

Structure of won medals, most successful teams, and wrestlers by continents at the Olympic Games 2024

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Abstract

This paper defined the structure of medals won by continent, determined the structure of medals won by nation, and identified the best wrestlers by style. Japan, the United States of America, and the Islamic Republic of Iran were the most successful nations. Asian countries won 50% of all medals, while European wrestlers experienced a notable decline in the number of medals (27.77%) and their performance quality. In Greco-Roman wrestling (GR), lower WQ (points per minute), the total number of points scored, and points per match are observed than in Freestyle Wrestling (FS) and Women's Wrestling (WW). This highlights the reduced efficiency and attractiveness of the GR style. Additionally, some nations granted citizenship to foreign wrestlers who subsequently won medals for them in these Olympic Games. The study also pointed out the extremely high efficiency among Japanese female wrestlers, in contrast to the low efficiency (only 16.67%) of European female wrestlers compared to GR and FS. This disparity indicates underdevelopment in women's wrestling in Europe, highlighting areas for further research and improvement. A comprehensive performance analysis of teams and wrestlers is crucial, focusing on techniques, wrestling positions, timing, and overall efficiency. Such analysis could reveal the reasons behind the superior performance of Asian wrestlers compared to their European counterparts and help guide improvements.

Key Words: seniors, Greco-Roman, freestyle, woman wrestling, success

Introduction

Wrestling, one of the oldest Olympic sports, holds a unique place in this prestigious event, embodying tradition and evolution. The Olympic Games represent the pinnacle of global sports competition, offering athletes from various nations and disciplines the chance to strive for excellence and secure their place in history. The Paris 2024 Olympics continued this legacy by showcasing Greco-Roman wrestling, freestyle, and women's wrestling at the highest level. Analyzing the distribution of medals and assessing team efficiency provides valuable insights into trends, strategies, and competitiveness in Olympic wrestling. Such evaluations highlight the dominance of specific nations, styles, or wrestlers and create a foundation for the further development of wrestling as a sport.

Athletes qualify for the Olympic Games by meeting the criteria of the United World Wrestling (UWW) qualification system (UWW, 2023/2024). The number of wrestlers who can qualify in each weight category is determined through three phases. The first phase refers to World Championships 2023: 60 male wrestlers and 30 female wrestlers (90 athletes) earned quotas. The second phase refers to Continental Qualification Tournaments 2024: 96 male wrestlers and 48 female wrestlers (144 athletes) secured spots. The third phase refers to the World Qualification Tournament 2024: 36 male wrestlers and 18 female wrestlers (54 athletes) qualified. In addition to these quotas, two wrestlers participated under the Refugee Olympic Team (competing under the UWW flag, EOR) through special invitations granted for this event. These allocations ensure representation from diverse backgrounds while adhering to the qualification standards.

The Olympic Games represent the pinnacle of athletic achievement for wrestlers, embodying the dream of competing at the highest level and providing an opportunity to win an Olympic medal. Achieving this goal depends on numerous factors, one of which is competitive efficiency. Research indicates that 87,8% of medalists participated in continental championships and all secured medals before winning the Olympic Games. Furthermore, 82,9% competed at world championships, with 91,2% achieving podium finishes (Latyshev et al., 2020). This underscores the importance of sustained success at high-level competitions as a key predictor of Olympic triumphs, reflecting both preparation and competitive readiness.

The analysis of competitive efficiency in major wrestling competitions was initiated over 30 years ago by Tünnemann, who analyzed video recordings and introduced the concept of Wrestler Quality (WQ) defined as the number of points scored per minute (Tünnemann, 2004). With the advancement of technology and greater accessibility to video materials, the last decade has witnessed a growth in studies focusing on analyzing competitive efficiency at major wrestling events. Studies in the fields of specific performance, methodologies and applications of WQ, statistical and tactical analyses of wrestlers, efficiency in preparation for and during Olympic competitions, as well as wrestler performance analysis and tactical approaches (Toupchi, Kohandel&Khodayari, 2014; Tünnemann, 2017; Dokmanac & Slaćanac, 2018; Latyshev et al., 2020; Starčević, 2023), underscore the evolution of wrestling analytics, blending traditional techniques with modern tools to enhance understanding and application in training and competition strategies.

The International Olympic Committee (IOC) defines successful nations based on the number of gold, silver, and bronze medals won (Olympics, 2024). However, the medal standings do not reveal the distribution of medals by continent, nor do they provide insights into team efficiency (number of wrestlers and medals won) or individual wrestler performance based on match duration, number of wins and losses, points scored, and conceded, and other factors.

This study aimed to evaluate the efficiency of countries, present the distribution of wrestling medals by continent, and identify the most successful wrestlers in Greco-Roman, Freestyle, and Women's Wrestling at the Paris 2024 Olympic Games. By outlining the distribution of medal winners by

continent and evaluating both team and individual wrestler performance, this research aims to identify success patterns and offer strategic insights for future Olympic participation. The findings of this study will be valuable to athletes, coaches, sports professionals, and researchers aiming to enhance their understanding of Olympic wrestling.

