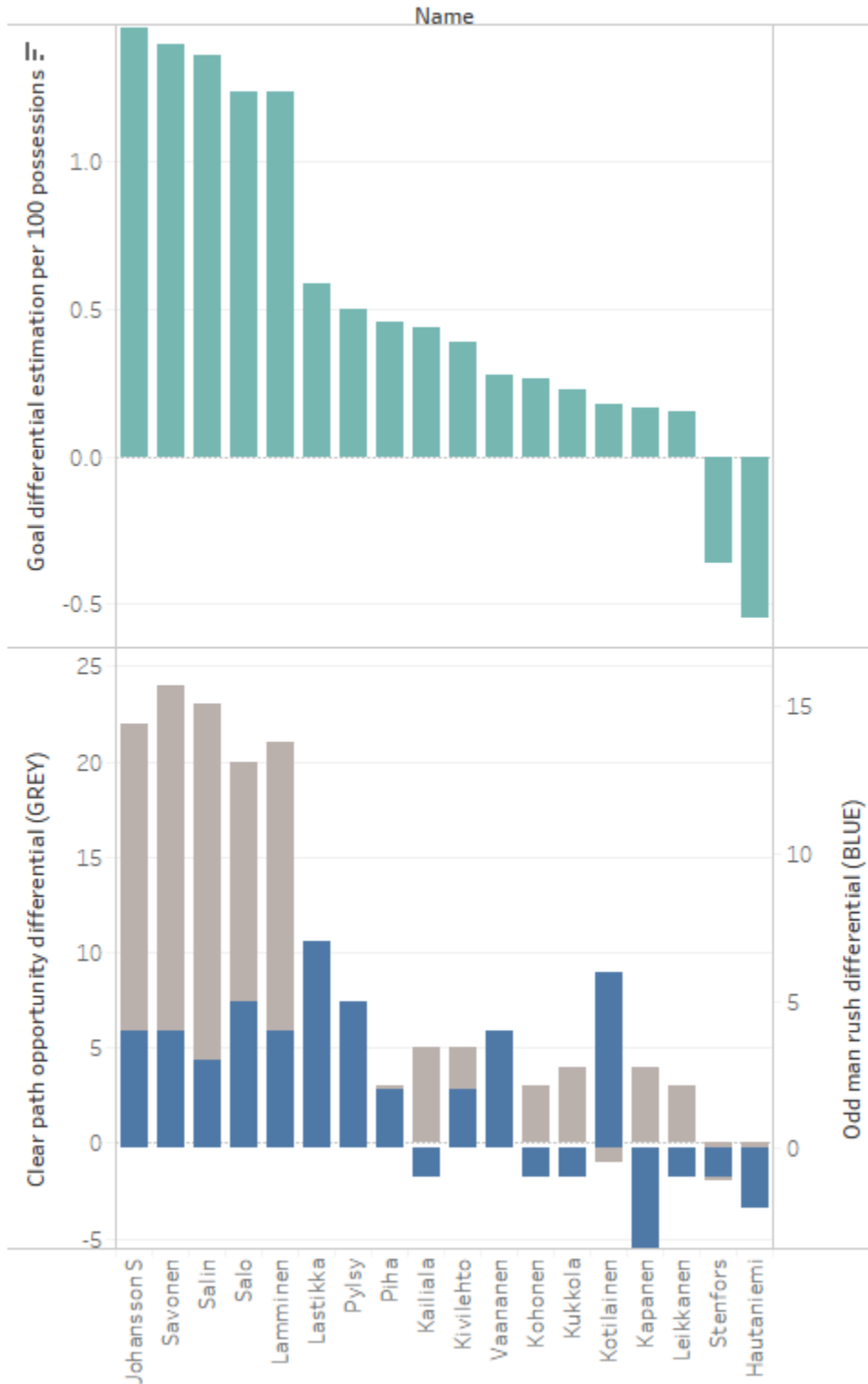
First line of Johansson S, Savonen, Salin, Salo and Lamminen brought dominant part of the quality to the team. They were strong in clear path opportunity differential in particular. Next in order were Lastikka and Pylsy.

To add context to the evaluation quality of teammates and quality of competition is included in the next graph.

Finland's Player Usage and Performance Chart

Caption: COLORS (and AXIS) = Goal differential estimation per 100 possessions
SIZE = Number of possessions

Goal differential e...   -0.547   1.454

Number of posses...   125   150   200   250   300
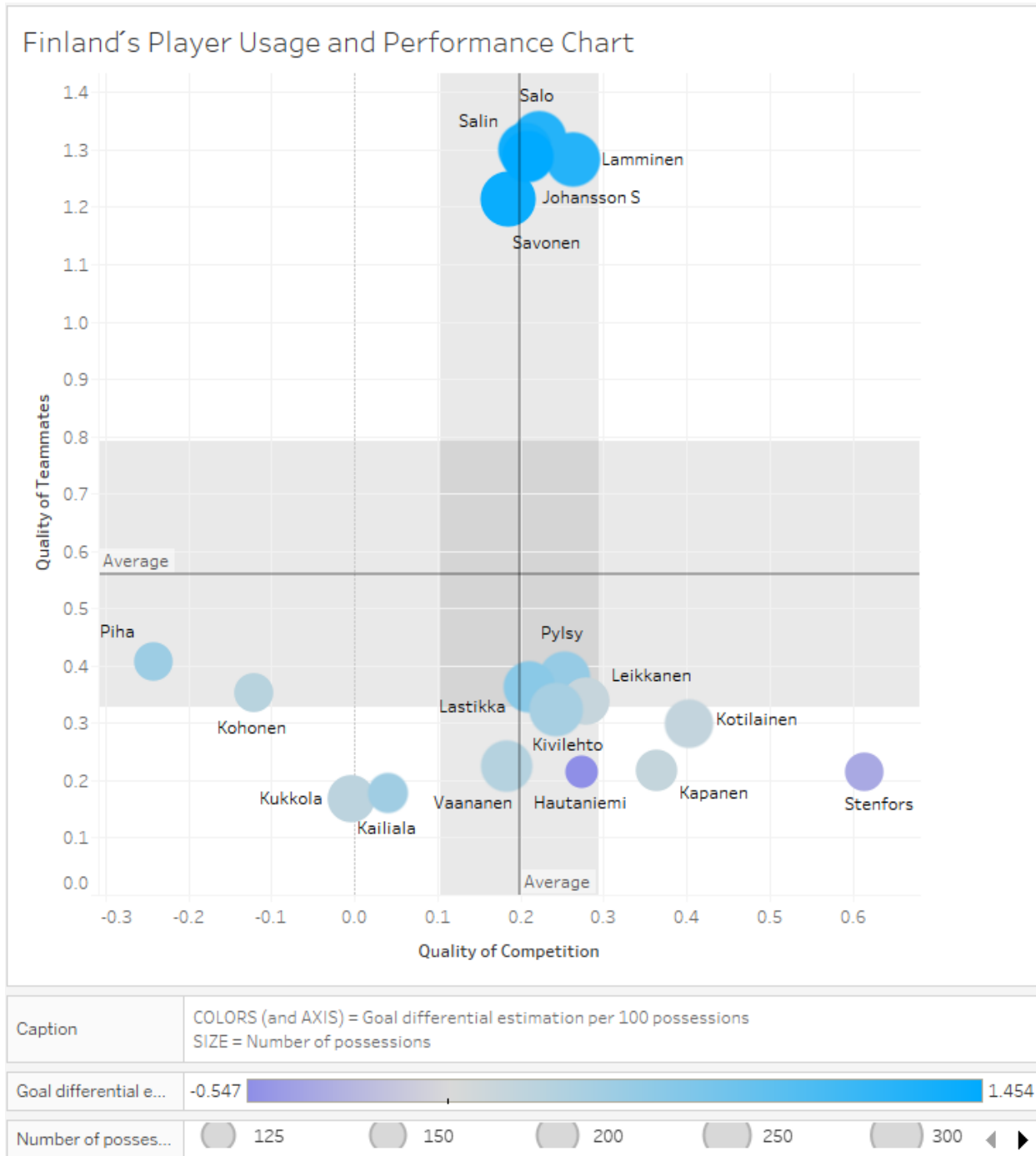
Mentioned first line is displayed above all other players meaning their chemistry was very strong and so the quality of teammates was high. There were also significant differences in quality of competition among players. Stenfors, Kotilainen or Kapanen had to face the toughest opponents while Piha or Kohonen played rather easier matchups.

This contextual results help to summarize performances of players:

- Great chemistry of Finnish first line resulted in a good quality results that put them at the very top of what the 2018 WFC could offer

- On the other hand Hautaniemi recorded a negative goal estimation differential along with Stenfors who could be excused by his tough assignments against a high quality competition

- Lastikka and Pylsy performed very well given their harder context

Offensively it were Johansson S (3.7), Savonen (3.7), Lamminen (3.5), Salin (3.4), Salo (3.4) and Lastikka (3.3) with the best goal estimation for per 100 possession. If Finland needs to score a goal they should be strongly considered as go to players.

Defensively it were Salin (0.8 - the best in the entire tournament), Salo (1.0), Johansson S (1.0), Savonen (1.0), Lamminen (1.1) and Kapanen (1.5) with the best goal estimation against per 100 possession values. If a priority is not to be scored on these players proved to have good goal prevention results.

At the same time data sample from six games is not sufficient to judge players with a big significance. This was just a display of their performances during the nine day tournament in a specific environment with other factors likely playing its role (see Chapter 2.3).

Lastly even strength shot attempts dat are presented on a player level. Who was active in finishing plays and who rather elected pass than shot? These can be revealed by looking at the next graph.

Finland's Shot Attempts and Assists per 100 Possessions for

| Caption | COLOR = Corsi for percentage |
| | SIZE = Number of possessions |
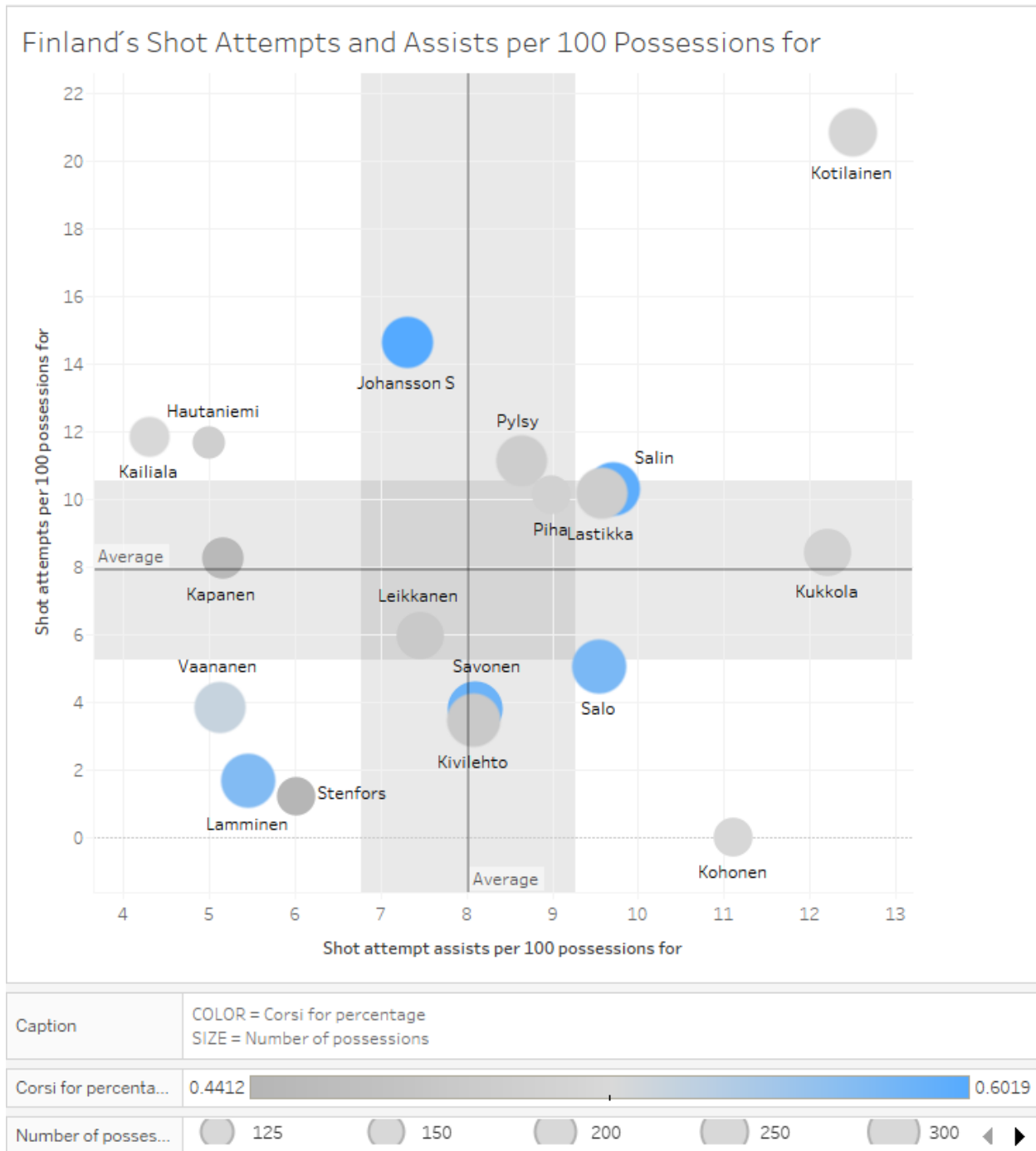
Kotilainen was the most frequent shooter at the whole 2018 WFC with 21 shot attempts per 100 possessions for on average. Johansson S averaged 15 shot attempts per 100 possessions for and was second on the team.

Kotilainen was very active when passing with 12.5 assists per 100 possessions. This together gives him around 33.5 contributions on finish per each 100 possession for. There was no player with a higher value than his. Kukkola registered high 12 assist per 100 possessions as well.

The color represents ability to outshoot opponents at even strength (corsi for) and Johansson S, Salin, Savonen, Salo, Lamminen followed by Vaananen recorded the highest values.

2.9. Analysis of team Germany

Team and player analysis of Germany is presented here.

2.9.1. TEAM ANALYSIS OF GERMANY

This chapter focuses on strong and weak aspects as well as specifics of performances of Germany at the 2018 WFC. Firstly Important variable differentials for Germany and their opponents are visualized game by game.

FIGURE 2.31. IMPORTANT STATISTICS FOR GERMANY DURING TOURNAMENT GAMES
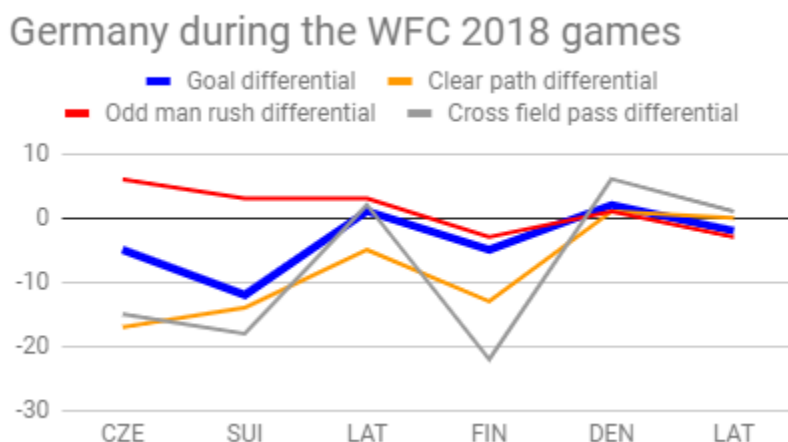
Germany were able to outproduce opponents in odd man rushes in the group stage but could not prevent a significant negative differential against top 4 teams (5:10 vs Czechia, 1:13 vs Switzerland and 1:6 against Finland).

Following table summarizes strong aspects, weak aspects and specifics about the play of Germany.

TABLE 2.10. STRONG, WEAK AND SPECIFIC ASPECTS OF PERFORMANCES OF GERMANY AT THE 2018 WFC

Strong aspects
- High share of odd man rushes for (almost 6%, the second highest behind Sweden)   - The second highest amount of odd man rushes created for (32) and the lowest amount of odd man rushes created against (25)   - Good clear path execution shares both for (70%, the second best) and against (65%)
Weak aspects
- Below average PDO (95.1) mainly due to low goal percentage (19.0%)   - Below average corsi numbers (corsi for percentage = 44%)   - Negative differential of share of shots blocked (28.6%) and shots of being blocked by opponents (33.6%)   - The second worst differential of clear path opportunities created due to the lowest amount of clear path created (only 50)   - The lowest number of cross field pass opportunities created (only 46)
Specific aspects
- Above average shares of turnover possessions against (8%) and quick attack against (25%)   - Medium in particular (56%) but also high (32%) pressure used often when forechecking

2.9.2. PLAYER ANALYSIS OF GERMANY

Goal estimation differential per 100 possessions as presented in Chapter 2.6.2. is used to evaluate performance of players. Next graph puts in order German players according to their performance results. Clear path and odd man rush differentials are added in the lower part.

