Moroccan tourist portfolio efficiency with the mean-variance approach

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Abstract

Nowadays, the major objective of all destinations is the development. Develop their attractions, their management strategy to cope with the competition and attract the maximum number of tourists, satisfy and retain them. This paper analyses the Moroccan destination performance with the use of the mean-variance shortage function approach. This method permits to help destination decision-makers to minimize the instability and maximize the return of inbound tourism. Accordingly, to optimize its tourism strategy, the Moroccan tourism authority can choose a combination of tourist origins according to its preference in terms of risk. The Results allow us to say that Moroccan Destination Management Organisations (DMOs) have ways for adjustment to achieve best performing strategy. The main contribution of this paper is both empirical and managerial.

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Keywords: tourism; mean-variance; shortage function; efficiency; destination management organisations; Morocco.

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Introduction

With 12% of global GDP and 8% of global employment, tourism has certainly become, as confirmed by the UNWTO, the leading industry in the world. One of the first economic pillars in some countries, it is also a major player in development and the fight against poverty. In Morocco, tourism is considered as a national priority. In addition to its Mediterranean climate, the country is characterized by a wide variety of landscapes that satisfy all tastes. Its cultural wealth, its gastronomy and its various traditions, symbolizing its history of more than 2500 years.

In the fact of the crisis that has been rocking the global economy since 2008 the Moroccan tourism industry had its best years. The importance of this sector is reflected by major projects that keep coming for a decade already. Since the royal speech of January 10, 2001 edifying for a new policy that draws tourism a national priority, the Moroccan tourism policy has taken an unprecedented twist with the
launch of “Vision 2010” and “Vision 2020” (Peypoch and Sbai, 2011) which implements the guidelines of HM king. After that date, the country has set targets tourism, and since, it only earns ranks in several sectors. On the other hand, the tourism sector shows considerable instability in demand. Decreased or increasing tourist arrivals affect positively or negatively the national economy. So each country must hold firm the flows of tourism demand. It should be noted also that the change in demand is often linked to political, social and economic variables; the Arab spring is a recent example.

In a recent paper, Botti, Goncalves and Ratsimbanierana (2012) used a mean-variance approach to help French DMO to minimize the instability and maximize the return of inbound tourism. In this paper, we will use a similar approach to gauge the less efficient Moroccan DMO to improve their tourism inbound by investing in marketing policy.

**Contextual setting**

Indeed, the results recorded in 2010, 10 million of tourists were almost reached and the accommodation capacity has reached about 175,000 beds and nearly 57 billion dirhams (1 Euro=11 Dhs approximately) foreign exchange earnings. The role played by private and public institutions in the conduct of this strategy is major, what encouraged more international players in the tourism sector, hospitality in particular, which is a complex sector and it’s constantly changing.

This sector of hospitality is considered one of the main foundations of the tourism industry in Morocco; it addresses two types of actors, international and local who share the tourism areas. These actors are classified in categories so aiming at their customers. Thanks to the efforts of the various actors engaged in this new strategy. Today, Morocco counts many international references in the hotel business as the Ritz Carlton, or, major tourism destinations as Marrakech and Tangier. Distribution in general is rather appropriate to the tourism strategy; the country has more than 1600 tourism establishments with 16% of hotels from 1 to 3 stars, 25% of 4 stars hotels, 24% of five stars hotels within 3% of Luxury. The international chains are present in all the main cities of the Kingdom (Peypoch and Sbai, 2011). What lends credibility to the image of Morocco as a destination is the influx of international brands renowned; they helped to strengthen the national capacity of accommodation and its quality. In 2012, the bed capacity of hotels should to grow more. More than 13 new hotel projects and tourist residences of category 5* divided between the cities of Marrakesh, Tangier, Casablanca and Agadir will emerge with 4500 beds more.