Methods

The sample consists of 62 countries, with a subsample of 291 wrestlers (GR=97; FS=98; WW=96) who participated in the 2024 Olympic Games in Paris. Among them, 72 wrestlers are medalists from the 2024 Paris Olympics. Data collection was conducted immediately after the conclusion of the 2024 Olympic Games (August). The data were gathered from the UWW database (Arena - Online Results). To validate the data, calculate efficiency (WQ – wrestlers’ quality), determine the distribution of medal winners by continent, and identify the most successful wrestlers, the Python 3.12 programming language (Pandas and NumPy Data Analysis Library) was used. The Microsoft Power BI application was employed for data visualization. Excluding criteria applied during WQ teams’ calculation (teams who won medals with three and less than three wrestlers excluded from the calculation).

Results

General review (all three styles)

The highest number of medals at the 2024 Olympic Games in Paris (OG 2024) was won by wrestlers from Japan, the Islamic Republic of Iran, the United States of America, China, Cuba, and Kyrgyzstan (Figure 1). The most efficient nations (based on the number of wrestlers/number of medals won) include Norway, Denmark, Bahrain (one wrestler, one medal), Chile (two wrestlers, one medal), the Democratic People's Republic of Korea, and Albania (three wrestlers, two medals), as well as Japan (13 wrestlers, 11 medals). In contrast, the least efficient nations (based on the number of wrestlers/number of medals won) include Kazakhstan, Turkey, Azerbaijan, and the USA.

The nations with the largest contingent of wrestlers who failed to secure a medal at the 2024 Olympic Games in Paris include Egypt, Mongolia, and Algeria. Additionally, countries such as Germany, Hungary, Poland, and Serbia stand out, as their wrestlers did not win medals at these Olympic Games, despite winning medals at the 2023 World Championship, which was one of the qualification tournaments. Of the 62 participating countries at the Paris 2024 Olympics, 26 (41.94%) won medals.

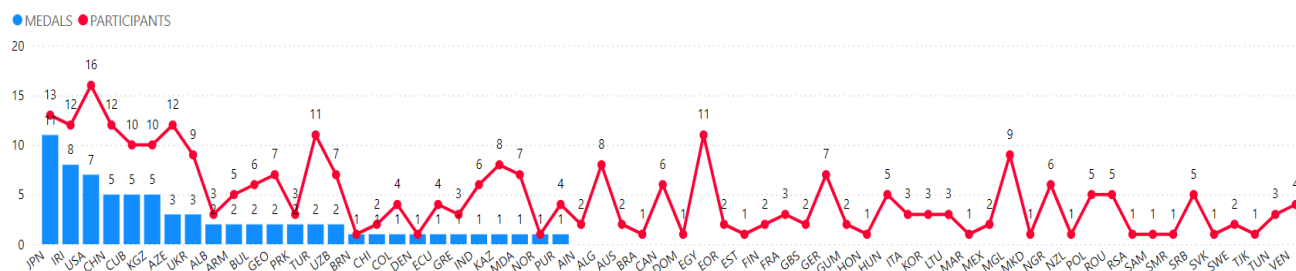


Figure 1 – Number of participants and medals by nations

Japan, the Islamic Republic of Iran, and the United States of America claimed the most medals. Looking at the structure of the medals won, Japan won the most gold medals, followed by Bulgaria, the Islamic Republic of Iran, and the United States of America (Figure 2). The Islamic Republic of Iran, the United States of America, and Ukraine secured the most silver medals, China, Kyrgyzstan, the United States of America, Cuba, and Azerbaijan earned the highest number of bronze medals.

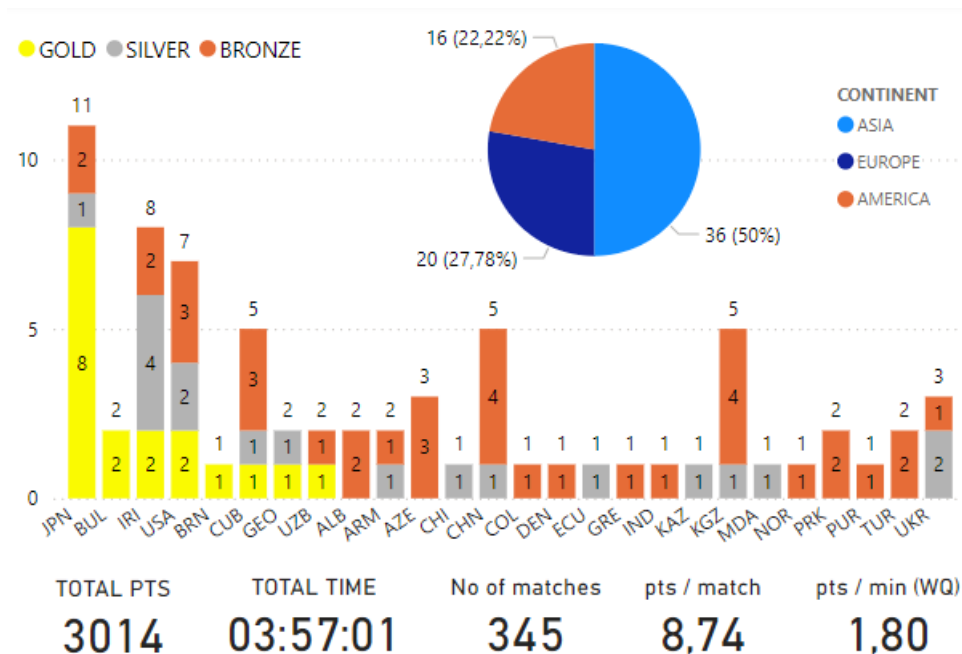


Figure 2 - Structure of medals won by nations

The distribution of medals by continent (Figure 2) shows that 36 medals (50,00%) were won by wrestlers from Asia, 20 medals (27,78%) by wrestlers from Europe, and 16 medals (22,22%) by wrestlers from America. Of the 345 matches in wrestling (all three styles), resulting in 3014 points. The average number of points per match was 8,74 while the efficiency was 1,80 points per minute.