Germany's Player Performance Indicators
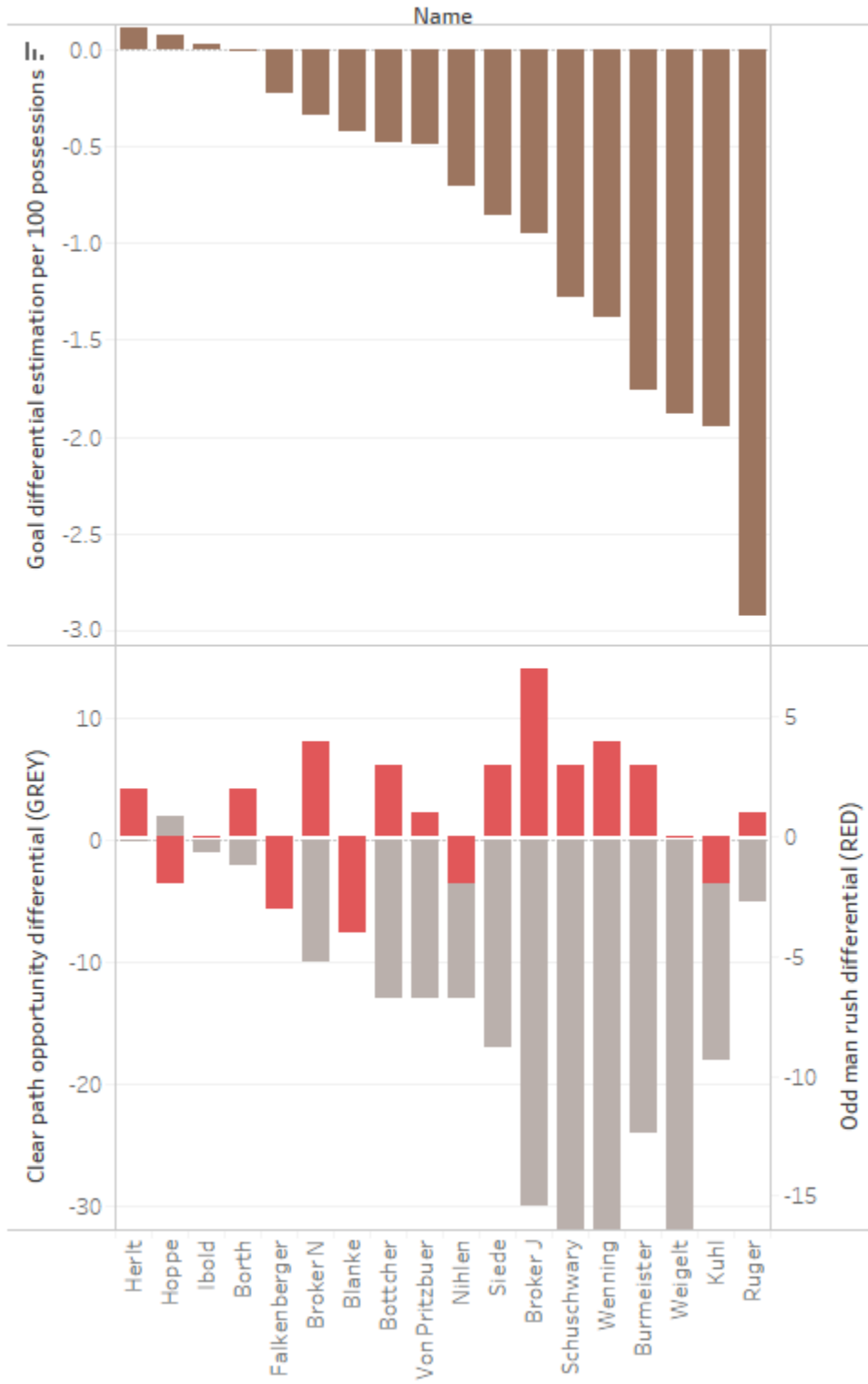
Four players ended the tournament with a positive performance results. Ordered It were Herlt, Hoppe, Ibold and Borth and they were relatively much more successful in preventing negative differential of clear path opportunities. Broker J was successful in odd man rush differential but recorded below average performance results overall.

To add context to the evaluation quality of teammates and quality of competition is included in the next graph.

Germany's Player Usage and Performance Chart

Caption: COLORS (and AXIS) = Goal differential estimation per 100 possessions
SIZE = Number of possessions

Goal differential e... -2.920 — 0.107

Number of posses... 30 100 200 300 400
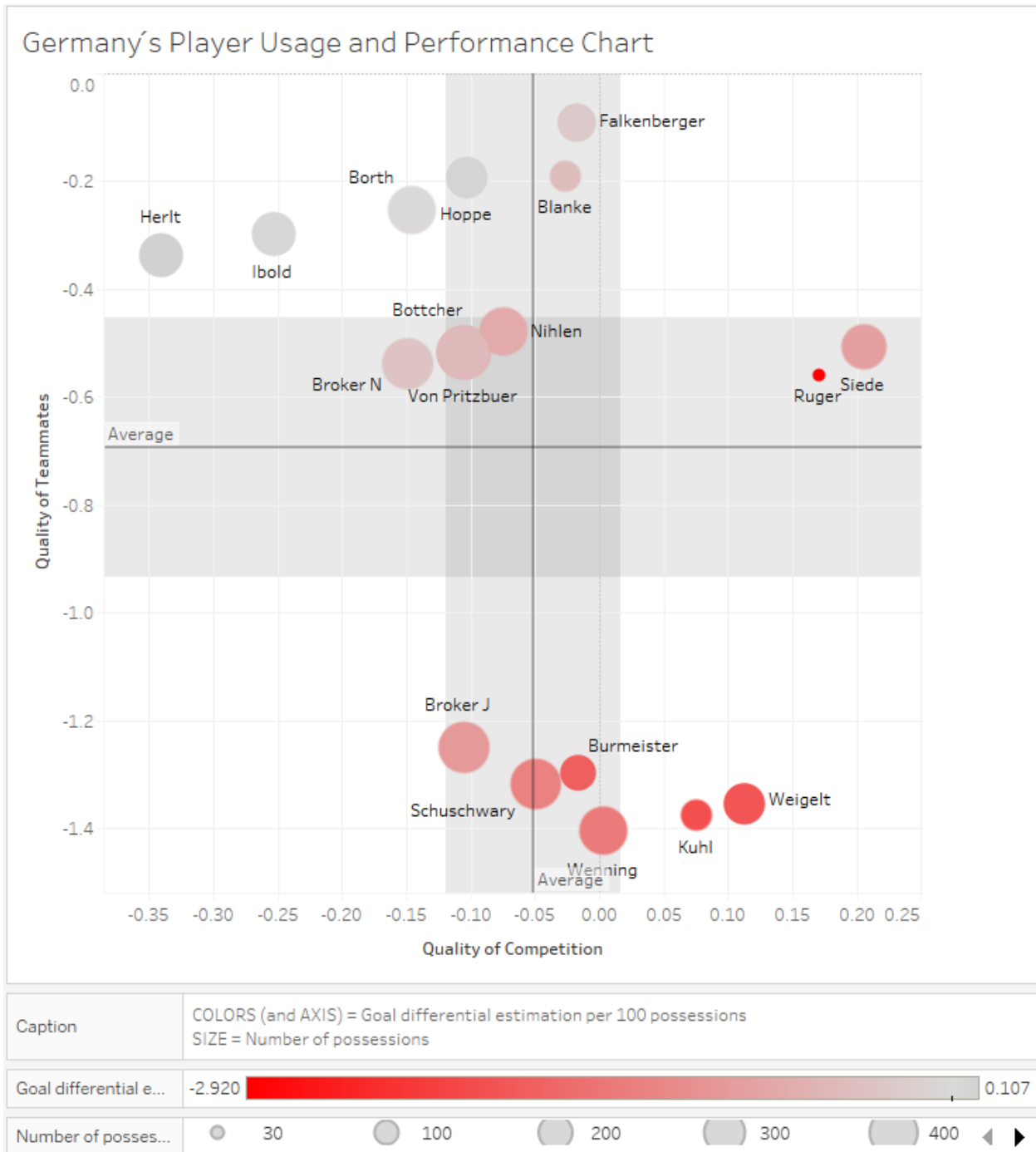
Falkenberger, Blanke, Hoppe or Borth played mostly with teammates who had stronger
performance results. On the other hand Wenning, Kuhl, Weigelt, Schuschwary, Burmeister and
Broker J had weaker teammates.

Siede, Ruger (with limited time on field), Weigelt and Kuhl faced stronger competition than other of their teammates. Herlt and Ibold had on the other hand easier matchups to play against.

Presented contextual results helps to summarize performances of players:

- Easier context helped significantly the likes of Herlt, Hoppe, Ibold or Borth to have the best results on the team

- Broker N, Siede or Broker J should receive a praise for maintaining respectable performances under tougher context

- Weigelt, Kuhl or Burmeister ended with rather less quality performance results but had to deal with tougher context especially in regard to low quality of their teammates

Offensively it were Broker N (2.8), Bottcher (2.7), Nihlen (2.6), Herlt (2.5) and Von Pritzbuer (2.3) with the best goal estimation for per 100 possessions. These players proved to be a good choice to be on the field when Germany needs to score a goal.

Defensively it were Ibold (1.6), Hoppe (1.7), Falkenberger (1.8) and Borth (1.9) with the best goal estimation against per 100 possessions values. If a priority is not to be scored on these players proved to have good goal prevention results.

At the same time data sample from six games is not sufficient to judge players with a big significance. This was just a display of their performances during the nine day tournament in a specific environment with other factors likely playing its role (see Chapter 2.3).

Lastly even strength shot attempts dat are presented on a player level. Who was active in finishing plays and who was rather passing than shooting? These can be revealed by looking at the next graph.

Ruger used his limited time on the field to produce a high rate of assist (on average 14 per 100 possessions for). Next in passing was Broker J with around 11 assist per 100 possessions for.

Von Pritzbuer was the most frequent shooter with almost 12 shot attempts per 100 possessions for on average followed by Nihlen (11) and Falkenberger (over 10).

The color represents ability to outshoot opponents at even strength (corsi for) and Herlt, Broker N, Von Pritzbuer, Bottcher and Nihlen recorded the highest values.

2.10. Analysis of team Latvia

Team and player analysis of Latvia is presented here.

2.10.1. TEAM ANALYSIS OF LATVIA

This chapter focuses on strong and weak aspects as well as specifics of performances of Latvia at the 2018 WFC. Important variable differentials for Latvia and their opponents are visualized game by game below.

FIGURE 2.35. IMPORTANT STATISTICS FOR LATVIA DURING TOURNAMENT GAMES
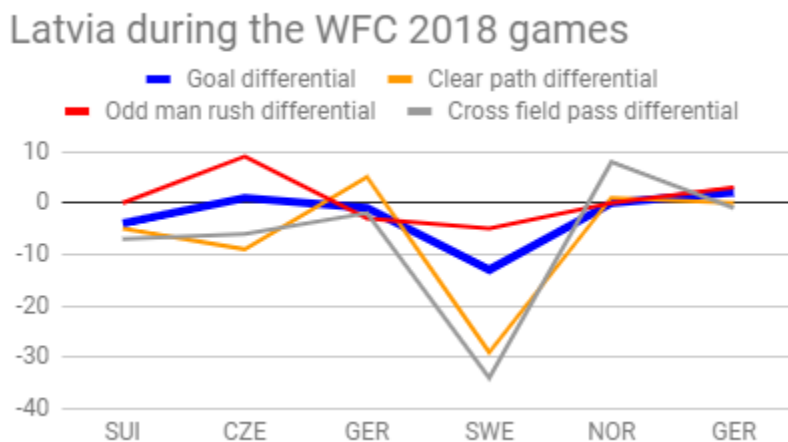
Latvia surprised Czechia in the group stage game with not only 4:3 win but also with their performance (positive odd man rush differential in particular). Latvia collapsed in the quarterfinal game against Sweden (1:14) but recovered to beat both Norway and Germany in rather even games to finish at 5th place.

Following table summarizes strong aspects, weak aspects and specifics about the play of Latvia.

TABLE 2.11. STRONG, WEAK AND SPECIFIC ASPECTS OF PERFORMANCES OF LATVIA AT THE 2018 WFC

Strong aspects
● Relatively high share of odd man rushes for (5.5%) ● The second highest amount of odd man rushes for (32)
Weak aspects
● Decreasing PDO values during the tournament (only 93.2 without qualification game against Slovakia) ● Negative differential of shot blocking share both of the team (28.6%) and of opponents (32.7%) ● The highest share of turnover possessions against Latvia (9%) ● Negative differential of both clear path and cross field pass opportunities ● The second highest share of clear path executed against (over 71%) ● The second lowest number of cross field pass opportunities (49) ● The worst in execution of cross field passes both for (46%) and against (64%)
Specific aspects
● Active approach resulting in the highest amount of possessions created including the most possessions against (over 630) ● The highest share (24%) of no attack possessions and quick attacks (31%) ● The lowest share of slow attacks (35%) ● Latvia pressured low the most (51%)

2.10.2. PLAYER ANALYSIS OF LATVIA

Goal estimation differential per 100 possessions as presented in Chapter 2.6.2. is used to evaluate performance of players. Next graph orders Latvian players according to their performance results. Clear path and odd man rush differentials are added in the lower part.

Latvia's Player Performance Indicators
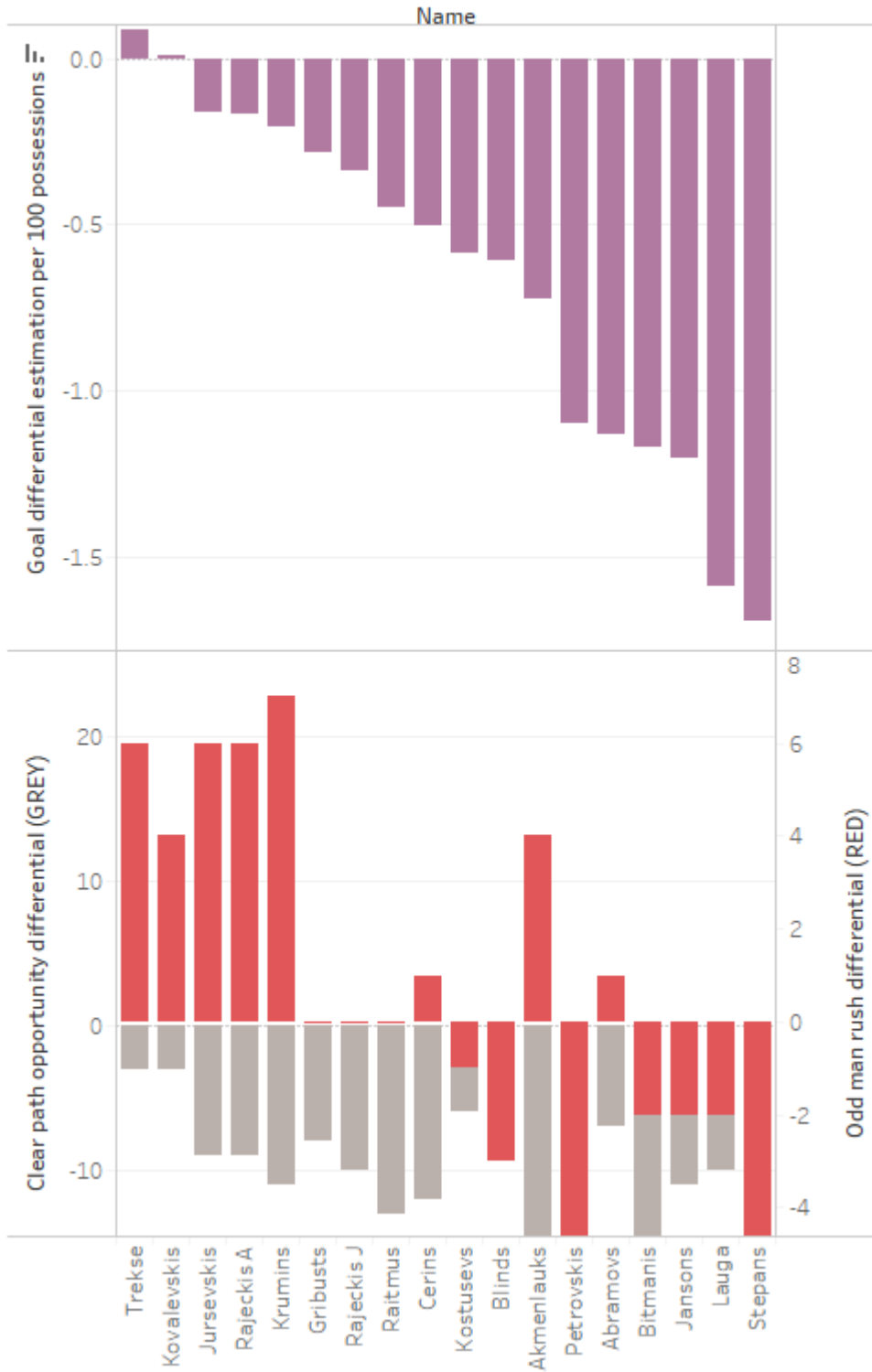
Only Trekse and Kovalevskis with a positive goal estimation differential on the team. Jursevskis, Rajeckis A and Krumins next and all of them were successful mainly due strong odd man rush differential. First two had also respectable differential of clear paths.

To add context to the evaluation quality of teammates and quality of competition is included in the next graph.

Latvia's Player Usage and Performance Chart

Caption	COLORS (and AXIS) = Goal differential estimation per 100 possessions SIZE = Number of possessions
Goal differential e...	-1.695 ▮▮▮▮▮▮▮▮▮▮ 0.086
Number of posses...	◯ 122 ◯ 200 ◯ 300 ◯ 400 ◯ 538
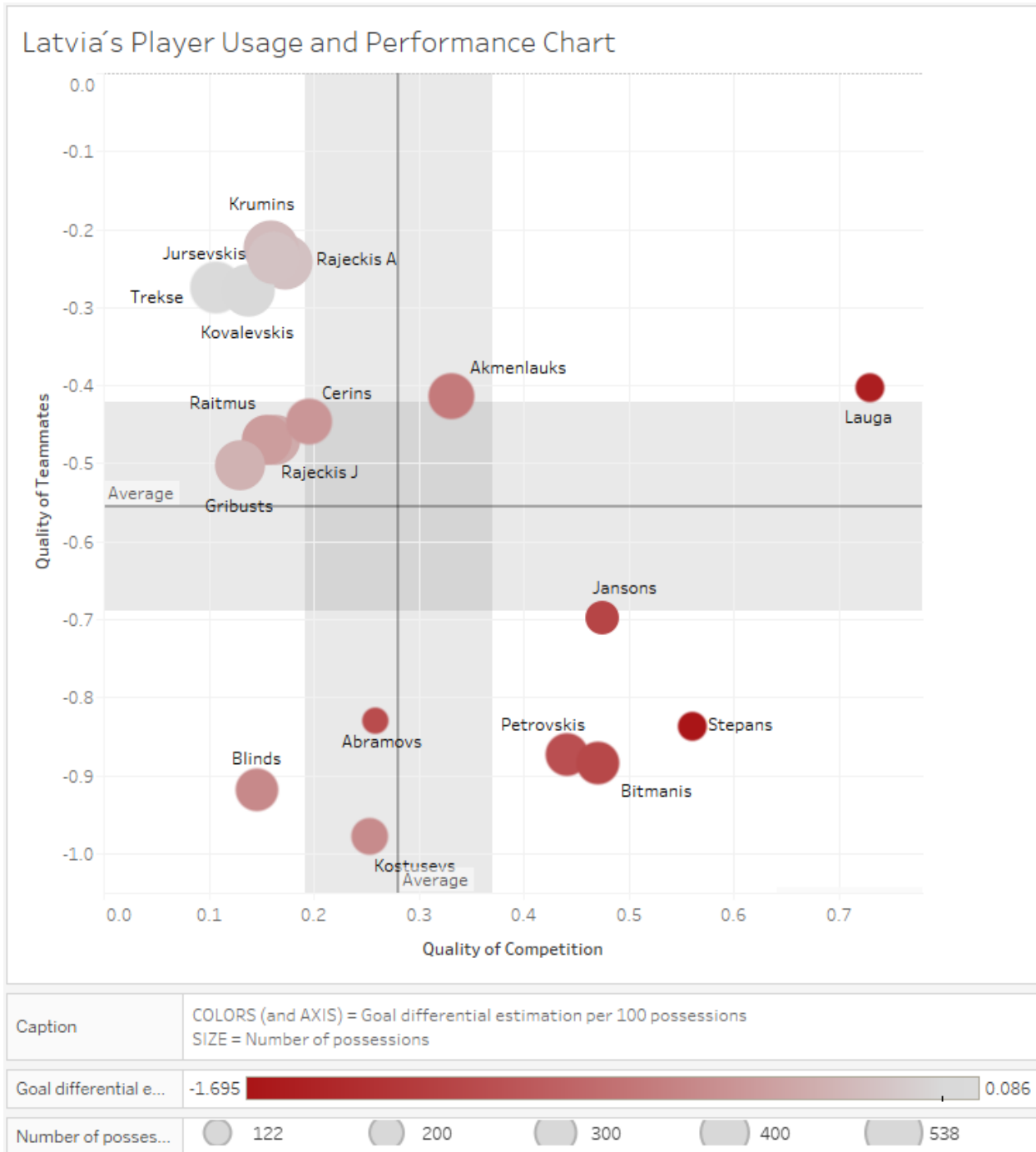
All five mentioned above enjoyed to play with teammates who recorded stronger performance results. On the other hand Kostusevs or Blinds played with weaker teammates.

