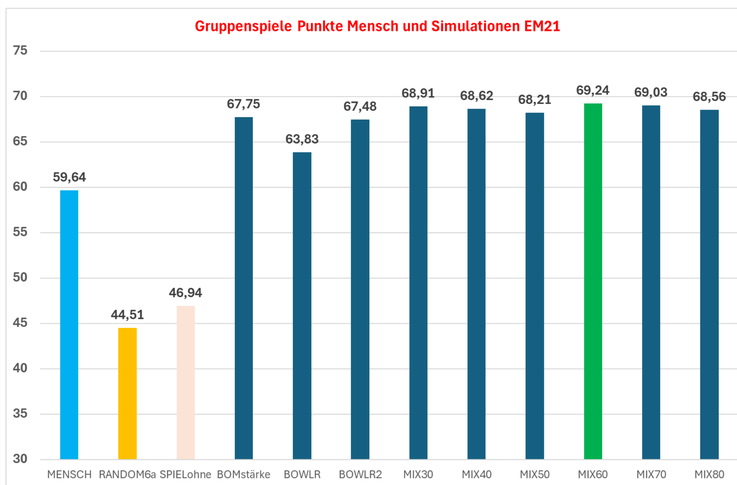
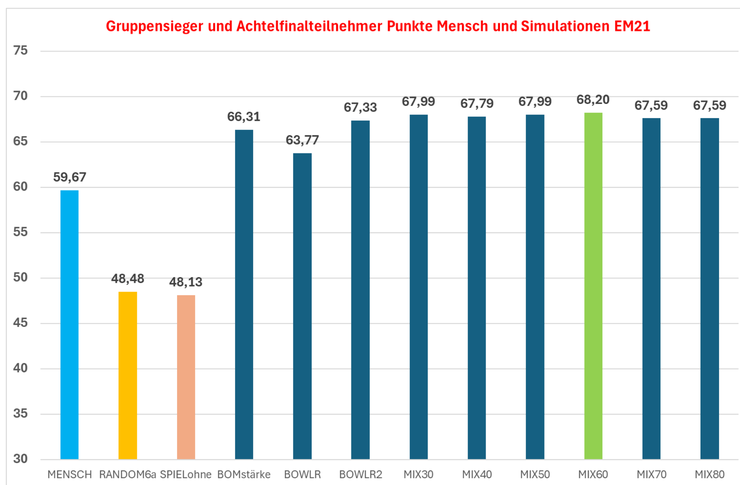
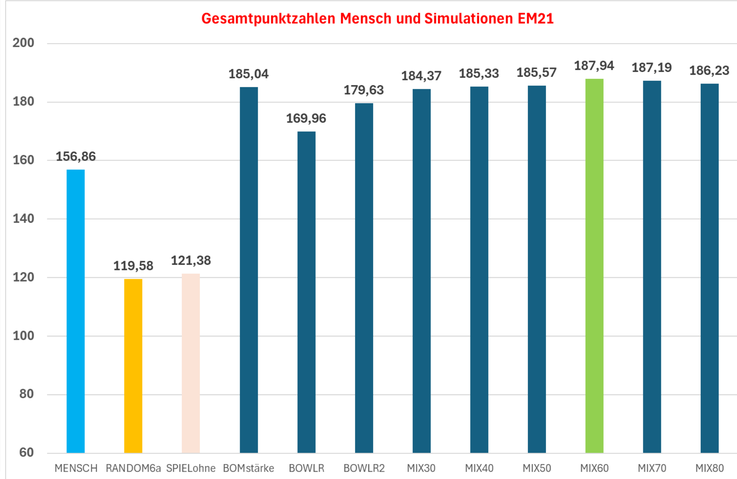
Simulation der Fußball-Europameisterschaft 2024