The nations that scored the most points were Japan, the United States of America, and the Islamic Republic of Iran (Table 1), while the nations with the highest lost points were the United States of America, Kyrgyzstan, and Ukraine (Table 2). According to the WQ index, the most successful nations are Norway, Japan, and Bahrain (Table 3).

Table 1. Attack teams' efficiency

Nation	WRES TLERS	TOT_time	WIN bouts	PTS win	WQ WIN (pts/min)
JPN	13	3:16:39	40	318	1,62
USA	16	3:37:55	26	252	1,16
IRI	12	3:17:02	30	241	1,22
CHN	12	2:22:26	16	157	1,10
KGZ	10	3:02:49	22	151	0,83
AZE	12	2:51:42	16	148	0,86
UZB	7	1:52:19	15	136	1,21
UKR	9	2:20:15	13	116	0,83
CUB	10	2:07:20	16	102	0,80
ARM	5	1:25:00	10	86	1,01

Table 2. Defense teams' efficiency

Nation	WRES TLERS	TOT_time	LOST bouts	PTS lost	WQ LOST (pts/min)
USA	16	3:37:55	18	172	0,79
KGZ	10	3:02:49	14	143	0,78
UKR	9	2:20:15	12	138	0,98
CHN	12	2:22:26	13	119	0,84
AZE	12	2:51:42	14	105	0,61
UZB	7	1:52:19	9	98	0,87
IRI	12	3:17:02	12	97	0,49
JPN	13	3:16:39	5	89	0,45
CUB	10	2:07:20	12	84	0,66
MDA	7	0:57:21	8	74	1,29

LEGEND: WRESTLERS – number of wrestlers; **TOT_time** – total time of bouts (all wrestlers), **WIN bouts** – total win bouts, **PTS win**– total win points; **WQ WIN** (win pts/min); **LOST bouts** – total lost bouts, **PTS lost**– total lost points; **WQ lost** (lost pts/min).

Table 3. WQ teams' efficiency

Nation	WQ/min WIN	WQ/min LOST	WQ
NOR	3,80	0,86	2,95
JPN	1,62	0,45	1,16
BRN	1,36	0,47	0,89
PRK	1,74	0,93	0,82
IRI	1,22	0,49	0,73
USA	1,16	0,79	0,37
IND	1,21	0,86	0,35
UZB	1,21	0,87	0,34
GRE	1,11	0,79	0,33
BUL	0,79	0,48	0,31

LEGEND: WQ/min WIN – totally won points/minute; **WQ/min LOST** – lost points/minute; **WQ** - WQ/min WIN - WQ/min LOST

Gold medal winners (Table 4) have an average of 4 matches, wrestle for 19:53 minutes, and produce 1.23 pts/min. The average attack WQ is 1,52 pts/min, while the average defense WQ is 0.29 pts/min.

The Most Successful Index (MSW) is a value that encompasses several parameters of competitive efficiency, allowing for comparisons and rankings of wrestlers across different weight categories and wrestling styles. MSW is calculated as follows:

MSW = CP diff (classification points scored per match – classification points lost per match) – **WQ** (win pts/min – lost pts/min).

The MSW index for gold medal-winning wrestlers at the OG 2024 ranges from 2.88 to 6.63 (Table 2). According to the MSW index, the top three wrestlers are from Japan (Fujinami, Motoki, and Higuchi).

Table 4. Gold medalists' performance (Most Successful Wrestlers – MSW)