Lauga, Stepans, Jansons, Bitmanis or Petrovskis had a tougher job while playing against the stronger competition. Big group of players led by Trekse faced weaker opponents.

These results help to summarize performances of players:

- Trekse, Kovalevskis with the best performance results but their context was easier compared to teammates

- Kostusevs with a solid performance considering his tougher context (lacking high quality of teammates)

- Stepans and Lauga with the worst performance results but big part of it can be excused by tough context

Offensively it were Trekse (2.9), Lauga (2.8), Jursevskis (2.8), Rajeckis A (2.7) and Krumins (2.6) with the best goal estimation for per 100 possessions. If in a need to score a goal these might be some of good choices to be put on the field.

Defensively it were Kovalevskis (2.0), Rajeckis J (2.3), Raitmus (2.4) and Gribusts (2.6) with the best goal estimation against per 100 possessions values. If a priority is to prevent to be scored on these players proved to have good goal prevention results.

At the same time data sample from six games is not sufficient to judge players with a big significance. This was just a display of their performances during the nine day tournament in a specific environment with other factors likely playing its role (see Chapter 2.3).

Lastly even strength shot attempts dat are presented on a player level. Who was active in finishing plays and who rather elects pass than shot? These can be revealed by looking at the next graph.

Blinds was the most active Latvian player in both shot attempts (11.5 per 100 possessions for on average) and assist on them (15). Trekse and Abramovs were also active in both shot attempts and assists on them.

The color represents ability to outshoot opponents at even strength (corsi for) and Trekse, Abramovs and Gribusts recorded the highest values.

2.11. Analysis of team Norway

Team and player analysis of Norway is presented here.

2.11.1. TEAM ANALYSIS OF NORWAY

This chapter focuses on strong and weak aspects as well as specifics of performances of Norway at the 2018 WFC. Important variable differentials for Norway and their opponents are visualized game by game below.

FIGURE 2.39. IMPORTANT STATISTICS FOR NORWAY DURING TOURNAMENT GAMES
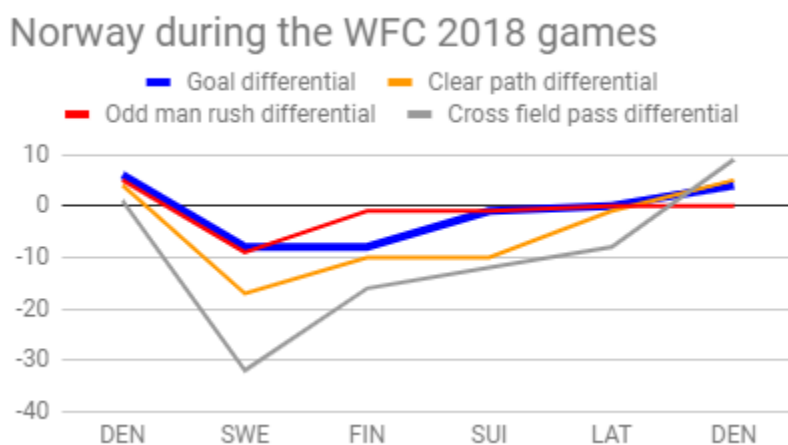
Norway outplayed Denmark both times (9:3 and 9:5 wins) and relatively to other 5th to 8th placed teams had respectable differentials of clear path opportunities created. Sweden (1:9) dominated them in cross field passes and as the only team in odd man rushes as well.

Following table summarizes strong aspects, weak aspects and specifics about the play of Norway.

Strong aspects
● Above average effectivity expressed through PDO (101.8 without the qualification game against Australia) ● The third best results in both share of shots blocked (33.3%) and share of their shots being blocked by opponents (30.3%) ● Relatively low number of odd man rushes against (26) ● Above average execution rate of clear paths (70%)
Weak aspects
● The second worst corsi for percentage (39%) ● Low share of turnover possessions (4%) and odd man rushes (3.5%) ● The lowest amount of odd man rushes created for (20) ● The second worst cross field pass opportunities differential ● The highest execution rate of clear path against (72%)
Specific aspects
● Low share of quick attacks against (15%) and high share of slow attacks against (60%) ● The highest share of low pressure used (53%) and lowest of high pressure used (11%)

2.11.2. PLAYER ANALYSIS OF NORWAY

Goal estimation differential per 100 possessions as presented in Chapter 2.6.2. is used to evaluate performance of players. Next graph orders Norwegian players according to their performance results. Clear path and odd man rush differentials are added in the lower part.
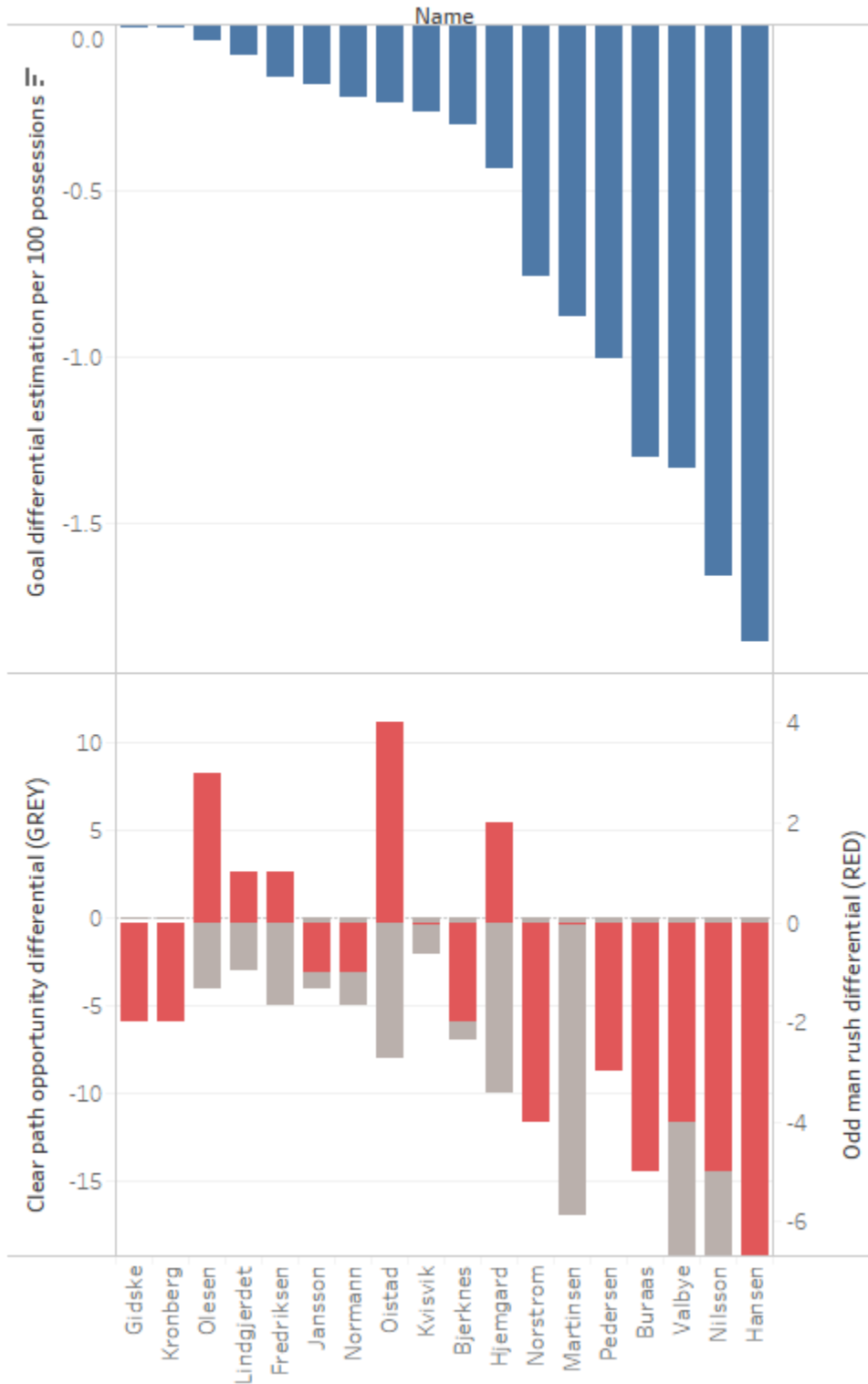
Gidske, Kronberg, Olesen and Lindgjerdet had the best goal estimation differentials on the team followed by Fredriksen, Jansson and Normann. Oistad, Olesen and Hjemgard had the best differentials of odd man rushes.

To add context to the evaluation quality of teammates and quality of competition is included in the next graph.
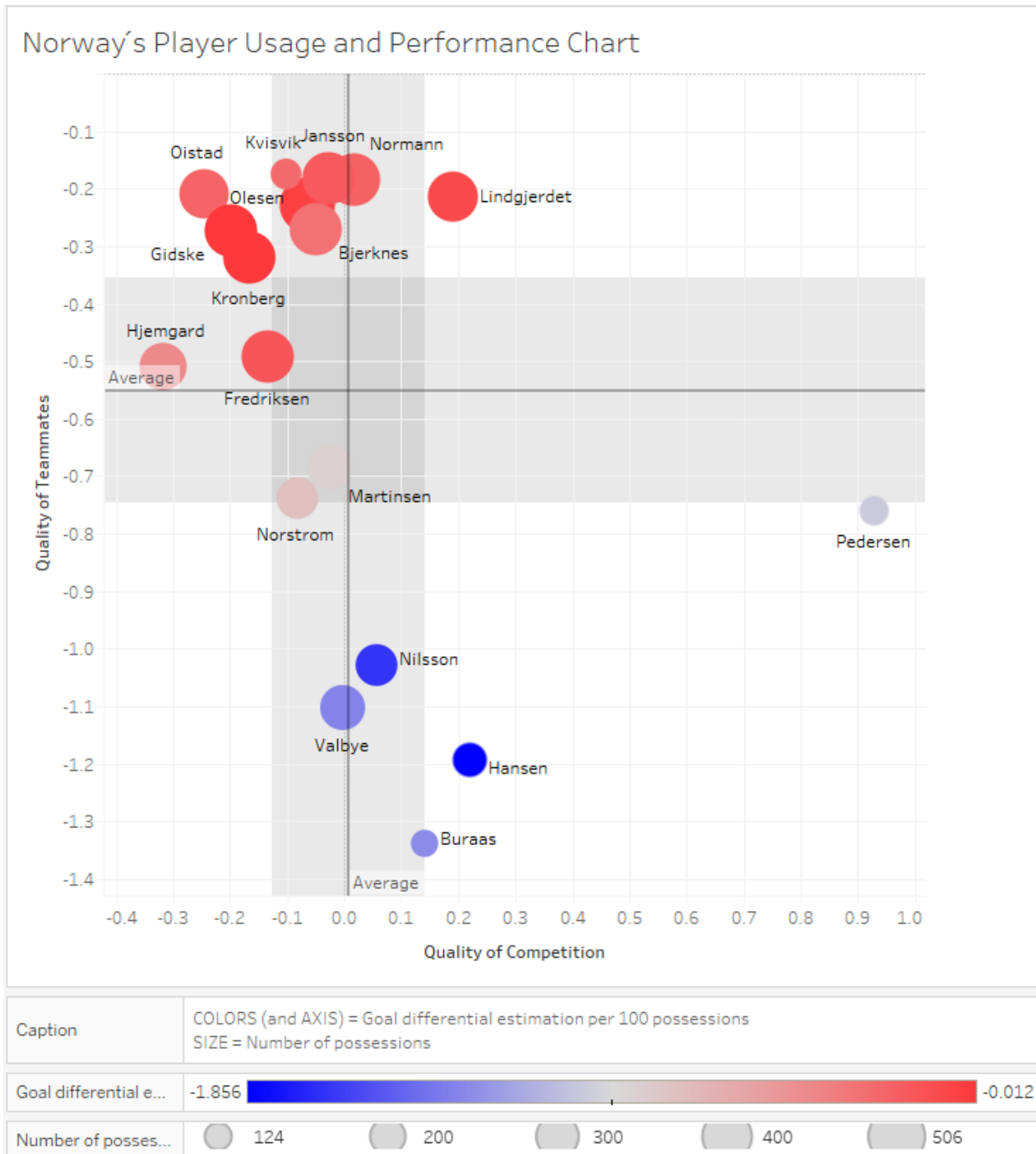
Best performance results are strongly connected with a context (red marks in the left upper corner of the graph) here. Jansson, Kvisvik, Normann and others played with stronger teammates. On the other hand Buraas, Hansen, Valbye or Nilsson had a harder assignments playing alongside weaker teammates.

Pedersen but also Hansen or Lindgjerdet faced tougher competition than others. Hjemgard, Oistad, Olesen and others played against less quality opponents allowing them to have better performance results.

This contextual results helps to summarize performances of players:

- Gidske, Kronberg, Olesen and Lindgjerdet with the best performances; it is more precious in case of Lindgjerdet who had tougher context facing high quality competition

- Hansen and Nilsson with the worst performance results but both had tough context playing alongside weaker teammates

- Pedersen but also Buraas who recorded below average performance results might be excused for their tough assignments on the field

Offensively it were Oistad (2.8), Hjemgard (2.7), Buraas (2.6), Olesen (2.6), amd Gidske (2.5) with the best goal estimation for per 100 possessions. If Norway needs to score a goal these might be some choices of who to put on the field.

Defensively it were Lindgjerdet (2.1), Kvisvik (2.3.), Normann (2.5), Kronberg (2.5), Fredriksen (2.6) and Olesen (2.6) with the best goal estimation against per 100 possessions values. If a priority is not to be scored on these players proved to have good goal prevention results.

At the same time data sample from six games is not sufficient to judge players with a big significance. This was just a display of their performances during the nine day tournament in a specific environment with other factors likely playing its role (see Chapter 2.3).

Lastly even strength shot attempts dat are presented on a player level. Who was active in finishing plays and who was rather passing than shooting? These can be revealed by looking at the next graph.

Hjemgard averaging 16 shot attempts per 100 possessions for was by far the most active shooter on the team. Next in line were Norstrom, Bjerknes and Jansson.

Both Kronberg and Olesen served as a typical passers for team Norway and both averaged over 11 assist per 100 possessions for while having only 4 shot attempts in the same amount of possessions for. Gidske was active in passing as well with 10.5 assists per 100 possessions for.

The color represents ability to outshoot opponents at even strength (corsi for) and Buraas, Kvisvik, Gidske and Fredriksen recorded the highest values.

2.12. Analysis of team Sweden

Team and player analysis of Sweden is presented here.

2.12.1. TEAM ANALYSIS OF SWEDEN

This chapter focuses on strong and weak aspects as well as specifics of performances of Sweden at the 2018 WFC. Firstly important variable differentials for Sweden and their opponents are visualized game by game.

FIGURE 2.43. IMPORTANT STATISTICS FOR SWEDEN DURING TOURNAMENT GAMES
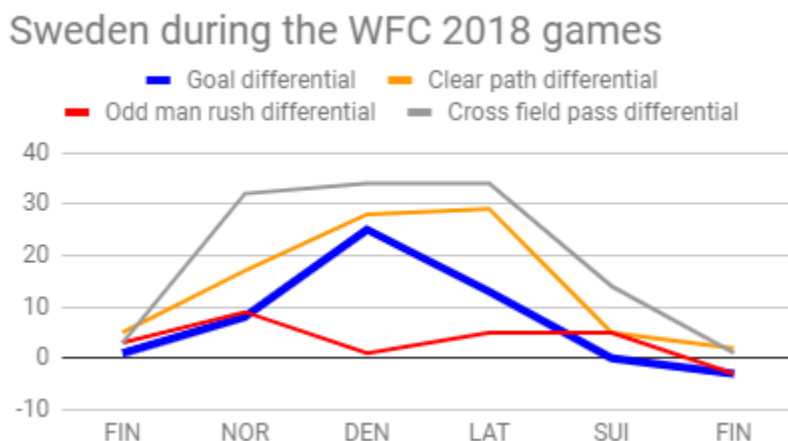
In all games at the 2018 WFC Sweden was able to have positive differential over opponents in both clear path and cross field pass opportunities with Finland being the toughest opponent on both occasions (5:4 in group game and 3:6 in the final game). Finland topped Sweden in odd man rushes in the final game.

Following table summarizes strong aspects, weak aspects and specifics about the play of Sweden.