Generally, the results of the tourism sector in 2011 remain satisfactory in view of the current situation in the major source market for tourist; these major markets of the kingdom recorded a positive trend: 10% for Belgium, 9% for Germany, 6% for the UK and 6% for Holland. However, the French and Spanish tourist arrivals have declined by -1% and -4% respectively. Altogether, a light evolution with 9.4 million arrivals (1%); 59 billion dirhams incoming. These results confirm the correctness of the strategic choices and the maturity of the Moroccan destination which demonstrated its capacities of resistance through the fundamental strengths of the sector.

Otherwise, while the results become more successful, the overnights stay in classified hotels establishment is still down (-6%), thus, the occupation rate loses 3 points compared to 2010. This paradox is related in large part to the development of other forms of accommodation, of whom unregulated tourism residences, new forms of accommodation thanks to the vision 2010. According to our study with a sample of tourists in Marrakech (Sbai, 2012), the results argue that the guesthouses extract more and more tourists to hotels, they attract more than 30% of tourists in Marrakech (with 2 % evolution per year). This is why we can’t rely only on statistics of classified establishment.

Otherwise, and after the good results recorded in general, Morocco has nowadays a real challenge to keep its tourists and win their loyalty. Up to now, the priority source markets of Morocco are: France, Spain, United Kingdom, Germany and Italy. Tourists from
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Figure 1. The Mean-Variance Space

these countries are more receptive to the Moroccan offers and have a better return in terms of average expenditure. But with the new offer on the market, including new accommodations not classified, and global competition, the government must put in place a specific marketing to attract tourists, maximize their return and minimize the risk of 'no return'.

The Markowitz Model and Shortage Function

The Markowitz Model

The mean–variance model was introduced by Markowitz (1952, 1959) for gauging portfolio efficiency in order to make a choice into several portfolios (tourism target). We use segments tourist by origins.

We segment the Moroccan tourism inbound demand into sub-markets represented by origins. In this line, DMOs have to find the optimal combination of origin i.e. the combination which minimize the instability and maximize the return of their inbound tourism demand. Each origin may be identified with different levels of risk and return. Set of optimal portfolios are on the efficient frontier, which specifies on the one hand the maximum return for any risk level and on the other hand the minimum risk level for any return level.

Let $E(R_M) = X_A E(R_A) + X_B E(R_B)$ (1) for the global inbound tourism demand.

With $A$ and $B$ representing countries of origin of tourists and $(X_A, X_B)$ are weights of origins $A$ and $B$ in the global inbound tourism demand of the destination $M$.

The fluctuation of this virtual inbound tourism demand (its risk) depends on the variance-covariance matrix of origins that can be calculated as follow:

$$V(R_M) = X_A^2 V(R_A) + X_B^2 V(R_B) + 2X_A X_B COV(R_A, R_B)$$ (2)

The market utility is used to measure investor satisfaction as far as higher is utility, better is satisfaction. Following the mean-variance model, the market utility is formally given by:

$$U(R_M) = E(R_M) - \Phi V(R_M)$$
$$= X_A E(R_A) + X_B E(R_B) - \Phi(X_A^2 V(R_A) + X_B^2 V(R_B) + 2X_A X_B COV(R_A, R_B))$$ (3)

where $\Phi$ stands for investor’s risk aversion. For our case study, and accordingly to other authors like Brie (1997,2004) and Morey and Morey (1999), we use $\Phi=0.5$. This standard
value of risk aversion represents cautious investors or the neutrality of risk aversion.

The expected return of a portfolio $x$ is defined by:

$$E[R(x)] = \sum_{i=1}^{n} x_i E(R_i)$$  \hspace{1cm} (4)

Where $x_i$ is the proportion of the asset $i$ in the portfolio, $E(R_i)$ the expected return of the same asset $i$ and $n$ the number of assets in the market. Along the same line, the variance of the return of the portfolio $x$ is defined by:

$$V[R(x)] = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i x_j \text{cov}(R_i, R_j)$$  \hspace{1cm} (5)

Following the mean-variance model of Markowitz, the representation set of portfolios is defined by:

$$\mathcal{N} = \left\{ \left( \text{Var}[R(x)], E[R(x)] \right) : x \in \mathcal{X} \right\}$$  \hspace{1cm} (6)

For a given degree of risk aversion, Markowitz defined the following utility function to compute the corresponding efficient portfolio:

$$U_{(\rho, \mu)}(x) = \mu E[R(x)] - \rho \text{Var}[R(x)]$$  \hspace{1cm} (7)

where $\mu > 0$ and $\rho > 0$.