Style	Nation	Wrestler	Rank	Time	Win	Lost	TP win	TP lost	Win pts /min	Lost pts /min	CP Win	CP Lost	CPwin/ match	CPlost/ match	WQ	CP diff	MSW indeks
WW	JPN	Akari FUJINAMI	1	0:15:02	4	0	34	2	2,26	0,13	18	0	4,50	0,00	2,13	4,50	6,63
WW	JPN	Sakura MOTOKI	1	0:14:08	4	0	34	8	2,41	0,57	18	1	4,50	0,25	1,84	4,25	6,09
FS	JPN	Rei HIGUCHI	1	0:11:37	4	0	26	4	2,24	0,34	16	2	4,00	0,50	1,89	3,50	5,39
WW	USA	Amit ELOR	1	0:19:44	4	0	31	2	1,57	0,10	13	1	3,25	0,25	1,47	3,00	4,47
GR	IRI	Saeid Morad Gholi ESMAEILI LEIVESI	1	0:17:57	4	0	35	9	1,95	0,50	14	2	3,50	0,50	1,45	3,00	4,45
WW	JPN	Tsugumi SAKURAI	1	0:22:08	4	0	33	5	1,49	0,23	14	2	3,50	0,50	1,27	3,00	4,27
GR	IRI	Mohammadhadi Abdollah SARAVI	1	0:21:03	4	0	28	2	1,33	0,10	14	2	3,50	0,50	1,24	3,00	4,24
GR	JPN	Nao KUSAKA	1	0:17:35	4	0	29	5	1,65	0,28	14	3	3,50	0,75	1,36	2,75	4,11
WW	USA	Sarah Ann HILDEBRANDT	1	0:19:44	4	0	25	4	1,27	0,20	13	1	3,25	0,25	1,06	3,00	4,06
GR	JPN	Kenichiro FUMITA	1	0:17:34	4	0	28	5	1,59	0,28	14	3	3,50	0,75	1,31	2,75	4,06
FS	BUL	Magomed Eldarovitch RAMAZANOV	1	0:20:06	4	0	27	7	1,34	0,35	15	3	3,75	0,75	1,00	3,00	4,00
FS	BRN	Akhmed TAZHUDINOV	1	0:19:03	4	0	26	9	1,36	0,47	15	3	3,75	0,75	0,89	3,00	3,89
FS	GEO	Geno PETRIASHVILI	1	0:23:10	4	0	37	11	1,60	0,47	13	2	3,25	0,50	1,12	2,75	3,87
FS	UZB	Razambek Salambekovitch JAMALOV	1	0:26:12	5	0	38	10	1,45	0,38	17	3	3,40	0,60	1,07	2,80	3,87
FS	JPN	Kotaro KIYOOKA	1	0:20:57	4	0	33	10	1,58	0,48	13	3	3,25	0,75	1,10	2,50	3,60
GR	CUB	Mijain LOPEZ NUNEZ	1	0:24:00	4	0	20	2	0,83	0,08	12	2	3,00	0,50	0,75	2,50	3,25
GR	BUL	Semen Sergeevich NOVIKOV	1	0:24:00	4	0	23	5	0,96	0,21	12	3	3,00	0,75	0,75	2,25	3,00
WW	JPN	Yuka KAGAMI	1	0:24:00	4	0	12	3	0,50	0,13	12	2	3,00	0,50	0,38	2,50	2,88

LEGEND: **Time** – total time of bouts (all wrestlers), **Win**– total win bouts, **Lost** – total lost bouts, **TP win** – total won points; **TP lost** – total lost points; **CP W** – classification points won per match, **CP L** – classification points lost per match; **WQ** (pts/min won – pts/min lost), **CP diff** - classification points difference (CP Win/match – CP Lost/match), **MSW index** (CP diff - WQ)

Greco-Roman style (GR)

The most successful team in GR in terms of the total number of medals is the Islamic Republic of Iran (4 medals), followed by Cuba and Kyrgyzstan (3 medals each). The teams with the largest number of wrestlers who did not win any medals are Egypt, Algeria, Turkey, the USA, and Serbia. Out of a total of 38 nations in the Greco-Roman style, 13 (34,21%) won medals (Figure 3).

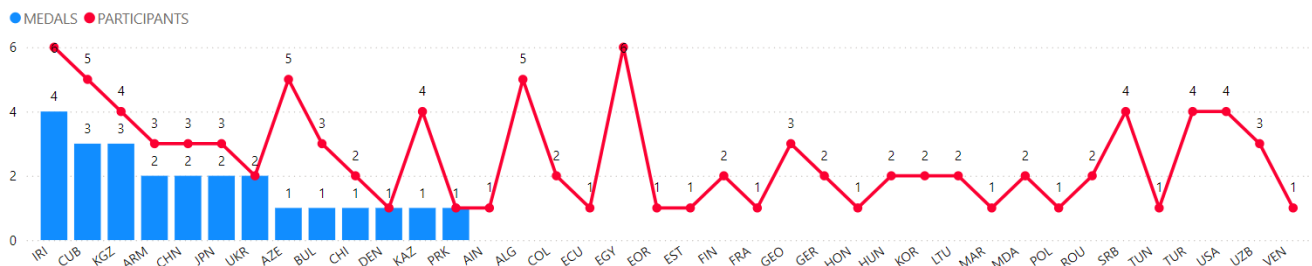


Figure 3 - Number of participants and medals by nations in Greco-Roman style

The Islamic Republic of Iran and Japan claimed the most gold medals, while Kyrgyzstan and Cuba secured the most bronze medals. Wrestlers from Asia captured 54,17% of the medals, and those from Europe earned 29,17% (Figure 4). In the GR, 115 matches were held, with 834 points earned (7,25 points per match and 1,46 points per minute), and the average match duration was 4:59 minutes.