TABLE 2.13. STRONG, WEAK AND SPECIFIC ASPECTS OF PERFORMANCES OF SWEDEN AT THE 2018 WFC

| Strong aspects |
|---|
| Effectivity at high values during the whole tournament (PDO at the end with a value of 110.9) Best in outshooting opponents (corsi for = 70%) The second best (behind Finland) in both their shot blocking share (34.8%) and shot blocking share by opponents (28.8%) Most possession for created (over 650) The highest share of turnover possessions for (9%) and odd man rushes for (7%) The best odd man rush and cross field pass opportunity differentials by a big margin The highest amount of clear path opportunities (127) and cross field passes (153) created The highest share of clear path opportunities executed (76%) High share of cross field passes executed (60%) |
| **Weak aspects** |
| Decreasing effectivity (PDO) in last three games against Latvia, Switzerland, Finland High share of clear path executed against (70%) |
| **Specific aspects** |
| High number of possessions created signalizing active approach with shorter possessions The highest share of slow attack for (60%) and low share of quick attacks for (15%) The highest share of no attack possession against (22%) and quick attack possessions against (29%) that indicates active play without the ball The lowest share of turnover possessions against (2%) High forechecking applied at the most frequent rate (56%) |

2.12.2. PLAYER ANALYSIS OF SWEDEN

Goal estimation differential per 100 possessions as presented in Chapter 2.6.2. is used to evaluate performance of players. Next graph is ordering Finnish players according to their performance results. Clear path and odd man rush differentials are added in the lower part.

Sweden´s Player Performance Indicators
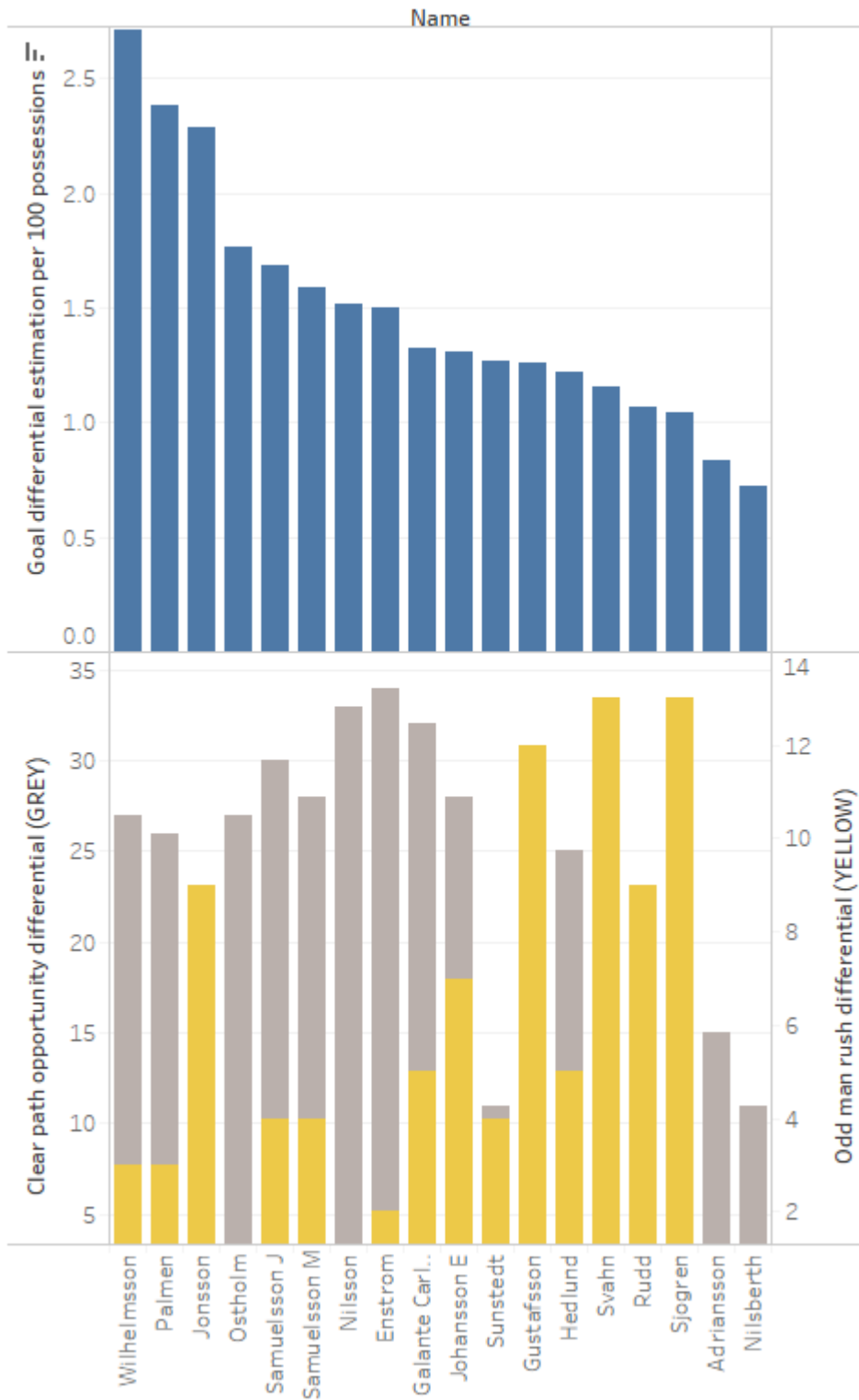
Wilhelmson, Palmen, Jonsson, Ostholm and Samuelsson J recorded the most dominant goal estimation differential results on the team. Taken into account only odd man rushes it were Svahn, Sjogren, Gustafsson, Jonsson and Rudd with the highest positive differentials. Enstrom, Nilsson and Galante Carlstrom had the biggest clear path differentials at the end of the tournament.

To add context to the evaluation quality of teammates and quality of competition is included in the next graph.
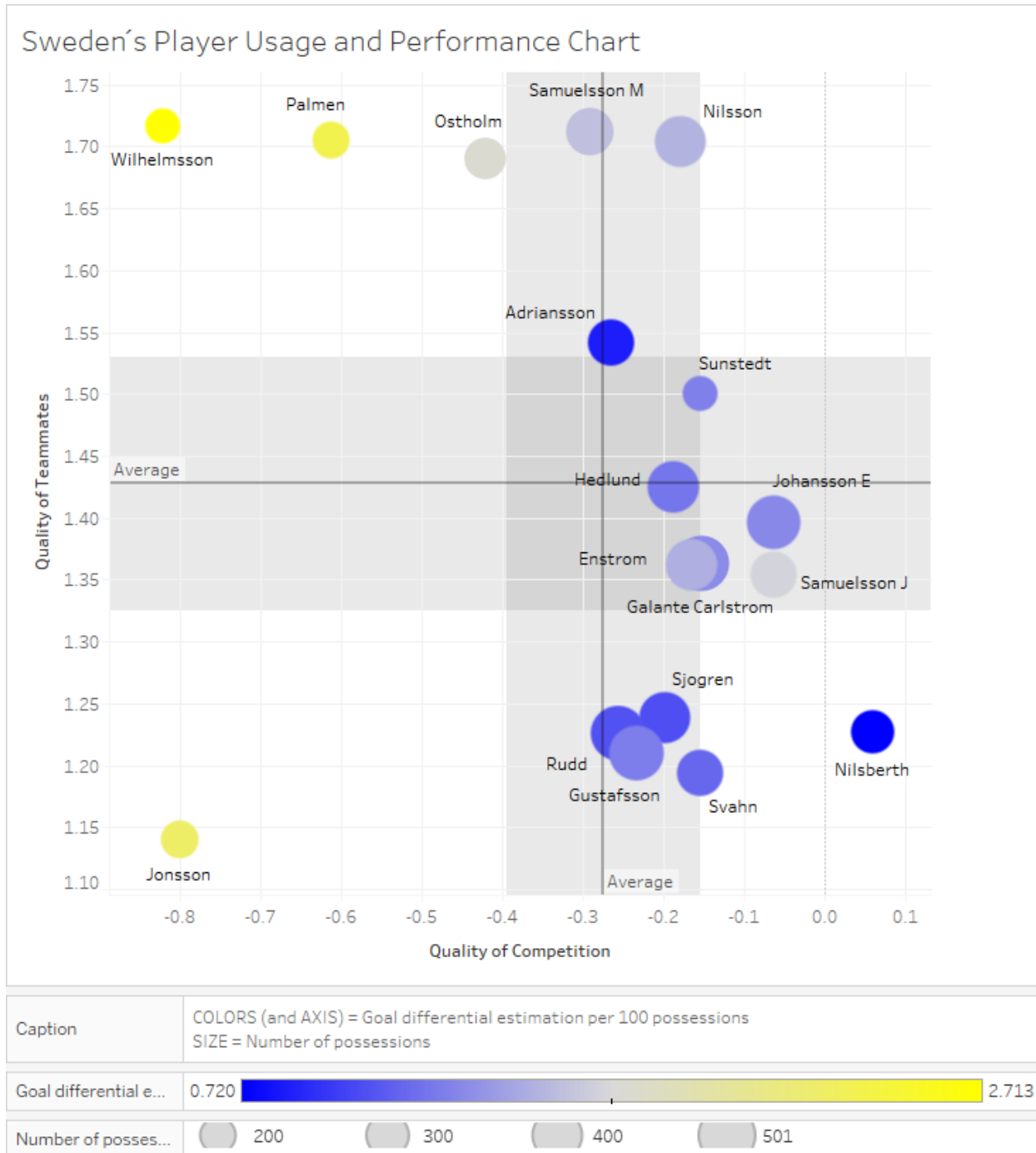
It is recognizable that quality performance of Wilhelmson and Palmen was influenced by easier context. They both played with strong teammates and against weak opponents. Jonsson played against weak opponents as well but played alongside teammates with the weakest performance results. Ostholm, Samuelsson J and Nilsson played with teammates that recorded stronger

performance results. The hardest context was put on Nilsberth who played against stronger opponents while playing with weaker teammates.

Presented contextual results help to summarize performances of players:

- Top quality performance results (in the whole 2018 WFC) of Wilhelmson, Palmen and Jonsson were influenced (at least to some extent in case of Jonsson) by the easiest context they played in

- Considering tougher context it was Samuelsson J with other high quality performances, also Galante Carlstrom or Gustafsson deserve a praise

- Nilsberth had relatively weaker performance results but these were influenced a lot by the toughest context he was put in; Adriansson was expected to do better given his context though

Offensively it were Jonsson (5.4 - top value at the 2018 WFC), Wilhelmson (5.0), Samuelsson J (4.9), Palmen (4.8), Samuelsson M (4.4), Sunstedt (4.3) and Ostholm (4.3) with the best goal estimation for per 100 possessions. These proved to be strong on the offensive side of the field.

Defensively it were Wilhelmson (0.9), Palmen (1.2), Nilsson (1.4), Ostholm (1.5), Samuelsson M (1.6), Adriansson (1.7) and Johansson E (1.8) with the best goal estimation against per 100 possessions values. Mentioned players proved to have good goal prevention results.

At the same time data sample from six games is not sufficient to judge players with a big significance. This was just a display of their performances during the nine day tournament in a specific environment with other factors likely playing its role (see Chapter 2.3).

Lastly even strength shot attempts dat are presented on a player level. Who was active in finishing plays and who elects rather pass than shot? These can be revealed by looking at the next graph.

Sweden´s Shot Attempts and Assists per 100 Possessions for

Caption	COLOR = Corsi for percentage SIZE = Number of possessions
Corsi for percenta...	0.6463 ▬ 0.8132
Number of posses...	200 300 400 501
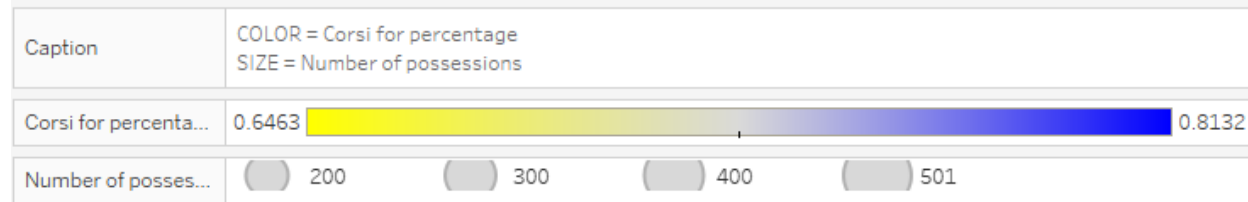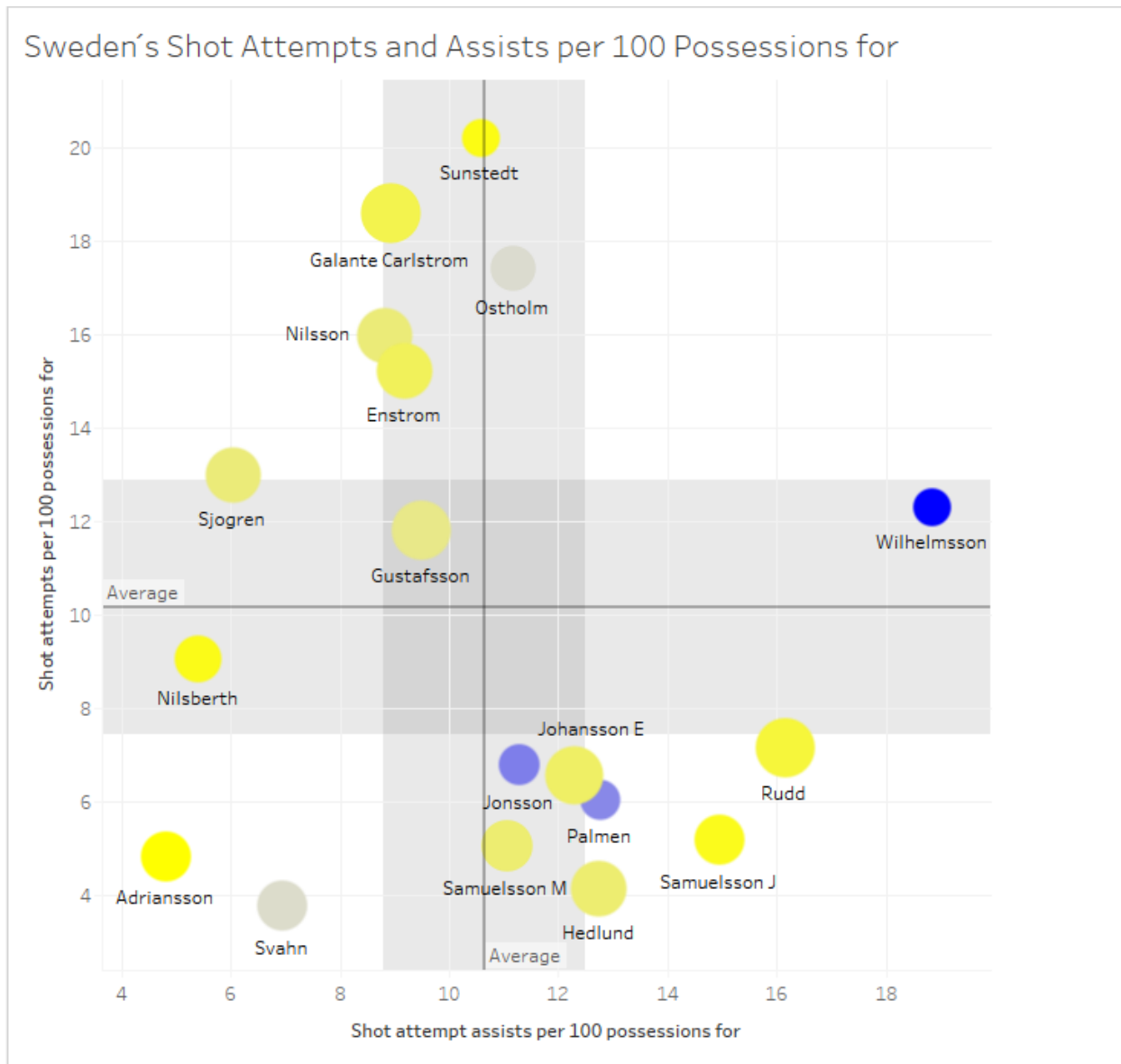
Wilhelmsson recorded the highest rate at the 2018 WFC with 19 assists per 100 possessions for. Rudd (16) and Samuelsson J (15) recorded very high passing results as well.

Sunstedt averaged 20 shot attempts per 100 possessions and that was the second most at the 2018 WFC. Active shooters were also Galante Carlstrom (19), Ostholm (17), Nilsson (16) and Enstrom (15).

The color represents ability to outshoot opponents at even strength (corsi for) and Wilhelmsson, Jonsson, Palmen, Ostholm and Svahn recorded the highest values.

2.13. Analysis of team Switzerland

Team and player analysis of Switzerland is presented here.

2.13.1. TEAM ANALYSIS OF SWITZERLAND

This chapter focuses on strong and weak aspects as well as specifics of performances of Switzerland at the 2018 WFC. Firstly important variable differentials for Switzerland and their opponents are visualized game by game.

FIGURE 2.47. IMPORTANT STATISTICS FOR SWITZERLAND DURING TOURNAMENT GAMES
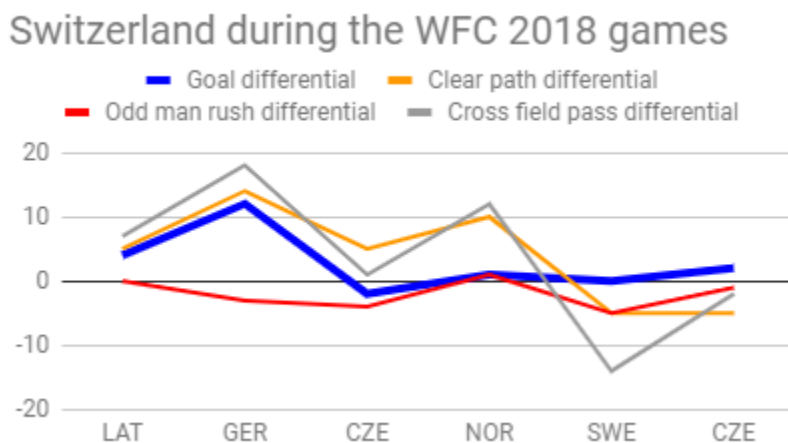
Odd man rushes were an area in which Switzerland had a negative differential in most games. They were productive and effective in first two group games (7:3 vs Latvia and 13:1 vs Germany) and found themselves more on a lucky side with their results in both of last two games (4:5 so. vs Sweden, 4:2 vs Czechia).

Following table summarizes strong aspects, weak aspects and specifics about the play of Switzerland.

Strong aspects
- Strong PDO values during the tournament (112 at the end which was the highest value)   - Solid amount (third best) of clear path opportunities created for (88)   - Solid amount (third best) of cross field pass opportunities created (93)   - The lowest execution of cross field passes against (45%)
Weak aspects
- The lowest share of blocks (less than 28%)   - Low share of odd man rushes for (3%)   - The highest share of odd man rushes against (6%)   - Low execution of clear paths for (60%)   - High execution of clear paths against (70%)   - Low execution of cross field passes for (51%)
Specific aspects
- High share of quick attacks against (28%)   - The second highest share of high forechecking (49%)

2.13.2. PLAYER ANALYSIS OF SWITZERLAND

Goal estimation differential per 100 possessions as presented in Chapter 2.6.2. is used to evaluate performance of players. Next graph orders Swiss players according to their performance results. Clear path and odd man rush differentials are added in the lower part.