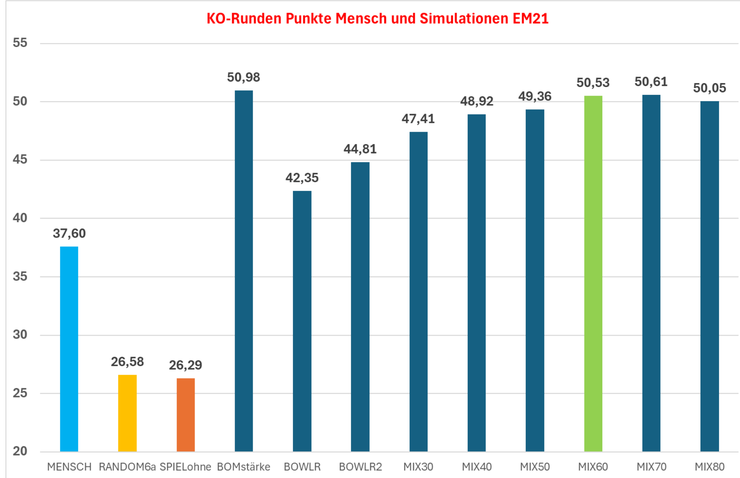
EM 2021 Simulationen vs. Mensch – Die Suche nach der optimalen Strategie

		MENSCH	RANDOM6a	SPIELohne	BOMstärke	BOWLR	BOWLR2	MIX30	MIX40	MIX50	MIX60	MIX70	MIX80	BEST
A	MAX	25	22	30	27	24	28	27	30	28	30	28	27	30
	MW	10,8382	7,70838	7,36648	12,649162	10,4905	10,855866	11,4949721	11,7139665	11,8804469	12,0502793	12,1106145	12,326257	12,649162
	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	ri E.	301	154	317	509	409	459	498	482	498	496	502	483	509
B	MAX	23	24	25	24	26	27	26	27	30	25	27	28	30
	MW	10,4978	8,20335	7,81564	12,030168	12,40447	14,141899	13,873743	13,6234637	13,4335196	13,5005587	13,0715084	13,0480447	14,1418994
	MIN	0	0	0	0	0	3	0	3	0	3	0	0	3
	ri E.	367	128	295	451	561	739	735	685	706	655	656	639	739
C	MAX	29	21	26	31	28	31	28	28	28	28	30	32	32
	MW	12,9699	8,46927	8,01676	16,634637	14,0067	14,694972	14,9530726	15,1307263	15,2748603	15,4391061	15,3664804	15,677095	16,6346369
	MIN	0	0	0	3	0	3	3	3	3	3	3	3	3
	ri E.	447	135	317	655	561	492	530	559	555	561	571	574	655
D	MAX	25	21	23	23	22	24	26	24	25	25	22	25	26
	MW	9,75446	6,95084	8,0067	10,849162	9,669274	10,486034	10,7564246	10,7642458	10,7620112	11,1351955	11,203352	11,1530726	11,203352
	MIN	0	0	0	3	0	0	0	0	0	0	0	0	3
	ri E.	295	153	369	247	330	457	439	392	368	375	370	364	457
E	MAX	22	24	24	24	25	27	30	25	24	29	24	25	30
	MW	7,83259	6,94413	7,75642	7,5173184	8,869274	9,0905028	9,26703911	8,93519553	8,60111732	8,74189944	8,58659218	8,42793296	9,26703911
	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	ri E.	260	146	355	290	338	369	408	381	375	387	400	353	408
F	MAX	20	25	23	26	26	24	23	24	23	27	25	24	27
	MW	7,7433	6,23017	7,97542	8,0670391	8,391061	8,2122905	8,56536313	8,4547486	8,2547486	8,37653631	8,21787709	8,39776536	8,56536313
	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	ri E.	251,0	144	415	408	373	386	412	383	364	398	383	414	415
GSP	MAX	96	86	86	109	94	103	104	104	105	108	104	102	109
	MW	59,6362	44,5061	46,9374	67,747486	63,83128	67,481564	68,9106145	68,6223464	68,2067039	69,2435754	68,5564246	69,0301676	69,2435754
	MIN	17	9	13	36	36	34	39	37	37	37	36	38	39
AFT	MAX	80	68	69	82	83	82	84	84	83	84	82	84	84
	MW	59,6693	48,4763	48,1253	66,306998	63,77088	67,3307	67,993228	67,7923251	67,9909707	68,2031603	67,5914221	67,5914221	68,2031603
	MIN	33	33	32	52	44	52	50	48	54	51	51	52	54