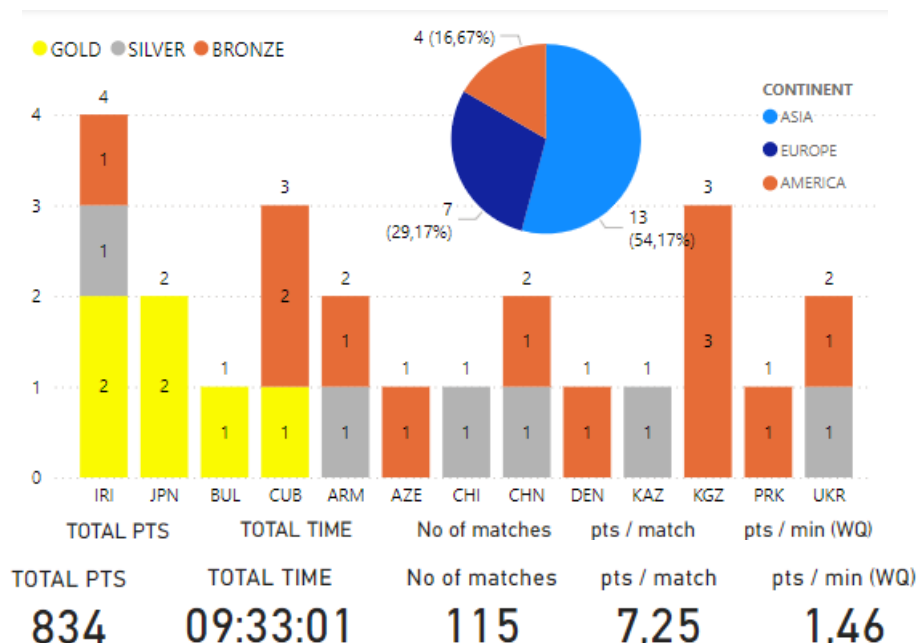


Figure 4 - Structure of medals won by nations in Greco-Roman style

Four gold medalists have a WQ higher than 1,00 (Table 5). One wrestler accumulated over 35 points and recorded the highest number of lost points. Notably, Mijain Lopez Nunez of Cuba, who achieved his fifth Olympic gold medal at these Games, had a WQ of 0,75 pts/min.

Table 5. Greco-Roman style gold medalists' performance (Most Successful Wrestlers – MSW)

Style	Nation	Wrestler	Rank	Time	Win	Lost	TP win	TP lost	Win pts /min	Lost pts /min	CP Win	CP Lost	CPwin/ match	CPlost/ match	WQ	CP diff	MSW indeks
GR	IRI	Saeid Morad Gholi ESMAEILI LEIVESI	1	0:17:57	4	0	35	9	1,95	0,50	14	2	3,50	0,50	1,45	3,00	4,45
GR	IRI	Mohammadhadji Abdollah SARAVI	1	0:21:03	4	0	28	2	1,33	0,10	14	2	3,50	0,50	1,24	3,00	4,24
GR	JPN	Nao KUSAKA	1	0:17:35	4	0	29	5	1,65	0,28	14	3	3,50	0,75	1,36	2,75	4,11
GR	JPN	Kenichiro FUMITA	1	0:17:34	4	0	28	5	1,59	0,28	14	3	3,50	0,75	1,31	2,75	4,06
GR	CUB	Mijain LOPEZ NUNEZ	1	0:24:00	4	0	20	2	0,83	0,08	12	2	3,00	0,50	0,75	2,50	3,25
GR	BUL	Semen Sergeevich NOVIKOV	1	0:24:00	4	0	23	5	0,96	0,21	12	3	3,00	0,75	0,75	2,25	3,00

LEGEND: **Time** – total time of bouts (all wrestlers), **Win**– total win bouts, **Lost** – total lost bouts, **TP win** – total won points; **TP lost** – total lost points; **CP W** – classification points won per match, **CP L** – classification points lost per match; **WQ** (pts/min won – pts/min lost), **CP diff** - classification points difference (CP Win/match – CP Lost/match), **MSW index** (CP diff - WQ)

Freestyle (FS)

The most successful team in Freestyle (FS) wrestling at the OG 2024 is the Islamic Republic of Iran with four medals won. The teams with the highest number of wrestlers who did not win any medals are China, Egypt, and Kazakhstan. Of the 43 nations participating in the FS style, 13 (30,23%) earned medals (Figure 5).

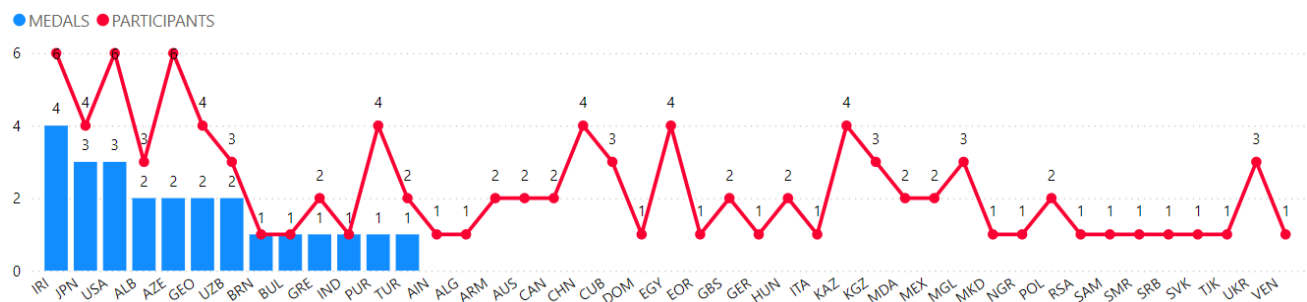


Figure 5 - Number of participants and medals by nations in Freestyle

Japan won the most FS gold medals at the OG 2024, while wrestlers from Japan claimed the most silver medals (Figure 6). A significant portion of the medals, 45,83%, was earned by Asian wrestlers, while 37,50% came from European competitors. The FS wrestling event featured 117 matches, with 1183 points scored (an average of 10,11 points per match and 2,09 points per minute). The average match duration was 4:51 minutes.