FIGURE 2.48. QUALITY ASPECTS OF POSSESSION DIFFERENTIALS FOR PLAYERS OF SWITZERLAND

Switzerland's Player Performance Indicators
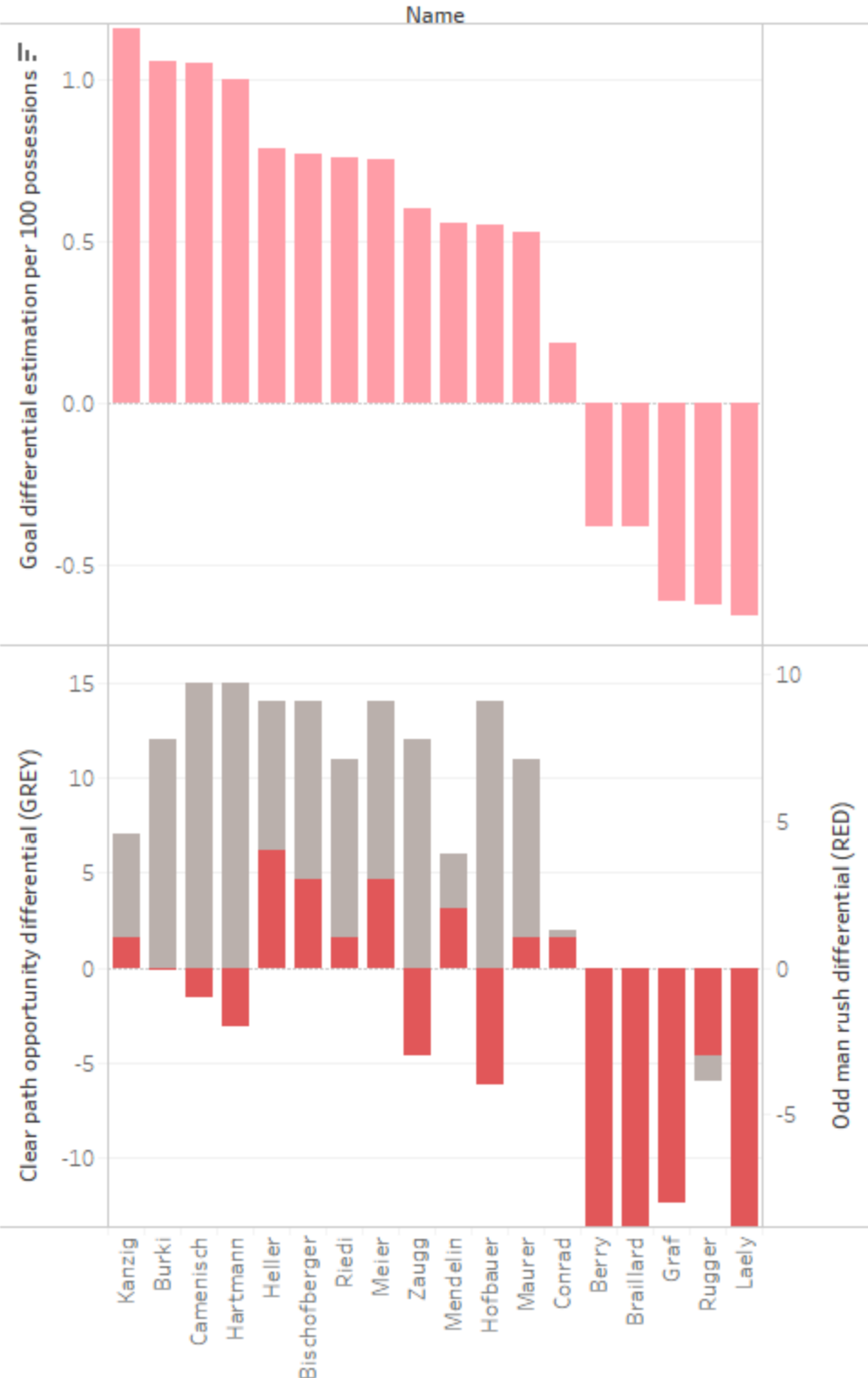
Kanzig, Burki, Camenisch, Hartmann, Heller, Bischofberger, Riedi and Meier are ordered according to the best performance results at the 2018 WFC. Camenisch, Hartmann, Heller, Bischofberger, Meier and Hofbauer recorded the highest clear path differentials. It was Heller, Bischofberger, Meier and Mendelin with the most positive odd man rush differentials.

To add context to the evaluation quality of teammates and quality of competition is included in the next graph.
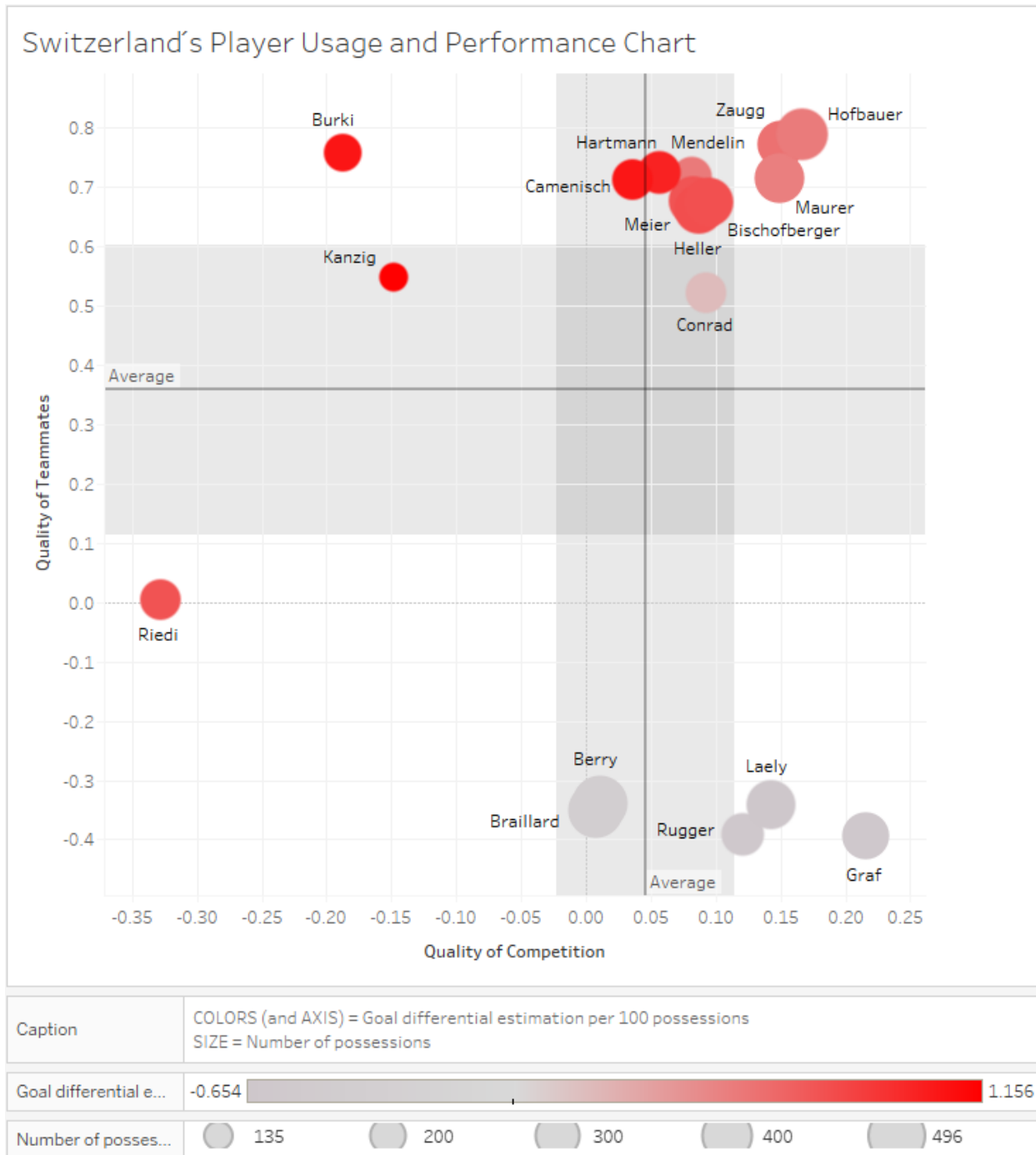
Graf, Berry, Braillard, Rugger and Laely had negative performance results (colored grey) as they played mostly together (weak quality of teammates). Riedi, Burki and Kanzig had easier jobs as they faced less quality competition when playing at the 2018 WFC.

This contextual results help to summarize performances of players:

- Strong performance results of Kanzig and Burki were significantly influenced by playing against weaker competition

- Camenisch, Hartmann on the other hand deserved the praise with their strong performance numbers

- Bad chemistry of a line with Graf, Berry, Braillard, Rugger and Laely sinked these players into negative performance results

Offensively it were Kanzig (5.2), Burki (4.1), Riedi (3.9), Heller (3.7), Camenisch (3.7), Bischofberger (3.7), Hartmann (3.6) and Meier (3.6) with the best goal estimation for per 100 possessions. If in a need of scoring a goal these might be some of coach choices of who to put on the field.

Defensively it were Camenisch (1.7), Hartmann (1.8), Zaugg (1.8) and Hofbauer (2.1) with the best goal estimation against per 100 possessions values. If a priority is not to be scored on these players proved to have good goal prevention results.

At the same time data sample from six games is not sufficient to judge players with a big significance. This was just a display of their performances during the nine day tournament in a specific environment with other factors likely playing its role (see Chapter 2.3).

Lastly even strength shot attempts dat are presented on a player level. Who was active in finishing plays and who rather elected to make a pass than shot? These can be revealed by looking at the next graph.
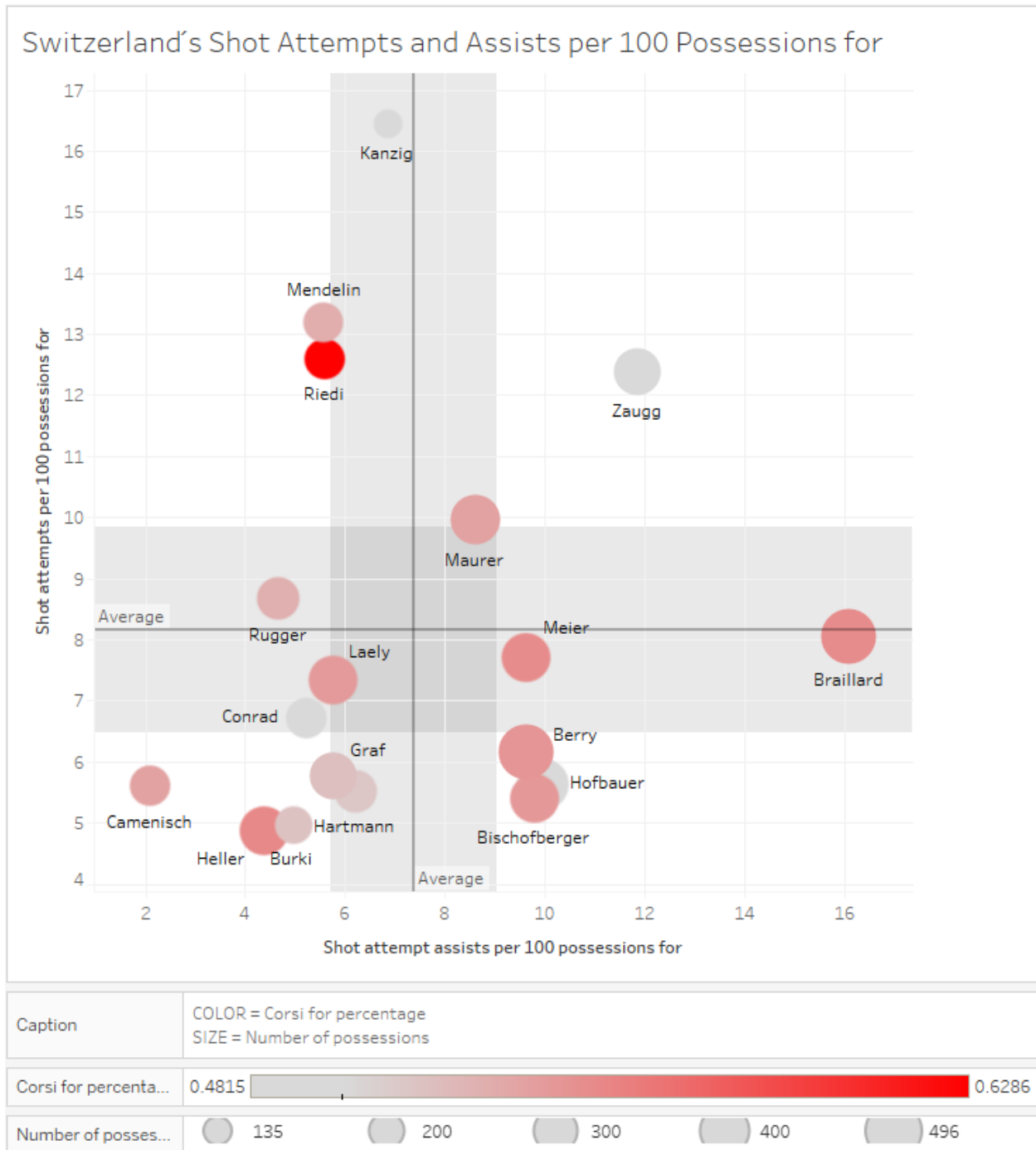
Kanzig was active averaging over 16 shot attempts per 100 possessions for. Next frequent shooters were Mendelin (13), Riedi (13) and Zaugg (12).

Braillard was the most active passer with 16 assists per 100 possessions for on average. Zaugg was the second most active in passing (12).

The color represents ability to outshoot opponents at even strength (corsi for) and Riedi, Heller, Meier, Braillard recorded the highest values.

2.14. Finish and shot blocking comparisons of players

This chapter compares all players at the 2018 WFC playing on eight elite teams in following areas:

- Shooting

- Passing

- Shot blocking

Number of shot attempts per 100 possessions for is the variables that orders players from top to bottom. Next graph visualizes the top part of that order.

WFC 2018 Most Shot attempts per 100 possessions for
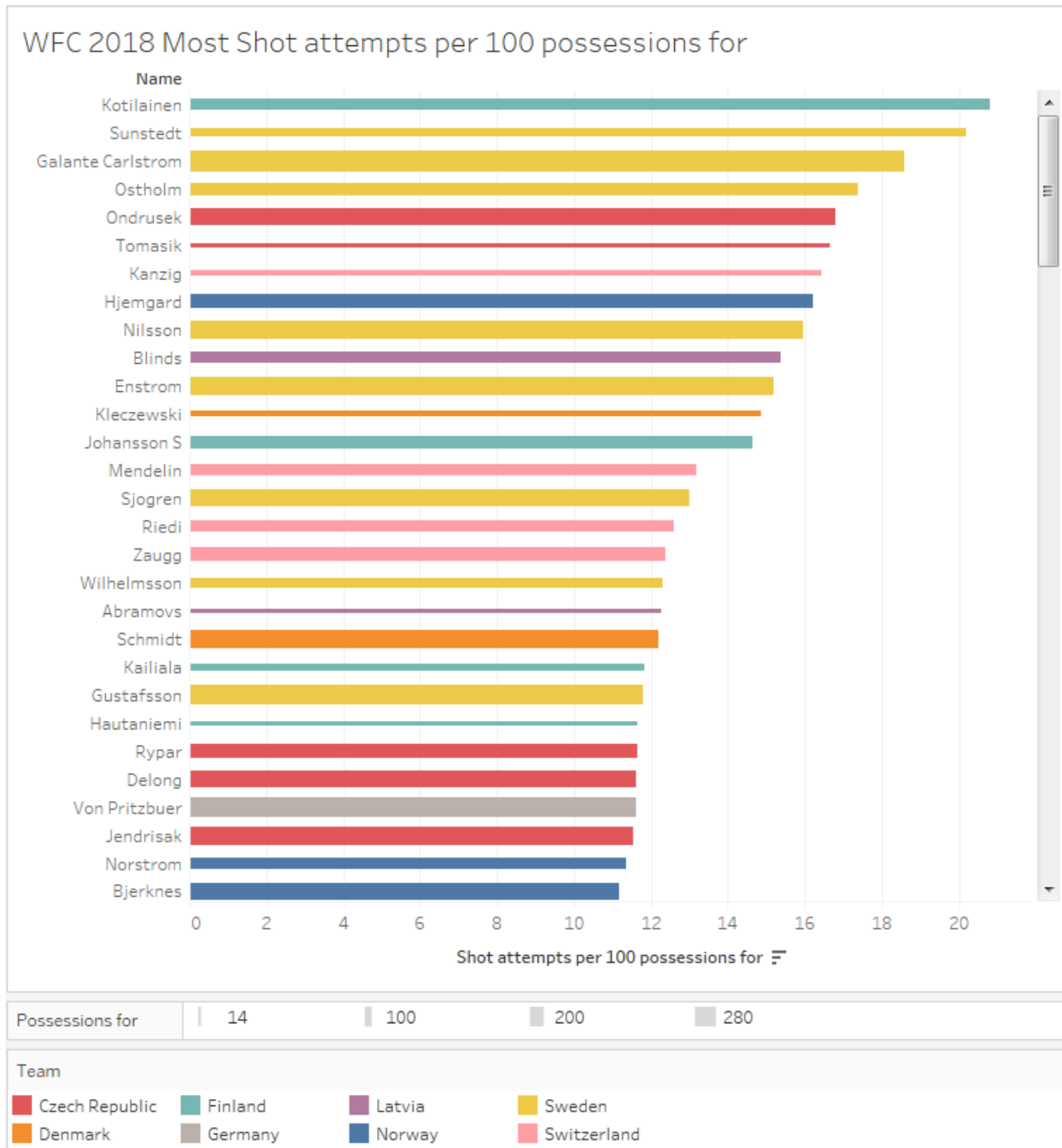
Who was a shooting machine at the 2018 WFC? It was Pettri Kotilainen with the most frequent finish as a shooter (21 shot attempts per 100 possessions for). Next was Sunstedt (thin line signalizes smaller data sample for him) followed his countrymen Galante Carlstrom and Ostholm. Ondrusek, Tomasik and Kanzig (both with limited time on the field) occupy positions 5 to 7 and top 10 is completed with Hjemgard, Nilsson and Blinds.