The following program maximizes the mean-variance utility function:

$$\text{Max } Z = \Phi E[R(x)] - \text{Var}[R(x)]$$  \hspace{1cm} (8)

s. c. $Ax \geq 0$

$$\sum_{i=1}^{n} x_i = 1$$

$$x \geq 0$$  \hspace{1cm} (4)

where the ratio $\phi = \frac{\mu}{\rho} \in [0, +\infty[$ stands for risk aversion.

According to our data, this example permits us to determine that, for the next period (2011),

$$E(R_A) = -0.994166\%$$

$$E(R_B) = -2.940457\%$$ and

$$X_A = 0.61619961 *$$

$$X_B = 0.38380039 +$$

$$* X_A = 4775662 / (4775662 + 3119347) = 0.61619961$$

$$+ X_B = 3119347 / (4775662 + 3119347) = 0.38380039$$

$$V(R_A) = 0.00204388$$

$$V(R_B) = 0.00227799$$

$$\text{COV}(R_A, R_B) = 0.00092276$$

$$U(R_M) = E(R_M) - \Phi V(R_M)$$

$$= X_A E(R_A) + X_B E(R_B) -$$

$$- \Phi [X_A^2 V(R_A) + X_B^2 V(R_B) + 2X_A X_B \text{COV}(R_A, R_B)]$$

$$U(R_A) = -1.096\%$$ (utility of a market exclusively composed of Austrian tourists) and $$U(R_B) = -3.054\%$$ (utility of a market exclusively composed of Finnish tourists).

Table 1. Periodic overnight stays data

| Year | A: Germany | B: Belgium | $X_A$ | $X_B$ | $R_A$ | $R_B$ |
|------|------------|------------|------|------|------|------|
| 2006 | 985685     | 688878     | 0.58862223 | 0.41137777 | 0.00332053 | -0.03044371 |
| 2007 | 988958     | 667906     | 0.59688544 | 0.40311456 | 0.03812182 | -0.01453963 |
| 2008 | 959079     | 590868     | 0.6187818 | 0.3812182 | -0.03021261 | -0.11534258 |
| 2009 | 895617     | 582277     | 0.60600896 | 0.39399104 | -0.06616973 | -0.00092276 |
| 2010 | 946323     | 589418     | 0.61619961 | 0.38380039 | 0.05661572 | 0.01226392 |
| **Total** | **4775662** | **3119347** | 0.60489633 | 0.39510367 | 

| E( R ) | -0.00994166 | -0.02940457 |
| var | 0.00204388 | 0.00227799 |
| cov | 0.00092276 | 0.00092276 |
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The major problem of this model is the choice of way to reach the efficient frontier. It shows why we will use the shortage function. With a pre-assigned direction, this tool determines the shortcut which permits to reach the efficient frontier.

**Shortage Function**

The major problem of this model lies in the choice of a direction to reach the efficient frontier. To overcome this difficulty, we use in our paper the shortage function which is an useful tool for efficiency measurement. This concept was introduced by Luenberger (1984,1992) and used several times in a lot of sectors. It determines then the shortcut which permits to reach the efficient frontier. DMOs have indeed to find the optimal combination of origins, i.e. portfolio of origins which minimize the risk and maximize the return of their inbound tourism market.