VOR	MAX	173	143	142	185	169	180	174	183	174	181	183	174	185
	MW	119,257	92,9989	95,0914	134,06546	127,6129	134,82054	136,958239	136,413093	136,211061	137,411964	136,188488	136,583521	137,411964
	MIN	56	46	49	95	88	101	94	96	94	102	94	95	102
AFSP	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	MW	5,22348	2,13318	2,09819	5,96614	5,223476	5,8871332	6,07562077	6,28442438	6,3013544	6,5778781	6,17607223	6,2234763	6,5778781
	MAX	20	14	18	21	20	24	25	20	23	26	26	27	27
VFTN	MIN	0	0	0	6	6	6	6	6	6	6	6	6	6
	MW	19,7743	16,1242	15,6027	23,227991	21,76524	22,957111	23,0248307	23,5801354	23,5530474	23,5733634	23,261851	23,5801354	23,5801354
	MAX	36	36	42	36	42	42	42	42	42	42	42	42	42
VFSP	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	MW	1,75169	0,66704	0,72348	3,0891648	1,803612	1,9616253	2,33408578	2,51580135	2,73927765	2,89954853	2,71896163	2,93905192	3,08916479
	MAX	11	8	10	14	14	16	13	11	17	17	16	16	17
HFTN	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	MW	6,57336	4,55869	4,77991	10,594808	8,129797	8,7934537	9,251693	9,58352144	9,45711061	9,81264108	9,95485327	9,88374718	10,5948081
	MAX	21	28	21	21	28	28	21	28	28	28	28	28	28
HFSP	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	MW	0,70993	0,29571	0,36569	1,4232506	0,722348	0,7404063	1,03160271	1,13995485	1,33069977	1,35327314	1,25733634	1,42325056	1,42325056
	MAX	8	8	10	8	14	8	9	12	12	14	11	16	16
FTN+SP	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	MW	2,23702	1,6219	1,58126	4,4954853	2,990971	2,5744921	3,4785553	3,7731377	3,82957111	4,11738149	4,23476298	4,37471783	4,49548533
	MAX	24	22	24	24	24	24	24	24	24	24	24	24	24
PLATZ	MIN	0	0	0	0	0	0	0	0	0	0	0	0	0
	MW	1,32957	1,18059	1,13431	2,1817156	1,876975	1,8927765	2,21557562	2,25959368	2,1489842	2,19413093	2,44243792	2,18510158	2,44243792
	MAX	14	17	17	14	20	17	17	17	20	17	17	17	20
KO GES	MIN	0	0	0	6	6	6	6	6	6	6	6	6	6
	MW	37,5993	26,5813	26,2856	50,978555	42,3465	44,806998	47,4119639	48,9198646	49,3600451	50,5282167	50,0462754	50,6094808	50,9785553
	MAX	115	107	102	121	142	111	116	122	144	132	127	128	144
GESAMT	MIN	0	67	61	119	101	117	113	118	124	130	124	130	130
	MW	156,857	119,58	121,377	185,04402	169,9594	179,62754	184,370203	185,332957	185,571106	187,940181	186,234763	187,193002	187,940181
	MAX	259	213	207	276	269	264	274	272	304	276	272	296	304