Similarly shot attempt assists per 100 possessions for are displayed next.
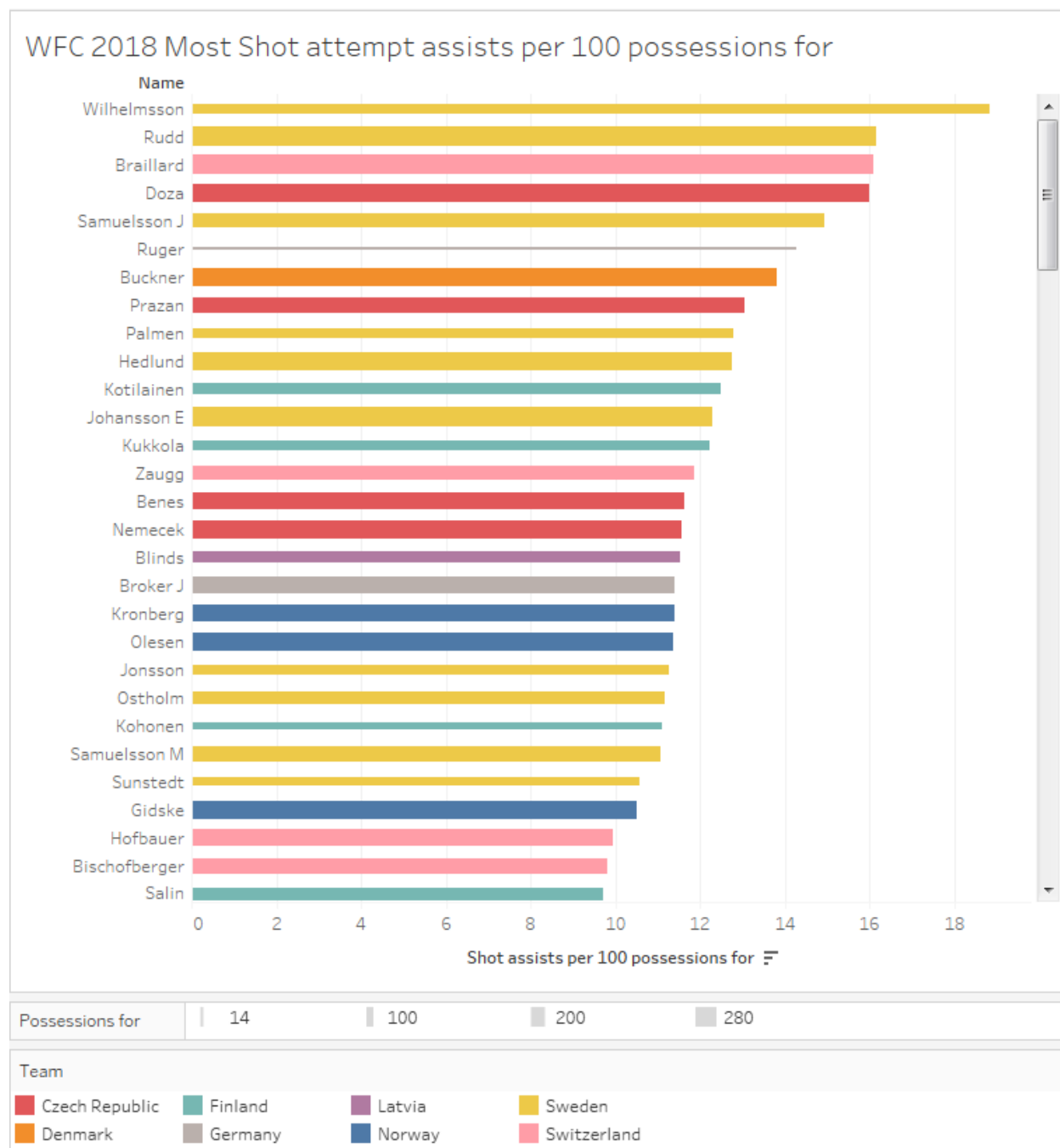
Swedish forward Wilhelmsson was searching many times for his teammates to finish plays (19 assists per 100 possessions for). Rudd, Braillard, Doza and Samuelsson J are next in order. Ruger with limited sample size is sixth and Buckner, Prazan, Palmen and Hedlund are completing the top 10.

It is a no surprise that more defenders are to be found in the next graph. Share of individual blocks against shot attempts of opponents is displayed.

FIGURE 2.52. PLAYERS WITH THE HIGHEST SHOT BLOCKING SHARE AT THE 2018 WFC
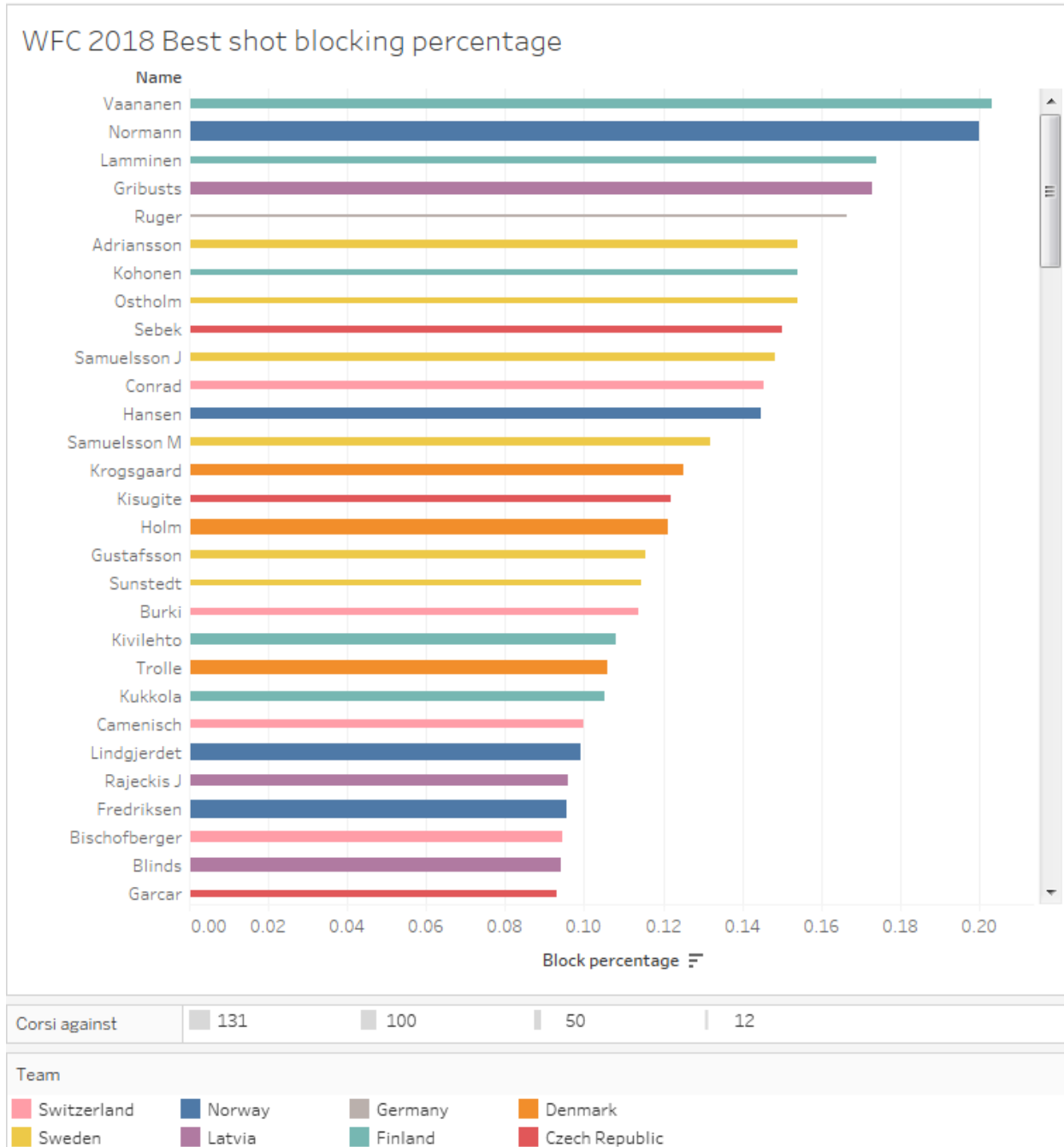
Vaananen was able to block more than 20% of opponent´s shot attempts! Normann was very close second with a similar share. Lamminen, Gribusts, Ruger (limited sample size) are next

with over 16% of a block share. Top 10 is completed with Adriansson, Kohonen, Ostholm, Sebek and Samuelsson J.

3. Discussion

Discussion chapter aims to expand some of the findings from chapters 2 and 3. The discussion also tries to offer a bridge allowing to transfer the knowledge gained from the data into the actual game and its strategy.

The chapter is divided into following parts according to questions they are opening:

- Pros and cons of Goal scoring data and Possession based data?

- What parts of the game were irrelevant and why?

- What parts of the game were important and why?

- How to play to win?

3.1. Pros and cons of GSD and PBD?

Simply put these are pluses (+) and minuses (-) of goal scoring data tracked:

+ Detailed categories for specific actions (such as zone and cause of possession start, defensive mistakes)

+ Tracked for all 16 teams and all 48 games

+ Allows to compare results with the 2016 WFC

- Lacking analytical insight - do not reveal efficiency of defined actions (goal percentage), results might be interesting but with no certainty on its importance

Similarly pluses (+) and minuses (-) of possession based data tracked are following:

+ Analytical insight revealing efficiency of defined actions (correlations to goal differentials)

+ Allows to estimate goals scored

+ Bring on-field player data (corsi, goals estimated)

- Limited level of detail of data tracked (compared to GSD) as well as teams covered (8)

3.2. What parts of the game were irrelevant and why?

Turnovers. To steal a ball on an offensive half leads to a dangerous possession, might be the hypothesis suggesting. With 7.2% of a goal percentage it was not much more dangerous in comparison to slow or quick attacks (around 5.0%) and odd man rushes were still more

dangerous (11.9%). Okay but how often were teams able to yield turnover possessions? On only 6.0% of possessions. To compare it to slow and quick attacks (73.4%), it is more than 12x less.

On the other hand there were more often (41.8% vs 14.2%) clear path opportunities created on turnover possessions than on slow or quick attacks as well as cross field pass opportunities (19.8% vs 14.0%). The problem was an efficiency of these opportunities that was low. Much lower than in case of clear paths (13.8% vs 19.6%) and cross field passes (9.1% vs 12.6%) on slow and quick attacks. What was the problem here? Two probable answers are presented. First simply a luck could play a role. Only tens of goals are considered in presented goal percentages so a confidence bound is rather wide. While first answer is more hypothetical the second one touches the logic of a play after turnover. When losing the ball on own half players are often still around the ball in solid defensive positions and ready to block potential shot attempts. Also opponent that stole the ball has usually limited time for execution. Lastly execution of turnover possession does not need to match (in terms of goal percentage) execution of longer and prepared possessions (such as slow attack). Bigger data sample is recommendable to test if a luck really played its role at the 2018 WFC causing lower goal percentages of turnover possession than expected.

To get into the "**best scoring area**". Naturally to shoot more from the best scoring area is the way to go, the way to win games. Tracking shot attempts and its locations to specific areas including the "best scoring area" proved that outscoring opponent is not directly connected to shooting from the best scoring area specifically. Do not get it wrong, a correlation of 0.70 was found between goal differential and corsi from the best scoring area from tracked games. Nevertheless slightly higher correlation (0.71) was calculated for goal differential and simple corsi. This means, yes, when you outshoot opponent from the best scoring area you are more likely to win but you are more likely to win when you outshoot the opponent from anywhere.

Tracking shot attempts from dangerous (or specific) locations might look like a good practice but it is as important (or even less) as drawing marks just for every shot attempt into your sheet.

Simply put: stop drawing locations of each and every shot in order to get useful information. It does not look useful. It is a waste of a time.

Why so confident? In previous research work[4] shooting and outshooting opponents from in close was an area of study. It was proved wrong as a variable that is connected to a success.

Shot blocking? This is a tricky one as the question mark suggests. In the same research work share of blocks differential seemed to be a decent measure (correlated 0.73 with a goal differential) of a success. It was again tested using the 2018 WFC data and correlation found was not there (0.41) this time. Yes it stayed positive suggesting that to have a higher share of blocks you are bound to have a rather stronger result. This saying was just too inconsistent at the 2018 WFC from game to game. As an example it was the champion Finland with the best share of blocks differential but in other games this did not matter much. Further work is needed to answer how much are block shares relevant to the game. One is clear, it remains to be an interesting topic to study.

3.3. What parts of the game were important and why?

Ability to create and prevent **clear path opportunities was the key** to success at the 2018 WFC. 53.0% of all even strength goals were scored with a clear path opportunity! At the same time possessions with a clear path opportunity were not that often and happened on 12.9% of all possessions. Also clear path possession was 9x more dangerous than a common attack. Best teams had a strong differential of clear path opportunities at the tournament.

Cross field pass opportunities were another area to study that was proven to be important. Why? No matter what kind of a possession an existing opening for a cross field pass increased the likelihood of scoring. As was found analyzing power play data (Chapter 2.4.4.) there is a suggestion on how to measure a cross field pass opportunity. Passes on offensive half but not cutting a defensive formation (example being a power play and a deep defence) do not bring much of a danger. But cross field passes that cuts defensive formation creates a big danger. Such a pass changes angles for all defending players including goalkeeper and opens options on how to score for opposition. Following diagrams were created to show examples of what is less dangerous cross field pass opportunity (still tracked as a cross field pass opportunity at the 2018 WFC) and more dangerous one (should be tracked newly this way and tested on how much more dangerous they are).

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[4] Malina: Analysis: Does winning matter to you? So does for data analysts. Web: http://www.floorball.org/wfc2018/news.asp?offset=&kieli=826&tyyppi=&id_tiedote=5270. 2018

FIGURE 3.1. CROSS FIELD PASS OPPORTUNITY REDEFINED

Is NOT cross field pass opportunity (pass crosses goal to goal axis but does not cut through defensive formation)
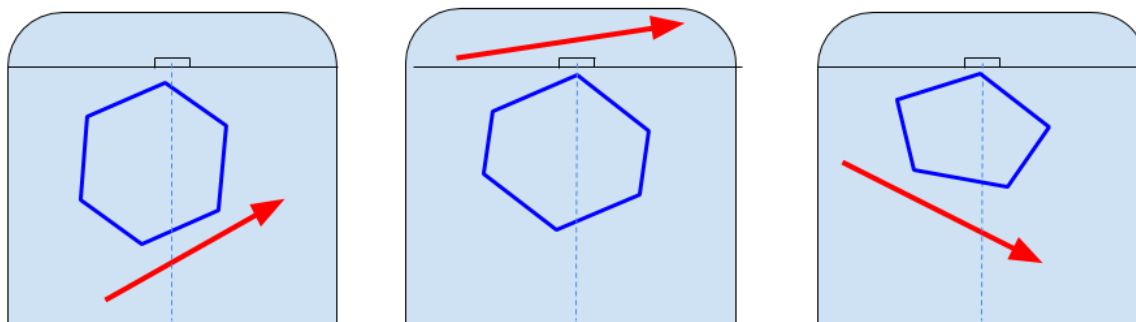
IS cross field pass opportunity (pass crosses goal to goal axis and cuts through defensive formation
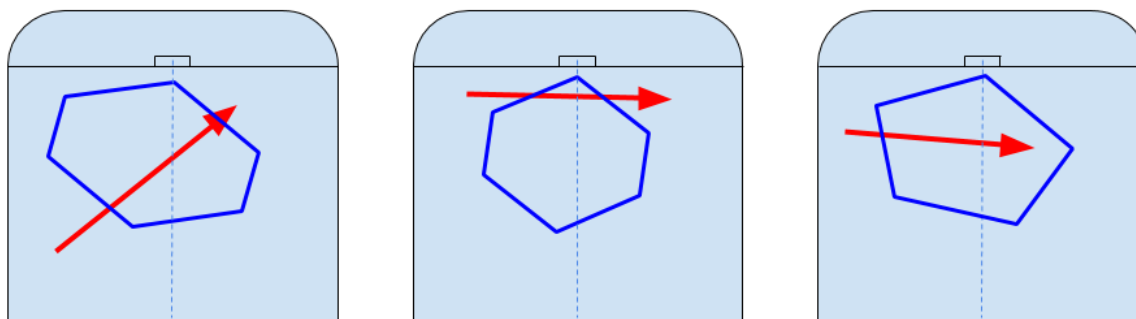
Each vertex of a defensive formation polygon (dark blue) represents position of a player (incl. goalie)

Odd man rushes? Big question mark. Really big one. Expectations were high. Previous work[5] suggested that odd man rushes could be one of the key to success in floorball. Yes, it proved to be the most dangerous possession type with a goal percentage of 11.9%. It is not that higher than slow or quick attacks (5.0%) but more importantly only 4.7% of odd man rushes were created from all possession types. To compare 73.4% of slow or quick attacks were created and so the effect on goal scoring was not huge from odd man rushes. What is more there was no correlation (0.19) found between goal differential and odd man rushes at the 2018 WFC. This was a big surprise after finding strong 0.87 correlation in different dataset and different floorball level. So why are odd man rushes in this chapter as an important possession? It is still the most dangerous possession type and important to note is the contextual aspect of the 2018 WFC. At the tournament where more quality teams are playing lesser competition often the strategy of

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[5] Malina: Analysis: Does winning matter to you? So does for data analysts. Web: http://www.floorball.org/wfc2018/news.asp?offset=&kieli=826&tyyppi=&id_tiedote=5270. 2018

weaker teams is simple. Defend deep and wait for odd man rush opportunities. And that is what exactly happened at the 2018 WFC.

So in what to conclude? Track odd man rushes, be aware of its relevance but check the quality context. Are you following a well balanced quality on both sides or is it a game of David vs Goliath?

Defensive mistakes? Chapter 1.3.10. studied defensive mistakes connected to goal scoring at the 2018 WFC. It was interesting (not proven statistically though) to find out how specific shares the tournament winner, Finland, had. Finland had the most "no mistake" goals scored against and the least tactical mistakes prior goals against committed. Data sample was very small but identifying that clear results for a team that won it all is a definitely area to study. Incorporating tracking defensive mistakes into possession-based data could be an interesting option but would require some level of difficulty.