Formally spoken, the disposal representation set is defined as:

$$DR = \left\{ \mathcal{N} + (R_x \times (-R_y)) \right\} \cap R^2$$  \hspace{1cm} (9)

This subset may be rewritten as follow:

$$DR = \left\{ (V', E') \in R^2; \exists x \in \mathcal{X}, (V', E') \leq \left( -\text{Var}[R(x)], E[R(x)] \right) \right\}$$  \hspace{1cm} (10)

The above subset represents the weakly efficient frontier, i.e. the set of all mean-variance points that are not strictly dominated:

$$\partial^M(\mathcal{X}) = \left\{ (\text{Var}[R(x)], E[R(x)]); \hspace{0.5cm} x \in \mathcal{X}, \left( -\text{Var}[R(x)], E[R(x)] \right) < \left( -V', E' \right) \in DR \right\}$$  \hspace{1cm} (11)

According to properties exposed by Briece et al. (2004), we can use the shortage function to gauge markets efficiency. This function is defined by:

$$S_g(x) = \sup \left\{ \delta; \text{Var}[R(x)] - \delta g_v, E[R(x)] + \delta g_e \in DR \right\}$$  \hspace{1cm} (12)

which is the shortage function for the portfolio $x$ in the direction of the vector $g = (-g_v, g_e)$.

![Figure 2. The shortage function](image-url)
It measures the shortcut in the direction of $g$ that looks simultaneously improvements in variance reduction and in mean expansion. Note that if $S_g(x) = 0$ no improvement is needed as the portfolio $x$ is an efficient point.

Note that the shortage function generalizes Morey and Morey distance function which gauge portfolio efficiency either in risk contraction or in mean expansion (Morey and Morey, 1999). In the risk reduction orientation, we have $g_E=0$ and $g=g_V$. For a given level of risk, the function computes the possible expansion of the expected number of overnight stays.

$$S_{gE}(x) = \sup \left\{ \delta_E; \left( \frac{\text{Var}[R(x)]}{E[R(x)]} + \delta_E g_E \right) \in DR \right\}$$

(15)

In the same way, the expected overnight stay expansion function is defined as follows:

$$D_{NSE}(x) = \sup \left\{ \theta; \left( \frac{\text{Var}[R(x)]}{\theta E[R(x)]} \right) \in DR \right\}$$

(16)

And as previously, it can be stated that we have: $\delta_E = 1 - \theta$.

**Results and discussion**

For each origin, they present, on the one hand, return and risk level and, on the other hand, relative efficiency. The relative efficiency is measured by the distance between a given tourist origin and the efficient frontier. This distance represents possible improvements and can be measured in three directions: (i) vertically in maximizing overnight stays expectancy, (ii) horizontally in reducing volatility.

![Figure 3. Morey and Morey distance functions](image-url)
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Table 2. Return Expansion