Unsere Simulationsstrategie

Stärke Nationalspieler → Marktwerte

Stärke Nationalteam Länderspielstatistik → Weltrangliste

Torwart (2)
Abwehr (6)
Mittelfeld (7)
Sturm (4)
Beste Startelf (11)
Bank (12)

Mittelwerte + Anpassung

z.B. =WENN(F5<5;10;WENN(F5<10;13;WENN(F5<13;15;WENN(F5<16;17;WENN(F5<19;19;F5)))))

Anpassung der Weltranglistenpunkte

Grundstärke=(Punktzahl-a) /b

mstwm
msdem
msmim
msofm
ms11m
msbam

mstww
msdew
msmiw
msofw
ms11w
msbaw

z.B.
= 0,6 *mstwm
+ 0,4 *mstww

TEAMPARA-METER
mstw
msde
msmi
msof
ms11
msba

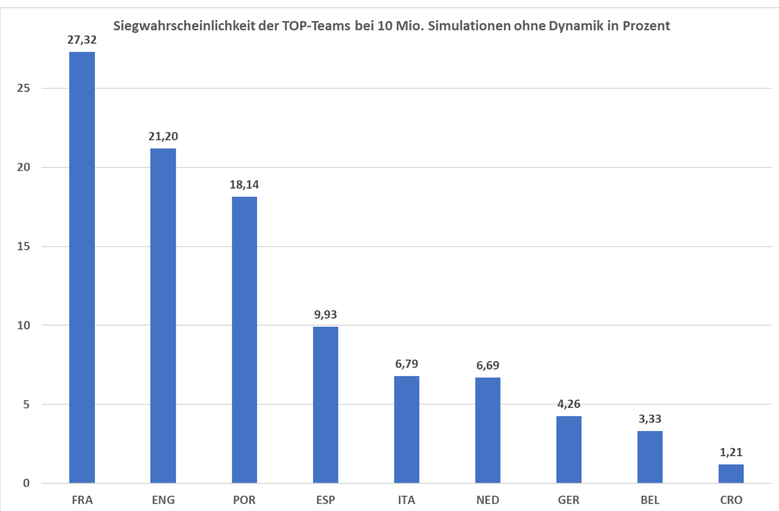
Direkte Vergleiche

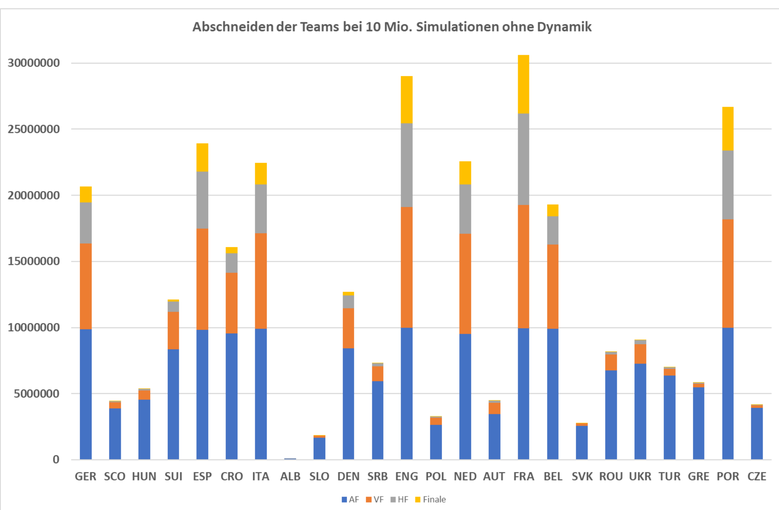
```
if modusdynamik=true then
begin
  if enda>endb then          //Team1 gewonnen
   begin msof[team1]:=msof[team1]+2;msde[team1]:=msde[team1]+2;end;
  if enda<endb then          //Team2 gewonnen
   begin msof[team2]:=msof [team2]+2;msde[team2]:=msde[team2]+2;end;
  if enda>2 then             //Team 1 ab 3 Tore
   begin msof[team1]:=msof[team1]+enda-1;dec(msde[team2]);inc(msmi[team1]);end;
  if endb>2 then             //Team 2 ab 3 Tore
   begin msof[team2]:=msof[team2]+endb-1;dec(msof[team1]);inc(msmi[team2]);end;
  if enda=0 then             //Team 1 ohne Tor
   begin msof[team1]:=msof[team1]-2;msde[team2]:=msde[team2]+2;inc(msmi[team2]);end;
  if endb=0 then             //Team 2 ohne Tor
   begin msof[team2]:=msof[team2]-2;msde[team1]:=msde[team1]+2;inc(msmi[team1]);end;
end;
```

```
procedure spiel; {Simulation Gruppenspiel}
begin
 h1a:=0;h1b:=0;h2a:=0;h2b:=0;
 //ZUORDNUNG MANNSCHAFTSSTÄRKEN
 an1:=round(msofa+0.5*msmia+0.25*ms11a); //Angriffsstärke Team1
 ab1:=round(mstwa+1.5*msdea+0.5*msmia+0.25*ms11a);//Abwehrstärke Team1
 an2:=round(msofb+0.5*msmib+0.25*ms11b); //Angriffsstärke Team2
 ab2:=round(mstwb+1.5*msdeb+0.5*msmib+0.25*ms11b);//Abwehrstärke Team1
 if modusls=true then … //wenn Länderspielstatistik eingehen soll
 //1.Halbzeit
 for z:=1 to 3 do begin
   if random(an1)>random(ab2) then //Mannschaft 1 Angriff
    begin inc(h1a);an1:=round(0.9*an1);inc(ab2);inc(ab1); end;
   if random(an2)>random(ab1) then //Mannschaft 2 Angriff
    begin inc(h1b);an2:=round(0.9*an1);inc(ab1);inc(ab2) end;
 end;
 //HALBZEITKORREKTUREN //Wechseloptionen (Bank)
 an1:=round(an1+random(msbaa+2));an2:=round(an2+random(msbab+2))
 ab1:=ab1+msbaa+1;ab2:=ab2+msbab+1;
 //2.Halbzeit
 for z:=1 to 3 do
 begin
   if random(an1)>random(ab2) then //Mannschaft 1 Angriff
    begin inc(h2a);an1:=round(0.9*an1);inc(ab2);inc(ab1) end;
   if random(an2)>random(ab1) then //Mannschaft 2 Angriff
     begin inc(h2b);an2:=round(0.9*an1);inc(ab1);inc(ab2) end;
 end;
   enda:=h1a+h2a;endb:=h1b+h2b; //Endergebnis
end;
```