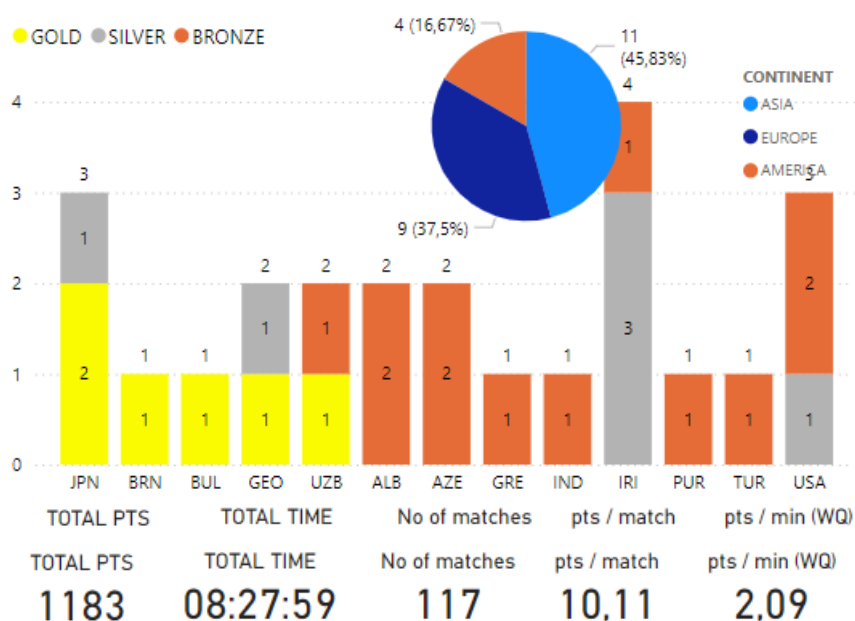


Figure 6 - Structure of medals won by nations in Freestyle

Two wrestlers in FS at the OG 2024 scored more than 35 points (Table 6), while three wrestlers lost fewer than 10 points. The WQ index for FS wrestlers ranged from 0,89 to 1,89. Among all the gold medalists, Higuchi Reil from Japan stands out for his exceptional efficiency, with a WQ of 1,89 pts/min, significantly higher than the others. This indicates his superior performance in terms of points per minute compared to other medalists.

Table 6. Freestyle gold medallists' performance (Most Successful Wrestlers – MSW)

Style	Nation	Wrestler	Rank	Time	Win	Lost	TP win	TP lost	Win pts /min	Lost pts /min	CP Win	CP Lost	CPwin/ match	CPlost/ match	WQ	CP diff	MSW indeks
FS	JPN	Rei HIGUCHI	1	0:11:37	4	0	26	4	2,24	0,34	16	2	4,00	0,50	1,89	3,50	5,39
FS	BUL	Magomed Eldarovitch RAMAZANOV	1	0:20:06	4	0	27	7	1,34	0,35	15	3	3,75	0,75	1,00	3,00	4,00
FS	BRN	Akhmed TAZHUDINOV	1	0:19:03	4	0	26	9	1,36	0,47	15	3	3,75	0,75	0,89	3,00	3,89
FS	GEO	Geno PETRIASHVILI	1	0:23:10	4	0	37	11	1,60	0,47	13	2	3,25	0,50	1,12	2,75	3,87
FS	UZB	Razambek Salambekovitch JAMALOV	1	0:26:12	5	0	38	10	1,45	0,38	17	3	3,40	0,60	1,07	2,80	3,87
FS	JPN	Kotaro KIYOOKA	1	0:20:57	4	0	33	10	1,58	0,48	13	3	3,25	0,75	1,10	2,50	3,60

LEGEND: **Time** – total time of bouts (all wrestlers), **Win**– total win bouts, **Lost** – total lost bouts, **TP win** – total won points; **TP lost** – total lost points; **CP W** – classification points won per match, **CP L** – classification points lost per match; **WQ** (pts/min won – pts/min lost), **CP diff** - classification points difference (CP Win/match – CP Lost/match), **MSW index** (CP diff - WQ)

Woman Wrestling (WW)

The most successful team in terms of total medals won in WW is Japan, with six medals, followed by the United States of America with four, and China with three medals won. The teams with the most wrestlers who did not win any medals include Mongolia, India, and Nigeria. Of the 36 nations competing in women's wrestling, 12 (33,33%) won medals (Figure 7).

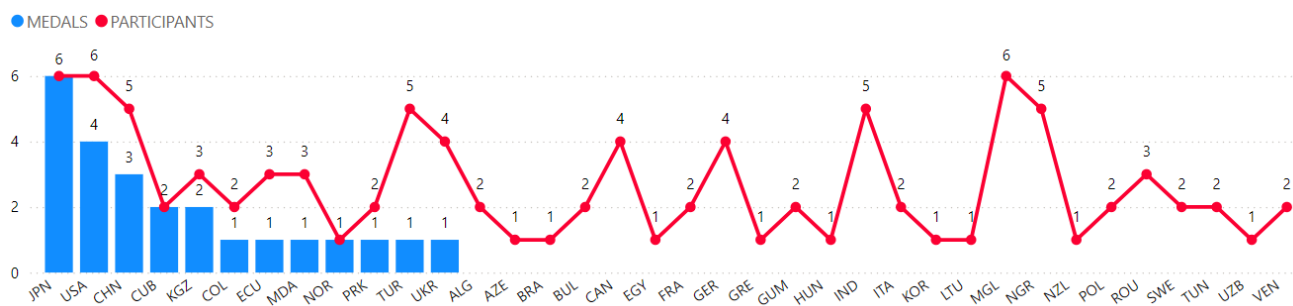


Figure 7 - Number of participants and medals by nations in Woman wrestling

Japan won the most gold medals, while wrestlers from China claimed the highest number of bronze medals. Wrestlers from Asia secured 50,00% of the total medals, while wrestlers from America won 33,33%, and European wrestlers earned only 16.67% of the medals (Figure 8). In women's wrestling, 113 matches took place, with 997 points scored (8,82 points per match and 1,86 points per minute), and the average match duration was 4:42 minutes.