| Country of origin                      | Expected number of overnight stays | Standard deviation | Maximum expected overnight stays for the same standard deviation level | Efficiency Θ |
|----------------------------------------|-----------------------------------|--------------------|------------------------------------------------------------------------|--------------|
| France                                 | 6025431                           | 340046             | 6025431                                                               | 1.0000       |
| Germany                                | 955131                            | 33802              | 1427175                                                               | 1.4942       |
| Belgium                                | 623868                            | 45103              | 1640175                                                               | 2.6290       |
| Other countries of the World           | 902390                            | 128628             | 3058175                                                               | 3.3890       |
| United States of America               | 246603                            | 22963              | 1216175                                                               | 4.9317       |
| Switzerland                            | 145543                            | 7008               | 862175                                                                | 5.9239       |
| United Kingdom                         | 1016516                           | 473700             | 6025431                                                               | 5.9275       |
| Netherlands                            | 278409                            | 47622              | 1687175                                                               | 6.0601       |
| Other countries of Middle East         | 141862                            | 14073              | 1025175                                                               | 7.2266       |
| Saudi Arabia                           | 173164                            | 28402              | 1323175                                                               | 7.6412       |
| Italy                                  | 504581                            | 225586             | 4496175                                                               | 8.9107       |
| Commonwealth of Independent States     | 279654                            | 99085              | 2600175                                                               | 9.2978       |
| Japan                                  | 85032                             | 9330               | 916175                                                                | 10.7745      |
| Spain                                  | 517424                            | 346726             | 6025431                                                               | 11.6451      |
| Tunisia                                | 47291                             | 4366               | 800175                                                                | 16.9203      |
| Portugal                               | 87431                             | 41041              | 1564175                                                               | 17.8903      |
| Algeria                                | 81851                             | 36583              | 1480175                                                               | 18.0837      |
| Sweden                                 | 80536                             | 37119              | 1490175                                                               | 18.5033      |
| Egypt                                  | 33122                             | 1280               | 719175                                                                | 21.7127      |
| Canada                                 | 54160                             | 26951              | 1295175                                                               | 23.9137      |
| Other countries of Africa              | 70481                             | 49988              | 1731175                                                               | 24.5623      |
| Nationals Residing Abroad              | 30720                             | 2893               | 763175                                                                | 24.8426      |
| Finland                                | 37407                             | 16207              | 1073175                                                               | 28.6888      |
| Austria                                | 35617                             | 17716              | 1106175                                                               | 31.0572      |
| Denmark                                | 27466                             | 9936               | 930175                                                                | 33.8659      |
| Libyan Arab Jamahiriya                 | 23329                             | 4078               | 793175                                                                | 33.9995      |
| United Arab Emirates                   | 25903                             | 12250              | 983175                                                                | 37.9566      |
| Norway                                 | 19921                             | 10041              | 932175                                                                | 46.7927      |
| Mauritania                             | 12167                             | 8966               | 907175                                                                | 74.5603      |
| Syrian Arab Republic                   | 6175                              | 2775               | 760175                                                                | 123.1013     |

and (iii) in the both (Botti et al., 2012).

Table 2 exposes the results of the expected overnight stays expansion (vertical frame). Indeed, for the next period, Morocco may expect from United Kingdom more than 10 16 millions of overnight stays. However, this expectation is associated with a standard deviation of 473 700 overnight stays. Moreover, for the same degree of risk, overnight stays may reached the level 6 025 431 which means that Morocco can improve United Kingdom overnights stay expansion at 59.9275%.

Table 3 exposes the horizontal frame i.e. the risk contraction perspective. As previously, Morocco may expect from the United Kingdom more than 1016516 of overnight stays with a standard deviation of 473700 overnight stays. But, our frame permits us to say that Morocco should be able to reduce the instability of this origin as, for the same number of overnight stays, the standard deviation of Germany could be 13667. In this line, Morocco may improve United Kingdom market stability by 28.85%.

Table 4 simultaneously incorporates the previous two perspectives. For efficient origins, shortage is equal to 0 %, meaning that regarding these origins, the Morocco DMO maximize return and minimize risk. As previously explained in our interpretation of the
Table 3. Risk contraction