Simulationsergebnisse zur EM 2024 (Stand Februar)

Ergebnisse ohne Dynamik





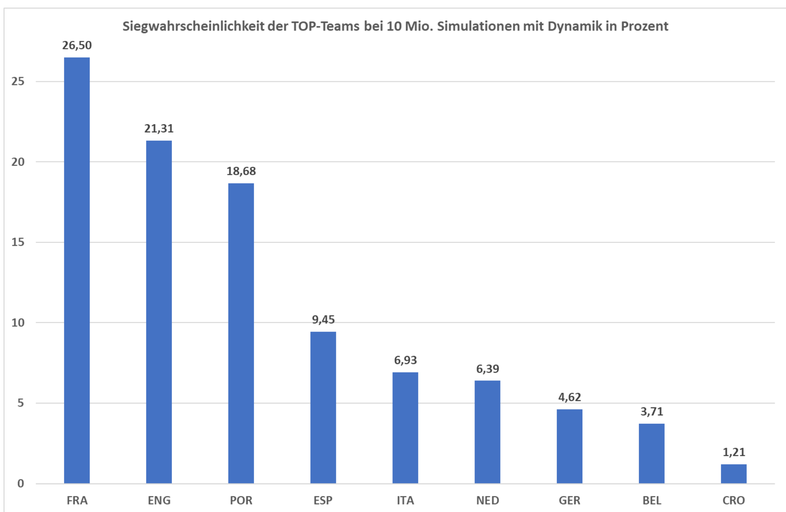
Platz	Nation	Wahrscheinlichkeit
1	FRA	27,32019
2	ENG	21,19527
3	POR	18,14101
4	ESP	9,92742
5	ITA	6,79444
6	NED	6,68741
7	GER	4,26041
8	BEL	3,32817
9	CRO	1,20825
10	DEN	0,50984
11	SUI	0,32818
12	UKR	0,08984
13	SRB	0,05668
14	ROU	0,05524
15	AUT	0,04056
16	POL	0,01661
17	TUR	0,01337
18	HUN	0,01318
19	SCO	0,0052
20	GRE	0,00356
21	CZE	0,00226
22	SVK	0,00146
23	SLO	0,00144
24	ALB	0,00001

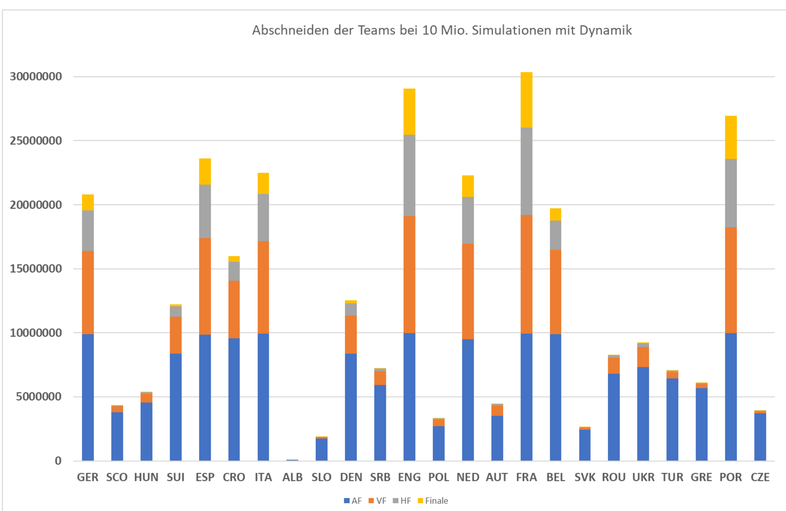
Details der 10 Mio.- Simulation mit Dynamik