To add to this discussion Finland had not only very specific results of defensive mistakes but other aspects of the game that fits to the defensive side of the game. There was the least number of possessions created in their games. Not surprisingly they allowed low numbers of clear path and cross field pass opportunities. Keeping the "low profile" Finland focused on execution and they were more successful than their opponents in executing dangerous possessions but also in executing their defence represented by a block share. Overall, Finland rolled the dice on winning through happening less in the game rather than opening up the game. At the end of the day if you are confident in your own abilities it makes sense to reduce a luck factor. Why not be satisfied with a 7-1 differential in a dangerous possessions over 15-6 one. Not suggesting that playing safe is the key to win (as it was not proved overall) but the topic for a discussion it is for sure.

3.4. How to play to win?

Alright alright. It is great to recognize what aspects of the game are important and what are not, It brings some information but… but how can a team incorporate this to an actual game and its strategy? Good question for sure. How to play to win then?

First step is just start focusing or focusing more on important things in the game (chapter 3.3.) and stop focusing on irrelevant or less important things in the game (chapter 3.2.). Strong teams are able to create clear path opportunities and prevent them against. Smart way of doing this could be highlighting of all clear path situations and looking at them in the video. Video analysis is a natural next step in the process of understanding the game better. During the 2018 WFC there were articles published with gifs included on how the game was played. Many examples

on how were clear paths, cross field passes, odd man rushes or other crucial plays created and executed were presented. It was not quantified as to what kind of examples were more frequent but following list should serve as a "cook book" on how to create or prevent dangerous plays. In this case clear path opportunities.

Offensive impact examples:

- Give and go - if timed and executed right this is a powerful "trick" to beat the defence and find some spacing while changing angles in a quick fashion

- Confident defenders - defenders can usually work with a bigger space in the game and if they feel strong with the ball and are able to fool opponents they can beat them in 1 on 1 battle to create dangerous possession

- Skilled play - good player has a feel for using more space to create offence, great player can go and use his/her skills to his/her advantage fooling the defence

- Quick steps back to find an opening in the best scoring area; there are no more easier things to do for a forward than to fake forward movement and step back instead to lose coverage and create a space to shoot

- Stay in front of the net - not really a recommendation for set play but there is no secret that rebounds, bounces, defensive misses and other things can happen quickly and closer to the goalkeeper the easier goal one can score

Defensive impact examples:

- Tactical hole in a defensive formation - players too far from each other to stop a possibility for a cross field pass or a clear path

- Double team mistake - at moments two defenders can decide to go after one attacking player leaving someone open and if not timed well a problem arises

Individual quality of players can execute some of these examples above. Nevertheless most of real examples are connected to tactical part of the game where more players are involved both offensively and defensively. Therefore potential for a right coaching is there to either create or prevent some of these dangerous plays.

Logically it can be a mix of two or more reasons leading to a clear path situation. Also remember that more than 80% of goals scored at both the 2018 and 2016 WFC were connected with a defensive mistake! To decrease a number of clear paths against just by one and increase a number of clear path for your team just by another one is already giving you an advantage of almost half of a goal over your opponent!

4. Conclusions

To remind these were aims of the report:

- To compare goal scoring statistics at the 2018 and 2016 WFCs

- To analyze possession-based data getting importance of specific plays and events in floorball

- To discuss what data result can mean to the game and its strategy

This chapter is divided to three main parts according to three aims defined above.

4.1. Conclusions of goal scoring data comparisons

Most of the data from the 2016 WFC were replicated and compared to the 2018 WFC results. Some categories were aggregated in order to get bigger sample size but could still be compared to the 2016 WFC results. Other statistics were too subjective or too vague in a definition and therefore were not compared or just with a comment added. This was always stated in a respective chapter. Next paragraphs are summarizing basic findings from whole goal scoring data chapter.

Key performance indicators (KPI) at team level were tested for its importance to outscoring opponent (goal differential) or winning (winning percentage) of all 16 teams at the 2018 WFC:

- **The strongest** correlation (+0.91) found for **Goal differential** and **Shots on goal differential**. Simply put teams that outshoot opponents tend to outscore them.

- However when testing **Win percentage** the **strongest** correlation (+0.87) belongs to **PDO**. It means at the end of the game it is an efficiency of teams that matters the most. PDO might be slightly worse indicator than shots on goal differential when it comes to more wild results but when accounting for winner of the game only PDO brings the best results.

- **Shooting percentage** correlates **stronger** (+0.80) **with Goal differential** than **Save percentage** (+0.68). This tells us that goalkeeping plays less significant role than shooting when it comes to a goal differential. **Save percentage** correlates stronger than **Shooting percentage** with **Win percentage**. Again if the quality gap is bigger shooting and offence leads the way to determine the final goal differential but it is goalkeeping

with stronger significance when it comes down to decide the winner more often. So in close games it might be a goalkeeper as a deciding factor.

For the 2018 and 2016 WFCs comparisons these were key findings:

- Average goal differential per game was reducing at every WFC from 2010 but in 2018 its value was higher (5.2) than in 2016 (4.2). This suggests that overall **quality gaps** among teams were **larger in 2018** and less even games were to be seen than at the 2016 WFC.

- There were only 8.1% power play goals scored at the 2018 WFC which was significantly less than in 2016 (14.5%). **Power plays did not play** that **big** of a **role** in 2018.

- Despite some concerns about replicability of the category goals from **odd man rushes** (counter attacks) were not that often (8.9%) in 2018 in comparison to the 2016 WFC (12.9%).

- Some categories were tested for its consistency and replicability from one tournament (2016 WFC) to the following one (2018 WFC). It was found that there is **no consistency** in data results of **average shooting distance** of teams and **no consistency** in data results of **average passing distance** of teams. However correlation and **consistency** was **found** studying **average possession duration** of teams.

4.2. Conclusions of possession based data analysis

Each possession in 24 games at the 2018 WFC was tracked and data were analyzed in order to know importance of specific plays and events in floorball. This a summary of possession based data analysis:

- **Odd man rush** was the **most dangerous** type of possession with a goal percentage of 11.9%; goal percentages of turnover possessions (7.2%), quick attacks (5.1%) and slow attack (4.9%) were not that far behind though and looking at occurence **odd man rushes** (4.6%) and **turnovers** (6.0%) were much less frequent than quick or slow attacks (73.4%) **lowering** their overall **impact** on the game

- There was a **clear path** executed in **53%** of all even strength **goals** while a share of "only" 13% clear path opportunities were created from all possessions

- **Clear path** possessions were about **9x more dangerous** than **common attack** possessions

- Existence of a **cross field pass increases** significantly the **goal percentage** of all possession types

- **Winners** at the 2018 WFC were very successful outnumbering opponents in both **cross field pass** (correlation of +0.86 to goal differential) and **clear path** opportunities (+0.84).

- It was **not relevant** to give more attention to shot attempts from the **best scoring area** as simple shot differential (corsi) correlated even stronger (+0.70 < +0.71) with becoming a winner of the game

- Power-play analysis helped to **redefine cross field pass** opportunities and their main danger in cutting through the defensive formation

4.3. Conclusions of discussion

The work of a data analyst is not to track all kind of different data but to be able to find important and core findings that help to understand the game better and support designing tools to transfer the findings into the actual game. Therefore a discussion on what data results mean and how can they be applied in floorball was presented.

In chapter 3. it is advised what plays and events in the game are less relevant than how they can be perceived. These include turnover possessions and concentrating on shooting from best scoring area in particular.

- Forcing **turnover possessions** was not an effective strategy at the 2018 WFC. Their share was rather low (6% of all possessions types) and their effectivity was not much higher (7.2%) comparing them to more common slow or quick attacks (5%). Defense proved to be quite ready to defend or block these possessions even though some lack of luck for offence could still play its role.

- Concentrating on tracking shot attempts from the **best scoring area** in order to account for better scoring chances proved to be an **ineffective** approach.

On the other hand some specific plays and aspects of possessions proved to be of a big interest. These were clear path opportunities and cross field pass opportunities in particular

- **Clear path** opportunities are events in floorball that **must be tracked**. Possessions with a clear path was 9x more **dangerous** than common possessions (without clear path, cross field pass and odd man rush). Also best teams were able to have the best clear path opportunity differentials.

- Similarly **cross field pass** opportunities proved to be of a **big significance** with even stronger (+0.86) correlation with game by game goal differential than clear paths (+0.84). Goal percentage of each possession increases in case of cross field pass opportunity.

Shot blocking, **odd man rushes** and **defensive mistakes** were all discussed as well. For some reason they seem to be important for the game but for other reason they were questioned.

Lastly and importantly how to connect data result findings with an actual game strategy was the topic of a discussion. Recommendations on where the focus should be and where should not be shifted was presented and there were examples given on how dangerous aspects of possessions were created at the 2018 WFC. The belief is this can serve as a stepping stone between data analysis to video analysis and to the actual game.

4.4. Limitations and future work

People as well as players, coaches and data analysts are working with hypothesis and assumptions. They believe some kind of plays work and some do not. They use their experience to decide. It was the same thing before creating this report. Variables for data tracking were designed with a hope to catch important aspects of a game. Experience from previous work was used while designing it. Also to prove or deny hypothesis does not mean there can´t be opposite output under different context. For example something will work at the WFC level but will not work in Czech second league. Therefore there is no certain good or bad approach taken, maybe just more or less effective one. Other aspects could have been tracked in games and some of them could have been proved to have an impact for the game. Any different approach is welcomed and any attempts to replicate or continue work from the 2018 WFC report is welcomed as well.

Another aspect essential to consider is data sample. In particular in case of goal scoring data only 505 goals are analyzed and assigned to different kind of categories. While some results may serve for comparison purpose other might be hard to replicate. In this regard it was more favourable to analyze possessions with data sample of 7244. These results are therefore more accurate but some categories have still high level of uncertainty (e.g. goal percentage of simple odd man rush opportunities - 9 goals from 122 opportunities).

A need for an interpretation and explanation of data and transferring the knowledge into the actual game is another challenge to be always aware of. This report with a substantial part oriented on data (actually two different datasets) put more emphasis on numbers. Explanations and easy understanding is essential as well as offering a view on the knowledge applied into the

game of floorball. This was touched in a discussion part but might take a book to go through designing detailed game strategies in floorball based on support from video and data analysis.

Future research on what was found (importance of clear path or cross field pass opportunities, detailed study on how to create and prevent them, further information on importance of shot blocking, odd man rushes and defensive mistakes) in this report is more than recommended. Floorball is rightfully associated with bright and open minds and using data analysis could be an important tool helping to shape a modern era of floorball.

Attachment

Team level possession-based data results

Team	Switzerland	Latvia	Finland	Sweden	Germany	Czechia	Denmark	Norway	Gdiff Correlation	Total
Rank	3	5	1	2	6	4	8	7	-0.91	x
Goals for	35	22	39	60	19	33	12	27	0.95	247
Shots on goal for	127	105	143	186	97	152	90	106	0.90	1006
Shots wide for	69	54	75	103	59	70	44	57	0.92	531
Shots blocked for	90	78	78	117	79	103	71	71	0.72	687
Shot attempts for	286	237	296	406	235	325	205	234	0.89	2224
Goals against	18	37	13	16	40	25	64	34	-0.96	247
Shots on goal against	118	138	93	76	140	86	194	161	-0.91	1006
Shots wide against	65	82	61	50	62	50	82	79	-0.73	531
Shots blocked against	71	88	91	67	81	59	110	120	-0.58	687
Shot attempts against	254	308	245	193	283	195	386	360	-0.83	2224
Goal differential	17	-15	26	44	-21	8	-52	-7	1.00	0
Shooting percentage for	27.6%	21.0%	27.3%	32.3%	19.6%	21.7%	13.3%	25.5%	0.95	24.6%
Shooting percentage against	15.3%	26.8%	14.0%	21.1%	28.6%	29.1%	33.0%	21.1%	-0.75	24.6%
Block share of a team	28.0%	28.6%	37.1%	34.7%	28.6%	30.3%	28.5%	33.3%	0.63	30.9%
Block share of opponents	31.5%	32.9%	26.4%	28.8%	33.6%	31.7%	34.6%	30.3%	-0.83	30.9%
Block share differential	-3.5%	-4.3%	10.8%	5.9%	-5.0%	-1.4%	-6.1%	3.0%	0.73	0.00
Not even strength possessions	92	81	115	127	90	103	94	72	0.66	774
Share of not even strength possessions	7.5%	6.2%	10.0%	9.6%	7.1%	8.1%	7.6%	5.7%	0.63	7.7%
Goals for	30	20	34	52	15	29	11	26	0.94	217
Goals against	16	34	8	15	35	21	57	31	-0.95	217

Number of possessions for	598	586	542	653	563	592	520	579	0.71	4633
Number of possessions against	537	632	497	537	617	577	624	612	-0.84	4633
Share of possessions for	52.7%	48.1%	52.2%	54.9%	47.7%	50.6%	45.5%	48.6%	0.98	50.0%
Number of possessions	1135	1218	1039	1190	1180	1169	1144	1191	-0.25	9266
Share of corsi for	52.9%	44.7%	55.6%	69.7%	43.8%	62.3%	34.6%	38.8%	0.89	50.0%
Share of shot attempts from zone 1	10%	21%	12%	13%	13%	16%	19%	24%	-0.57	15.5%
Share of shot attempts from zone 2	41%	38%	41%	51%	41%	42%	35%	33%	0.75	41.4%
Share of shot attempts from zone 3	17%	14%	16%	10%	11%	13%	17%	11%	-0.28	13.4%
Share of shot attempts from zone 4	9%	6%	5%	5%	10%	8%	7%	12%	-0.33	7.5%
Share of shot attempts from zone 5	16%	15%	17%	16%	16%	14%	13%	9%	0.40	14.7%
Share of shot attempts from zone 6	7%	5%	9%	5%	9%	7%	9%	11%	-0.34	7.5%
Share of no attack possessions for	14.4%	23.9%	13.8%	8.7%	18.1%	10.1%	20.4%	16.9%	-0.79	15.6%
Share of slow attack possessions for	55.7%	35.2%	57.7%	60.2%	46.5%	58.4%	46.7%	52.2%	0.71	51.8%
Share of quick attack possessions for	19.9%	31.1%	17.2%	15.5%	24.2%	19.3%	25.4%	23.3%	-0.79	21.8%
Share of turnover possessions for	6.4%	4.6%	6.3%	8.9%	6.0%	8.1%	2.9%	4.1%	0.83	6.0%
Share of odd man rush possessions for	3.5%	5.3%	5.0%	6.7%	5.2%	3.9%	4.6%	3.5%	0.28	4.7%
Share of high pressure used	50.2%	14.4%	34.1%	56.0%	33.1%	42.0%	14.7%	10.9%	0.77	31.7%
Share of medium pressure used	38.2%	34.8%	49.4%	35.7%	55.7%	50.6%	36.0%	35.5%	0.05	41.6%
Share of low pressure used	11.6%	50.8%	16.5%	8.3%	11.2%	7.4%	49.3%	53.6%	-0.65	26.7%
Share of clear paths in slow attacks for	13.2%	10.2%	17.6%	21.4%	9.2%	11.3%	9.1%	12.3%	0.88	13.6%
Share of clear paths in quick attacks for	21.8%	13.2%	21.5%	16.8%	9.6%	19.3%	15.9%	11.1%	0.53	15.6%
Share of clear paths in turnovers for	44.7%	33.3%	50.0%	41.4%	32.4%	47.9%	46.7%	33.3%	0.28	41.7%
Share of clear paths in possessions for	15.2%	9.7%	17.9%	20.6%	9.0%	14.8%	10.1%	10.7%	0.90	13.6%
Share of goals from slow attack clear paths for	22.7%	23.8%	14.5%	22.6%	4.2%	23.1%	9.1%	24.3%	0.52	19.3%

Share of goals from quick attack clear paths for	26.9%	12.5%	20.0%	29.4%	23.1%	27.3%	0.0%	20.0%	0.82	19.6%
Share of goals from turnover clear paths for	23.5%	11.1%	11.8%	20.8%	18.2%	8.7%	0.0%	0.0%	0.61	13.8%
Share of goals from odd man rushes for	9.5%	9.7%	14.8%	15.9%	10.3%	4.3%	8.3%	20.0%	0.33	11.9%
Share of goals from common slow attacks for	2.1%	2.2%	3.1%	2.6%	1.7%	3.3%	1.4%	3.0%	0.65	2.5%
Share of goals from common quick attacks for	1.1%	3.2%	5.5%	3.6%	0.8%	1.1%	3.6%	0.8%	0.19	2.3%
Share of goals from common turnovers for	0.0%	0.0%	5.9%	6.1%	4.3%	0.0%	0.0%	0.0%	0.54	2.5%
Share of goals from clear path possessions for	24.1%	16.7%	15.2%	23.2%	12.5%	20.2%	4.0%	20.0%	0.81	19.0%
Share of goals from common possessions for	1.4%	1.8%	3.1%	2.7%	1.2%	2.3%	1.6%	1.8%	0.69	2.0%
Share of clear paths in slow attacks executed for	56.8%	57.1%	63.6%	73.8%	83.3%	66.7%	63.6%	70.3%	0.00	67.5%
Share of clear paths in quick attacks executed for	73.1%	75.0%	90.0%	82.4%	69.2%	81.8%	57.1%	66.7%	0.84	74.7%
Share of clear paths in turnovers executed for	47.1%	44.4%	58.8%	79.2%	45.5%	56.5%	71.4%	75.0%	0.14	60.3%
Share of clear paths executed for	59.8%	63.0%	68.5%	76.0%	70.8%	67.9%	62.0%	70.0%	0.47	68.0%
Share of cross field pass opportunities in slow attacks for	16.8%	9.2%	21.7%	26.5%	6.5%	15.0%	8.6%	9.3%	0.90	15.2%
Share of cross field pass opportunities in quick attacks for	16.0%	8.2%	12.9%	12.9%	10.3%	13.2%	10.6%	6.7%	0.54	11.0%
Share of cross field pass opportunities in turnovers for	26.3%	7.4%	26.5%	13.8%	17.6%	22.9%	33.3%	20.8%	-0.25	20.1%
Share of cross field pass opportunities in odd man rushes for	38.1%	38.7%	40.7%	63.6%	27.6%	43.5%	45.8%	45.0%	0.46	44.3%
Share of cross field pass opportunities in possessions for	15.6%	8.2%	18.5%	23.4%	8.2%	14.9%	9.8%	8.8%	0.86	13.6%
Share of cross field pass opportunity and clear path in possessions for	6.9%	3.4%	7.6%	7.5%	3.0%	6.4%	2.9%	3.5%	0.91	5.2%