| Country of origin                        | Expected number of overnight stays | standard deviation | Minimum standard deviation for the same expected overnight stays level | Efficiency λ |
|------------------------------------------|-----------------------------------|--------------------|------------------------------------------------------------------------|---------------|
| France                                   | 6025431                           | 340046             | 340046                                                                  | 1.00000       |
| Germany                                  | 955131                            | 33802              | 11028                                                                  | 0.32625       |
| Other countries of the World             | 902390                            | 128628             | 8735                                                                   | 0.06791       |
| United Kingdom                           | 1016516                           | 473700             | 13667                                                                  | 0.02885       |
| Algeria                                  | 81851                             | 36583              | 0                                                                      | 0.00000       |
| Tunisia                                  | 47291                             | 4366               | 0                                                                      | 0.00000       |
| Mauritania                               | 12167                             | 8966               | 0                                                                      | 0.00000       |
| Other countries of Africa                | 70481                             | 49988              | 0                                                                      | 0.00000       |
| Canada                                   | 54160                             | 26951              | 0                                                                      | 0.00000       |
| United States of America                 | 246603                            | 22963              | 0                                                                      | 0.00000       |
| Japan                                    | 85032                             | 9330               | 0                                                                      | 0.00000       |
| Commonwealth Independent States          | 279654                            | 99085              | 0                                                                      | 0.00000       |
| Denmark                                  | 27466                             | 9936               | 0                                                                      | 0.00000       |
| Finland                                  | 37407                             | 16207              | 0                                                                      | 0.00000       |
| Norway                                   | 19921                             | 10041              | 0                                                                      | 0.00000       |
| Sweden                                   | 80536                             | 37119              | 0                                                                      | 0.00000       |
| Italy                                    | 504581                            | 225586             | 0                                                                      | 0.00000       |
| Portugal                                 | 87431                             | 41041              | 0                                                                      | 0.00000       |
| Spain                                    | 517424                            | 346726             | 0                                                                      | 0.00000       |
| Austria                                  | 35617                             | 17716              | 0                                                                      | 0.00000       |
| Belgium                                  | 623868                            | 45103              | 0                                                                      | 0.00000       |
| Netherlands                              | 278409                            | 47622              | 0                                                                      | 0.00000       |
| Switzerland                              | 145543                            | 7008               | 0                                                                      | 0.00000       |
| Libyan Arab Jamahiriya                   | 23329                             | 4078               | 0                                                                      | 0.00000       |
| Saudi Arabia                             | 173164                            | 28402              | 0                                                                      | 0.00000       |
| Syrian Arab Republic                     | 6175                              | 2775               | 0                                                                      | 0.00000       |
| United Arab Emirates                     | 25903                            | 12250              | 0                                                                      | 0.00000       |
| Egypt                                    | 33122                             | 1280               | 0                                                                      | 0.00000       |
| Other countries of Middle East           | 141862                            | 14073              | 0                                                                      | 0.00000       |
| Nationals Residing Abroad                | 30720                             | 2893               | 0                                                                      | 0.00000       |

Table 1 and 2 results, Morocco may expect for the next period from Germany more than 955 131 of overnight stays with a standard deviation of 33 802 overnight stays. Our framework indicates that the Moroccan destination manager may expect from German segment 1 234 651 overnight stays with 23 910 overnight stays of variation. The Moroccan DMO needs to improve the number of German overnight stays by 9 886 which is given by δ in equation 11. Efficiency of origins is given by the ratio δ / expected overnight stays. This choice permits us to take into account share market of each origin and accordingly, Germany has 77.4 % of shortage, which represent 9 886 overnight stays and Belgium have 59.9 % of shortage which represent 30 198 overnight stays. We can see that the French segment is efficient; indeed the shortage is equal to 0. Morocco may not improve the French overnight stays. Therefore, it is more interesting to invest promotional resources on another segment of origin.

Conclusion
Nowadays, research in tourism interest has increased, especially in the western world. In Morocco, the need of research in this area is indisputable. It’s a developing market and seeks maturity. Public and private institutions must coordinate more to develop further the sector and stand up to the competition. Our paper, as already mentioned, is a tool to demonstrate how the Moroccan DMOs can be
more operative and more efficient. That said, how they can make the Moroccan destination more competitive. It should be noted that the efficiency become among the main points of interest of decision makers and researchers for sure. This work allows us to target countries of origin that present the best capacity of improvement in term of return expansion and risk contraction. Moroccan authority can select a suit of origins according to its preference in terms of risk and choose origins less reliable to target their promotional policy in these countries.

Finally, we can conclude that the tourism in Morocco must be developed more to improve its attractiveness.