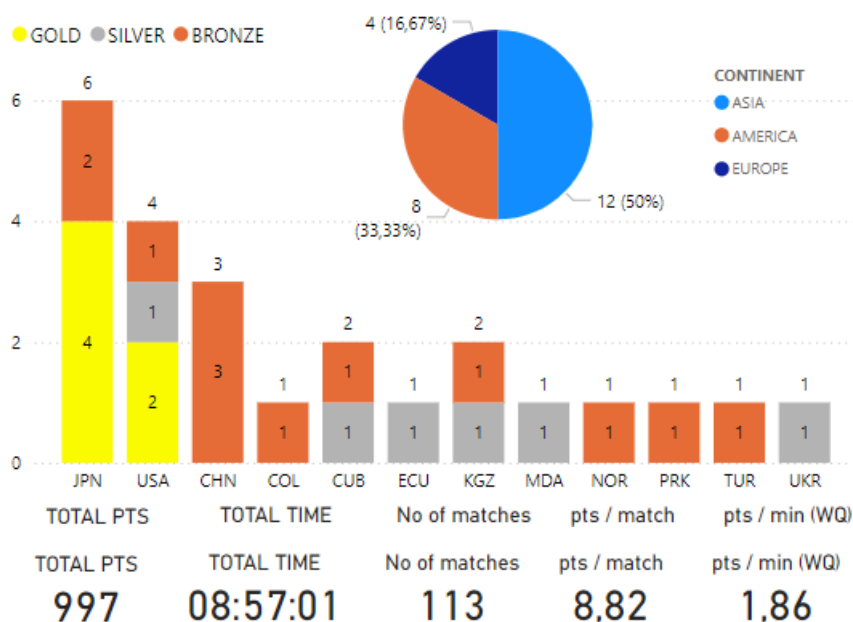


Figure 8 - Structure of medals won by nations in Woman wrestling

Four wrestlers scored over 30 points (Table 7). The gold medallists lost between 2 to 8 points. The wrestler with the best point differential (32 points) was Fujinami Akari. The WQ index values range from 0,38 to 2,13. By all efficiency indicators, the standout wrestler is Fujinami Akari (Japan), whose point differential is 32 points and whose WQ is 2,13.

Table 7. Women wrestling gold medallist's performance (Most Successful Wrestlers – MSW)

Style	Nation	Wrestler	Rank	Time	Win	Lost	TP win	TP lost	Win pts /min	Lost pts /min	CP Win	CP Lost	CPwin/ match	CPlost/ match	WQ	CP diff	MSW indeks
WW	JPN	Akari FUJINAMI	1	0:15:02	4	0	34	2	2,26	0,13	18	0	4,50	0,00	2,13	4,50	6,63
WW	JPN	Sakura MOTOKI	1	0:14:08	4	0	34	8	2,41	0,57	18	1	4,50	0,25	1,84	4,25	6,09
WW	USA	Amit ELOR	1	0:19:44	4	0	31	2	1,57	0,10	13	1	3,25	0,25	1,47	3,00	4,47
WW	JPN	Tsugumi SAKURAI	1	0:22:08	4	0	33	5	1,49	0,23	14	2	3,50	0,50	1,27	3,00	4,27
WW	USA	Sarah Ann HILDEBRANDT	1	0:19:44	4	0	25	4	1,27	0,20	13	1	3,25	0,25	1,06	3,00	4,06
WW	JPN	Yuka KAGAMI	1	0:24:00	4	0	12	3	0,50	0,13	12	2	3,00	0,50	0,38	2,50	2,88

LEGEND: Time – total time of bouts (all wrestlers), Win– total win bouts, Lost – total lost bouts, TP win – total won points; TP lost – total lost points; CP W – classification points won per match, CP L – classification points

lost per match; **WQ** (pts/min won – pts/min lost), **CP diff** - classification points difference (CP Win/match – CP Lost/match), **MSW index** (CP diff - WQ)

Discussion

Comparing the data from the previous 2020 Olympic Games (OG 2020), wrestlers from Europe (OG 2020: 35 medals; OG 2024: 20 medals) and Africa (OG 2020: 2 medals; OG 2024: 0 medals) won significantly fewer medals in OG 2024. Meanwhile, Asian wrestlers made notable progress, securing 50% of all medals in OG 2024 (OG 2020: 23 medals; OG 2024: 36 medals). Six European teams that won 9 medals at OG 2020 did not secure any medals at OG 2024. A key reason for the decline in European medals is the absence of Russian and Belarusian wrestlers, who participated in OG 2020 with 24 athletes and won 10 medals. Wrestlers who had won medals at the 2023 World Championships but failed to secure any at OG 2024 include athletes from Hungary, Serbia, Germany, and Poland. In contrast, Japan (OG 2020: 7 medals; OG 2024: 11 medals) and the Islamic Republic of Iran (OG 2020: 4 medals; OG 2024: 8 medals) showed substantial improvement compared to the previous Olympic Games. Both countries were among the most successful, with Japan achieving 11 medals from 13 wrestlers and Iran winning 8 medals from 12 wrestlers. Factors such as facilities, physiological aspects, management, and psychological elements played a key role in the success of the Iranian Greco-Roman wrestling team at the 2012 Olympic Games in London (Toupchi et al., 2014).