Nation	Punkte	Tore	Gegentor	G1	G2	G3	AF	VF	HF	Finale	Europame	Siegwahrs	Vize	Dritter/Vie
GER	71110965	62241366	23657262	7571624	1939696	407268	9875916	6531194	3137337	1257827	461680	4,6168	796147	1879510
SCO	21773758	28252939	54289307	241636	1370010	3429380	3807631	464865	60467	5733	546	0,00546	5187	54734
HUN	25323722	29217496	49322264	358005	1779535	3847794	4541805	692526	105803	12191	1372	0,01372	10819	93612
SUI	46844878	38762294	31205262	1828096	4911111	2316771	8376938	2887355	793322	175496	37435	0,37435	138061	617826
ESP	63688103	49577853	23788130	4410572	3473079	2092947	9850319	7553825	4166972	2038949	945489	9,45489	1093460	2128023
CRO	45408170	48745291	35344385	1491092	2862522	5559982	9590162	4495487	1481048	439638	120978	1,20978	318660	1041410
ITA	58947606	58373532	25660884	4096412	3660363	2226436	9921108	7226855	3691357	1650374	693052	6,93052	957322	2040983
ALB	1775913	10042218	81945495	584	6703	119321	69238	1685	50	1	0	0	1	49
SLO	14168097	19972834	63384081	27415	635609	2320441	1747035	126642	13365	1351	123	0,00123	1228	12014
DEN	45301091	41050782	37596877	927553	5712896	2631283	8388659	2961939	961372	235730	51091	0,51091	184639	725642
SRB	29786576	31213045	45023448	264695	2571825	4916427	5918242	1071542	215744	36352	5323	0,05323	31029	179392
ENG	77605483	71863358	18095613	8780158	1079524	132678	9987466	9119068	6369544	3599840	2131129	21,31129	1468711	2769704
POL	17880126	22972260	57584408	72254	617998	3859336	2703747	513698	86604	12472	1589	0,01589	10883	74132
NED	56665565	49308767	30616941	2656724	5939382	1164052	9492895	7474958	3627326	1695027	639304	6,39304	1055723	1932299
AUT	20582089	26038473	52274357	128213	884156	4707065	3496023	802499	154204	25418	3632	0,03632	21786	128786
FRA	71932275	63815179	21658973	7142487	2558770	269901	9945697	9269500	6813163	4331590	2649839	26,49839	1681751	2481573
BEL	73204535	64842788	23412321	8099426	1494354	348253	9910583	6555470	2276392	980094	371457	3,71457	608637	1296298
SVK	16762478	22576881	54704474	127307	965473	2439489	2426414	175693	17600	1520	156	0,00156	1364	16080
ROU	36269395	37006904	44998891	776304	3541293	3775290	6809676	1232054	217329	37977	5773	0,05773	32204	179352
UKR	38998471	35148877	36459764	996349	3999080	3438410	7336217	1555058	297354	58502	9679	0,09679	48823	238852
TUR	33480333	33158662	41726291	296201	4122741	3384734	6430406	512088	104294	15752	1613	0,01613	14139	88542
GRE	30006190	37017067	52823543	245613	3328906	3552365	5675949	338178	56304	6872	542	0,00542	6330	49432
POR	81080289	71745400	16276195	9369404	561570	62419	9990092	8257606	5325553	3378134	1867961	18,67961	1510173	1947419
CZE	22648723	31209262	62304362	88609	1986255	3002057	3707782	180215	27496	3160	237	0,00237	2923	24336

Top-Favorit: Frankreich

Ergebnisse mit Dynamik





Platz	Nation	Wahrscheinlichkeit i
1	FRA	26,49839
2	ENG	21,31129
3	POR	18,67961
4	ESP	9,45489
5	ITA	6,93052
6	NED	6,39304
7	GER	4,6168
8	BEL	3,71457
9	CRO	1,20978
10	DEN	0,51091
11	SUI	0,37435
12	UKR	0,09679
13	ROU	0,05773
14	SRB	0,05323
15	AUT	0,03632
16	TUR	0,01613
17	POL	0,01589
18	HUN	0,01372
19	SCO	0,00546
20	GRE	0,00542
21	CZE	0,00237
22	SVK	0,00156
23	SLO	0,00123
24	ALB	0