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### Table 4. Shortages

| Country of origin                      | Expected overnight stays | Standard deviation | Shorted expected overnight stays | Shorted standard deviation | $\delta$ Shortage | Efficiency of each origin |
|----------------------------------------|--------------------------|--------------------|----------------------------------|----------------------------|-------------------|--------------------------|
| France                                 | 6 025 431                | 340 046            | 6 025 431                        | 340 046                    | -                 | 1.00000                  |
| Egypt                                  | 33 122                   | 1 280              | 66 221                           | 1                          | 1 278             | 0.50056                  |
| Syrian Arab Republic                   | 6 175                    | 2 775              | 12 348                           | 1                          | 2 530             | 0.54824                  |
| Nationals Residing Abroad              | 30 720                   | 2 893              | 61 435                           | 1                          | 2 880             | 0.50226                  |
| Libyan Arab Jamahiriya                 | 23 329                   | 4 078              | 46 657                           | 0                          | 4 017             | 0.50760                  |
| Tunisia                                | 47 291                   | 4 366              | 94 576                           | 1                          | 4 347             | 0.50216                  |
| Switzerland                            | 145 543                  | 7 008              | 291 079                          | 0                          | 7 000             | 0.50059                  |
| Mauritania                             | 12 167                   | 8 966              | 24 332                           | 1                          | 7 217             | 0.62113                  |
| Norway                                 | 19 921                   | 10 041             | 39 842                           | 0                          | 8 966             | 0.55993                  |
| Japan                                  | 85 032                   | 9 330              | 174 061                          | 0                          | 9 274             | 0.50301                  |
| Denmark                                | 27 466                   | 9 936              | 54 932                           | 0                          | 9 343             | 0.53171                  |
| Germany                                | 955 131                  | 33 802             | 1 234 651                        | 23 910                     | 9 886             | 0.77394                  |
| United Arab Emirates                   | 25 903                   | 12 250             | 51 804                           | 0                          | 11 074            | 0.55311                  |
| Other countries of Middle East         | 141 862                  | 14 073             | 283 718                          | 1                          | 14 004            | 0.50247                  |
| Finland                                | 37 407                   | 16 207             | 74 813                           | 1                          | 14 871            | 0.54492                  |
| Austria                                | 35 617                   | 17 716             | 71 234                           | 0                          | 15 862            | 0.55844                  |
| United States of America               | 246 603                  | 22 963             | 493 199                          | 1                          | 22 863            | 0.50217                  |
| Canada                                 | 54 160                   | 26 951             | 108 319                          | 1                          | 24 128            | 0.55850                  |
| Saudi Arabia                           | 173 164                  | 28 402             | 346 323                          | 1                          | 28 027            | 0.50669                  |
| Belgium                                | 623 868                  | 45 103             | 1 042 663                        | 14 826                     | 30 198            | 0.59984                  |
| Algeria                                | 81 851                   | 36 583             | 163 701                          | 1                          | 33 398            | 0.54767                  |
| Sweden                                 | 80 536                   | 37 119             | 161 070                          | 1                          | 33 710            | 0.55056                  |
| Portugal                               | 87 431                   | 41 041             | 174 861                          | 1                          | 37 151            | 0.55235                  |
| Other countries of Africa              | 70 481                   | 49 988             | 140 960                          | 1                          | 40 773            | 0.61300                  |
| Netherlands                            | 278 409                  | 47 622             | 556 811                          | 1                          | 46 939            | 0.50727                  |
| Other countries of the World Commonwealth Independent States | 902 390 | 126 628 | 1 529 672 | 39 214 | 88 519 | 0.59569 |
| States                                 | 279 654                  | 99 085             | 559 305                          | 1                          | 93 395            | 0.53046                  |
| Italy                                  | 504 581                  | 225 586            | 981 882                          | 12 197                     | 194 807           | 0.56287                  |
| Spain                                  | 517 424                  | 346 726            | 1 014 581                        | 13 581                     | 276 754           | 0.61385                  |
| United Kingdom                         | 1 016 516                | 473 700            | 1 905 603                        | 59 383                     | 375 543           | 0.58823                  |
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