The results indicate that the Greco-Roman (GR) style at the OG 2024 has a lower WQ value (1.46 pts/min), as well as fewer points and points per match compared to Freestyle (FS) (2,09 pts/min) and Women's Wrestling (WW) (1,86 pts/min). However, these efficiency indicators for GR suggest a more detailed analysis of techniques and rule modifications to enhance the attractiveness of the Greco-Roman style. In all three styles, WQ values at OG 2024 have increased (GR = 1,46; FS = 2,09; WW = 1,86) compared to OG 2020 (GR = 1,32; FS = 1,72; WW = 1,84), which aligns with previous research (Tünnemann, 2017; Dokmanac & Slačanac, 2018; Starčević, 2023). The increase in efficiency and WQ values across all three wrestling styles may be attributed to improved conditioning, mental preparation, and technical-tactical training of Asian wrestlers. Further, in-depth research into the technical and tactical approaches is essential to identify the factors contributing to their enhanced efficiency at the Olympic Games.

For the first time in Olympic history, Asian wrestlers won more medals than those from Europe in the Greco-Roman (GR) style. This is also supported by the fact that only 20 medallists (27.7%) came from Europe. Greco-Roman wrestlers earned 883 technical points, significantly fewer compared to the Freestyle (FS) (1,183 points) and Women's Wrestling (WW) (997 points) categories. Furthermore, only seven GR medallists achieved a WQ (win points per minute) of 1.00 pts/min, of which four were gold medallists. The lower efficiency may be attributed to the absence of Russian and Belarusian wrestlers, whose performance at the OG 2020 was significantly high. The small number of points earned in GR may be due to the rule of technical superiority, which is set at 8 8-point difference in GR, whereas FS and WW require a 10-point difference. Therefore, WQ (pts/min) is a more accurate

and realistic efficiency indicator. All of this highlights the lower performance of GR wrestlers and the need for a detailed analysis of competitive efficiency to improve both the effectiveness and attractiveness of the Greco-Roman style.

The competition in freestyle (FS) wrestling has been significantly enhanced by wrestlers of Russian and Belarusian nationality competing for other countries such as Hungary, Greece, Slovakia, and Serbia. This has contributed to Bahrain winning a gold medal and Albania securing two bronze medals. Furthermore, European wrestlers claimed 37,5% of the FS medals, outperforming those in Greco-Roman (GR) and women's wrestling (WW). This increase in performance compared to the 2020 Olympics can be seen in the rise of technical points scored (OG 2020: 1046; OG 2024: 1183), the improvement in the WQ value (OG 2020: 1,72; OG 2024: 2,09), and points per match (OG 2020: 9,18; OG 2024: 10,11). Japan, the Islamic Republic of Iran, and the United States claimed 10 medals, almost 30% of all FS medals, reflecting the strong tradition and dedicated training in freestyle wrestling in these countries.

Japan has been a dominant force in women's wrestling since 1989 when they won their first team world championship. Japan has had a world champion at every world championship since 1989 and has won the team championship 19 times. They have won 136 world championship medals (Curby & Jomand, 2015). In the context of the 2024 Olympics, Japan's wrestlers have secured 25% of all WW medals, with an outstanding 100% efficiency rate—6 wrestlers won 4 gold and 2 bronze medals. This impressive performance can be attributed to Japan's long-standing women's wrestling tradition, exceptional technical and physical preparation, and strong discipline. On the contrary, European female wrestlers showed much lower efficiency compared with (GR) and freestyle (FS) wrestling, with only 16,67% of medals being claimed by them. This indicates the need for further development in women's wrestling within Europe, highlighting areas for future research and progress.

Conclusions

This study defines the structure of medal wins by continent, outlines the medal distribution by nation, and identifies the top wrestlers by style. It also analyses the competitive efficiency of nations and athletes, highlighting specific weaknesses in terms of performance.

The findings show that Asian nations claimed 50% of all medals, while European wrestlers showed a decline in the medals number and the quality of their performances. Although there was an increase in efficiency compared to the previous Olympic Games, the performance of Greco-Roman wrestlers remains low. Additionally, a noticeable trend is the rise in wrestlers who, after changing nationality, won medals for other nations. Japan's dominance in women's wrestling (WW) is confirmed, with all their wrestlers securing medals, showcasing a 100% efficiency rate.

Given these insights, there is a need for a detailed analysis of the technical and tactical actions of teams and individual wrestlers, including techniques, wrestling positions, time spent, and overall

efficiency. This will help determine the true reasons behind the superior performance of Asian wrestlers compared to their European counterparts, particularly in terms of medal wins.

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