Share of cross field passes executed for	50.5%	45.8%	63.0%	60.1%	56.5%	60.2%	52.9%	52.9%	0.52	56.7%
Share of goals from cross field pass opportunities for	16.1%	6.3%	10.0%	13.7%	4.3%	12.5%	3.9%	7.8%	0.83	10.8%
Share of goals from cross field pass and clear path for	31.7%	5.0%	9.8%	20.4%	0.0%	23.7%	6.7%	15.0%	0.60	17.0%
Share of goals from cross field pass on odd man rush for	0.0%	16.7%	18.2%	17.9%	12.5%	10.0%	0.0%	11.1%	0.48	12.4%
Share of goals from cross field pass and no clear path for	4.5%	0.0%	6.3%	6.7%	4.8%	2.5%	4.0%	0.0%	0.45	4.5%
Share of goals from no cross field and no clear path for	1.1%	1.9%	2.7%	1.5%	1.1%	2.3%	1.2%	1.2%	0.40	1.6%
Share of shot attempts from zone 1 against	11%	16%	17%	18%	17%	13%	16%	16%	-0.02	15.5%
Share of shot attempts from zone 2 against	44%	46%	32%	33%	50%	43%	40%	40%	-0.54	41.4%
Share of shot attempts from zone 3 against	11%	12%	15%	16%	11%	11%	13%	18%	0.21	13.4%
Share of shot attempts from zone 4 against	13%	7%	9%	8%	8%	5%	6%	7%	0.43	7.5%
Share of shot attempts from zone 5 against	14%	13%	17%	19%	10%	17%	16%	14%	0.52	14.7%
Share of shot attempts from zone 6 against	7%	7%	11%	7%	5%	11%	10%	4%	0.11	7.5%
Share of no attack possessions against	17.7%	14.4%	15.7%	21.8%	14.6%	19.9%	9.9%	12.4%	0.85	15.6%
Share of slow attack possessions against	42.8%	56.5%	52.1%	42.3%	47.5%	44.7%	64.3%	60.9%	-0.73	51.8%
Share of quick attack possessions against	29.4%	15.5%	22.5%	28.9%	25.6%	25.6%	13.9%	15.7%	0.72	21.8%
Share of turnover possessions against	4.8%	9.2%	4.6%	2.4%	8.3%	3.5%	7.2%	6.9%	-0.79	6.0%
Share of odd man rush possessions against	5.2%	4.4%	5.0%	4.7%	4.1%	6.1%	4.5%	4.1%	0.42	4.7%
Share of high pressure used against	26.4%	53.3%	29.3%	14.9%	37.7%	19.8%	44.8%	37.1%	-0.80	31.7%

Share of medium pressure used against	45.9%	30.6%	51.9%	44.1%	34.7%	53.9%	38.7%	29.3%	0.56	41.6%
Share of low pressure used against	27.7%	16.1%	18.9%	41.0%	27.6%	26.3%	16.5%	33.6%	0.58	26.7%
Share of clear paths in slow attacks against	12.6%	13.4%	10.0%	9.3%	15.7%	7.8%	20.9%	13.9%	-0.88	13.6%
Share of clear paths in quick attacks against	14.6%	19.4%	6.3%	8.4%	19.6%	16.9%	23.0%	20.8%	-0.89	15.6%
Share of clear paths in turnovers against	38.5%	39.7%	39.1%	46.2%	41.2%	60.0%	42.2%	38.1%	0.17	41.7%
Share of clear paths in possessions against	12.2%	14.9%	8.9%	7.8%	16.6%	10.6%	20.7%	15.0%	-0.98	13.6%
Share of goals from slow attack clear paths against	13.8%	22.9%	3.8%	14.3%	21.7%	15.0%	23.8%	21.2%	-0.78	19.3%
Share of goals from quick attack clear paths against	17.4%	21.1%	0.0%	7.7%	25.8%	20.0%	35.0%	10.0%	-0.84	19.6%
Share of goals from turnover clear paths against	10.0%	13.0%	11.1%	0.0%	9.5%	33.3%	10.5%	18.8%	-0.17	13.8%
Share of goals from odd man rushes against	3.6%	21.4%	0.0%	20.0%	4.0%	11.4%	21.4%	12.0%	-0.31	11.9%
Share of goals from common slow attacks against	2.0%	2.3%	1.7%	1.5%	3.3%	0.8%	4.7%	2.5%	-0.85	2.5%
Share of goals from common quick attacks against	0.7%	1.3%	1.9%	2.1%	4.7%	1.6%	3.0%	3.9%	-0.46	2.3%
Share of goals from common turnovers against	6.3%	2.9%	0.0%	0.0%	3.3%	12.5%	0.0%	0.0%	0.10	2.5%
Share of goals from clear path possessions against	14.5%	20.0%	4.8%	10.0%	20.4%	21.1%	23.6%	18.2%	-0.82	19.0%
Share of goals from common possessions against	1.3%	1.8%	1.4%	1.3%	3.0%	1.0%	3.6%	2.2%	-0.87	2.0%
Share of clear paths in slow attacks executed against	69.0%	75.0%	65.4%	76.2%	63.0%	45.0%	67.9%	69.2%	0.06	67.5%
Share of clear paths in quick attacks executed against	73.9%	68.4%	71.4%	84.6%	71.0%	80.0%	75.0%	75.0%	0.48	74.7%
Share of clear paths in turnovers executed against	60.0%	65.2%	55.6%	16.7%	61.9%	50.0%	63.2%	75.0%	-0.67	60.3%

Share of clear paths executed against	69.4%	71.1%	64.3%	70.0%	65.3%	61.4%	68.3%	71.6%	-0.09	**68.0%**
Share of cross field pass opportunities in slow attacks against	13.0%	13.7%	10.4%	8.8%	18.8%	7.0%	23.4%	19.3%	-0.84	**15.2%**
Share of cross field pass opportunities in quick attacks against	11.4%	15.3%	5.4%	3.2%	12.7%	10.8%	17.2%	16.7%	-0.88	**11.0%**
Share of cross field pass opportunities in turnovers against	30.8%	25.9%	17.4%	7.7%	15.7%	30.0%	15.6%	16.7%	-0.05	**20.1%**
Share of cross field pass opportunities in odd man rushes against	53.6%	39.3%	48.0%	36.0%	32.0%	34.3%	57.1%	56.0%	-0.28	**44.3%**
Share of cross field pass opportunities in possessions against	13.4%	14.2%	9.9%	6.5%	14.7%	9.0%	21.2%	17.8%	-0.89	**13.6%**
Share of cross field pass opportunity and clear path in possessions against	4.5%	5.4%	3.6%	2.4%	6.3%	4.0%	8.3%	6.2%	-0.97	**5.2%**
Share of cross field passes executed against	44.4%	64.4%	55.1%	54.3%	57.1%	50.0%	59.8%	58.7%	-0.55	**56.7%**
Share of goals from cross field pass opportunities against	6.9%	14.4%	0.0%	8.6%	9.9%	13.5%	14.4%	11.0%	-0.63	**10.8%**
Share of goals from cross field pass and clear path against	16.7%	23.5%	0.0%	7.7%	17.9%	21.7%	15.4%	21.1%	-0.52	**17.0%**
Share of goals from cross field pass on odd man rush against	0.0%	18.2%	0.0%	22.2%	0.0%	16.7%	31.3%	7.1%	-0.33	**12.4%**
Share of goals from cross field pass and no clear path against	3.0%	6.7%	0.0%	0.0%	4.5%	0.0%	7.9%	3.5%	-0.89	**4.5%**
Share of goals from no cross field and no clear path against	1.0%	1.1%	1.5%	1.3%	2.9%	1.1%	2.7%	2.7%	-0.65	**1.6%**
Number of no attack possessions for	86	140	75	57	102	60	106	98	-0.70	**90.5**
Number of slow attack possessions for	333	206	313	393	262	346	243	302	0.82	**299.8**
Number of quick attack possessions for	119	182	93	101	136	114	132	135	-0.62	**126.5**
Number of turnover possessions for	38	27	34	58	34	48	15	24	0.83	**34.8**
Number of odd man rush possessions for	21	31	27	44	29	23	24	20	0.44	**27.4**
Number of high pressure used	212	57	114	215	121	165	61	45	0.73	**123.8**
Number of medium pressure used	161	138	165	137	204	199	149	147	-0.09	**162.5**

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Number of low pressure used	49	201	55	32	41	29	204	222	-0.66	104.1
Number of clear paths in slow attacks for	44	21	55	84	24	39	22	37	0.89	40.8
Number of clear paths in quick attacks for	26	24	20	17	13	22	21	15	0.06	19.8
Number of clear paths in turnovers for	17	9	17	24	11	23	7	8	0.83	14.5
Number of clear paths in possessions for	87	54	92	125	48	84	50	60	0.92	75.0
Number of goals from slow attack clear paths for	10	5	8	19	1	9	2	9	0.86	7.9
Number of goals from quick attack clear paths for	7	3	4	5	3	6	0	3	0.79	3.9
Number of goals from turnover clear paths for	4	1	2	5	2	2	0	0	0.80	2.0
Number of goals from odd man rushes for	2	3	4	7	3	1	2	4	0.55	3.3
Number of goals from common slow attacks for	6	4	8	8	4	10	3	8	0.73	6.4
Number of goals from common quick attacks for	1	5	4	3	1	1	4	1	-0.14	2.5
Number of goals from common turnovers for	0	0	1	2	1	0	0	0	0.58	0.5
Number of goals from clear path possessions for	21	9	14	29	6	17	2	12	0.92	13.8
Number of goals from common possessions for	7	9	13	13	6	11	7	9	0.75	9.4
Number of clear paths in slow attacks executed for	25	12	35	62	20	26	14	26	0.83	27.5
Number of clear paths in quick attacks executed for	19	18	18	14	9	18	12	10	0.47	14.8
Number of clear paths in turnovers executed for	8	4	10	19	5	13	5	6	0.80	8.8
Number of clear paths executed for	52	34	63	95	34	57	31	42	0.89	51.0

Number of cross field pass opportunities in slow attacks for	56	19	68	104	17	52	21	28	0.90	45.6
Number of cross field pass opportunities in quick attacks for	19	15	12	13	14	15	14	9	0.03	13.9
Number of cross field pass opportunities in turnovers for	10	2	9	8	6	11	5	5	0.61	7.0
Number of cross field pass opportunities in odd man rushes for	8	12	11	28	8	10	11	9	0.54	12.1
Number of cross field pass opportunities in possessions for	93	48	100	153	46	88	51	51	0.87	78.8
Number of cross field pass opportunity and clear path in possessions for	41	20	41	49	17	38	15	20	0.93	30.1
Number of cross field passes executed for	47	22	63	92	26	53	27	27	0.86	44.6
Number of goals from cross field pass opportunities for	15	3	10	21	2	11	2	4	0.89	8.5
Number of goals from cross field pass and clear path for	13	1	4	10	0	9	1	3	0.73	5.1
Number of goals from cross field pass on odd man rush for	0	2	2	5	1	1	0	1	0.65	1.5
Number of goals from cross field pass and no clear path for	2	0	3	5	1	1	1	0	0.75	1.6
Number of goals from no cross field and no clear path for	5	9	10	6	5	10	5	8	0.28	7.3
Number of no attack possessions against	95	91	78	117	90	115	62	76	0.68	90.5
Number of slow attack possessions against	230	357	259	227	293	258	401	373	-0.85	299.8
Number of quick attack possessions against	158	98	112	155	158	148	87	96	0.55	126.5
Number of turnover possessions against	26	58	23	13	51	20	45	42	-0.81	34.8
Number of odd man rush possessions against	28	28	25	25	25	35	28	25	-0.10	27.4
Number of high pressure used against	128	188	110	67	127	81	141	148	-0.64	123.8

Number of medium pressure used against	222	108	195	198	117	221	122	117	0.75	162.5
Number of low pressure used against	134	57	71	184	93	108	52	134	0.69	104.1
Number of clear paths in slow attacks against	29	48	26	21	46	20	84	52	-0.91	40.8
Number of clear paths in quick attacks against	23	19	7	13	31	25	20	20	-0.50	19.8
Number of clear paths in turnovers against	10	23	9	6	21	12	19	16	-0.86	14.5
Number of clear paths in possessions against	62	90	42	40	98	57	123	88	-0.98	75.0
Number of goals from slow attack clear paths against	4	11	1	3	10	3	20	11	-0.93	7.9
Number of goals from quick attack clear paths against	4	4	0	1	8	5	7	2	-0.77	3.9
Number of goals from turnover clear paths against	1	3	1	0	2	4	2	3	-0.49	2.0
Number of goals from odd man rushes against	1	6	0	5	1	4	6	3	-0.35	3.3
Number of goals from common slow attacks against	4	7	4	3	8	2	15	8	-0.89	6.4
Number of goals from common quick attacks against	1	1	2	3	6	2	2	3	-0.14	2.5
Number of goals from common turnovers against	1	1	0	0	1	1	0	0	-0.10	0.5
Number of goals from clear path possessions against	9	18	2	4	20	12	29	16	-0.98	13.8
Number of goals from common possessions against	6	9	6	6	15	5	17	11	-0.88	9.4
Number of clear paths in slow attacks executed against	20	36	17	16	29	9	57	36	-0.86	27.5
Number of clear paths in quick attacks executed against	17	13	5	11	22	20	15	15	-0.43	14.8
Number of clear paths in turnovers executed against	6	15	5	1	13	6	12	12	-0.85	8.8

Number of clear paths executed against	43	64	27	28	64	35	84	63	-0.95	**51.0**
Number of cross field pass opportunities in slow attacks against	30	49	27	20	55	18	94	72	-0.88	**45.6**
Number of cross field pass opportunities in quick attacks against	18	15	6	5	20	16	15	16	-0.63	**13.9**
Number of cross field pass opportunities in turnovers against	8	15	4	1	8	6	7	7	-0.56	**7.0**
Number of cross field pass opportunities in odd man rushes against	15	11	12	9	8	12	16	14	-0.34	**12.1**
Number of cross field pass opportunities in possessions against	72	90	49	35	91	52	132	109	-0.92	**78.8**
Number of cross field pass opportunity and clear path in possessions against	24	34	18	13	39	23	52	38	-0.98	**30.1**
Number of cross field passes executed against	32	58	27	19	52	26	79	64	-0.93	**44.6**
Number of goals from cross field pass opportunities against	5	13	0	3	9	7	19	12	-0.92	**8.5**
Number of goals from cross field pass and clear path against	4	8	0	1	7	5	8	8	-0.86	**5.1**
Number of goals from cross field pass on odd man rush against	0	2	0	2	0	2	5	1	-0.54	**1.5**
Number of goals from cross field pass and no clear path against	1	3	0	0	2	0	5	2	-0.92	**1.6**
Number of goals from no cross field and no clear path against	4	5	6	6	13	5	11	8	-0.66	**7.3**
No attack possessions differential	-9	49	-3	-60	12	-55	44	22	-0.78	**0.0**
Slow attack possessions differential	103	-151	54	166	-31	88	-158	-71	0.89	**0.0**
Quick attack possessions differential	-39	84	-19	-54	-22	-34	45	39	-0.69	**0.0**
Turnover possessions differential	12	-31	11	45	-17	28	-30	-18	0.87	**0.0**
Odd man rush possessions differential	-7	3	2	19	4	-12	-4	-5	0.39	**0.0**
High pressure used differential	84	-131	4	148	-6	84	-80	-103	0.74	**0.0**

Medium pressure used differential	-61	30	-30	-61	87	-22	27	30	-0.78	0.0
Low pressure used differential	-85	144	-16	-152	-52	-79	152	88	-0.78	0.0
Clear paths in slow attacks differential	15	-27	29	63	-22	19	-62	-15	0.98	0.0
Clear paths in quick attacks differential	3	5	13	4	-18	-3	1	-5	0.43	0.0
Clear paths in turnovers differential	7	-14	8	18	-10	11	-12	-8	0.89	0.0
Clear paths in possessions differential	25	-36	50	85	-50	27	-73	-28	0.97	0.0
Goals from slow attack clear paths differential	6	-6	7	16	-9	6	-18	-2	0.99	0.0
Goals from quick attack clear paths differential	3	-1	4	4	-5	1	-7	1	0.94	0.0
Goals from turnover clear paths differential	3	-2	1	5	0	-2	-2	-3	0.73	0.0
Goals from odd man rushes differential	1	-3	4	2	2	-3	-4	1	0.63	0.0
Goals from common slow attacks differential	2	-3	4	5	-4	8	-12	0	0.88	0.0
Goals from common quick attacks differential	0	4	2	0	-5	-1	2	-2	0.00	0.0
Goals from common turnovers differential	-1	-1	1	2	0	-1	0	0	0.46	0.0
Goals from clear path possessions differential	12	-9	12	25	-14	5	-27	-4	0.99	0.0
Goals from common possessions differential	1	0	7	7	-9	6	-10	-2	0.89	0.0
Clear paths in slow attacks executed differential	5	-24	18	46	-9	17	-43	-10	0.95	0.0
Clear paths in quick attacks executed differential	2	5	13	3	-13	-2	-3	-5	0.54	0.0
Clear paths in turnovers executed differential	2	-11	5	18	-8	7	-7	-6	0.85	0.0
Clear paths executed differential	9	-30	36	67	-30	22	-53	-21	0.96	0.0
Cross field pass opportunities in slow attacks differential	26	-30	41	84	-38	34	-73	-44	0.95	0.0

Cross field pass opportunities in quick attacks differential	1	0	6	8	-6	-1	-1	-7	0.68	0.0
Cross field pass opportunities in turnovers differential	2	-13	5	7	-2	5	-2	-2	0.64	0.0
Cross field pass opportunities in odd man rushes differential	-7	1	-1	19	0	-2	-5	-5	0.55	0.0
Cross field pass opportunities in possessions differential	21	-42	51	118	-45	36	-81	-58	0.93	0.0
Cross field pass opportunity and clear path in possessions differential	17	-14	23	36	-22	15	-37	-18	0.97	0.0
Cross field passes executed differential	15	-36	36	73	-26	27	-52	-37	0.93	0.0
Goals from cross field pass opportunities differential	10	-10	10	18	-7	4	-17	-8	0.97	0.0
Goals from cross field pass and clear path differential	9	-7	4	9	-7	4	-7	-5	0.87	0.0
Goals from cross field pass on odd man rush differential	0	0	2	3	1	-1	-5	0	0.82	0.0
Goals from cross field pass and no clear path differential	1	-3	3	5	-1	1	-4	-2	0.94	0.0
Goals from no cross field and no clear path differential	1	4	4	0	-8	5	-6	0	0.58	0.0

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