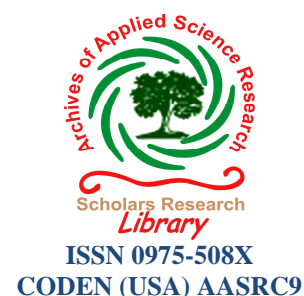




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## Ranking of Moroccan food sector companies according to ISO 22003 version 2007 food chain categories

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### ABSTRACT

*The objective of this study is to provide the distribution of food industry in Morocco according to the 13 categories established by ISO 22003 version 2007 and according to their geographical distribution. This allowed us to have a global vision on the profile of food industry in order to determine the needs and constraints of these companies taking into account their location. Through a database of 2676 companies, the results of this study show that food companies studied are dispatched on the 13 categories with 63.9% are in category E (Transformation 3 -Products with long shelf life at ambient temperature-). On the second part of the study, geographic distribution, we found that companies are spread all over the Moroccan territory with a large part in the economic capital Casablanca (17.46%). This diversity in categories and distribution in Morocco provides a coverage rate of 93.9%.*

**Key Words:** ISO 22000 version 2005, ISO 22003 version 2007, Food industry categories, Moroccan food industry.

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### INTRODUCTION

Food industry remains a strategic sector in Morocco because of its economic, social and environmental crucial role. In fact, this sector contributes on average 16% of GDP through its upstream agriculture and 4% of its food-industrial downstream, for nearly 10% to total exports and 44% of employment. Agriculture is also responsible for valorization and conservation of natural resources of our country (land and water) [1].

Over the period 2009-2011, Moroccan food exports were heavily concentrated to the European Union market, which has absorbed about 73% of it. Among importers we note France which leads with nearly 50%. The evolution of EU part from food industry exports informs about its dominance despite the obstacles placed for access to this market. Indeed, this part has almost remained unchanged all over the last decade above 70%. The high concentration of exports to the European market has made Morocco very vulnerable to the changing economic conditions of the European Union [2].

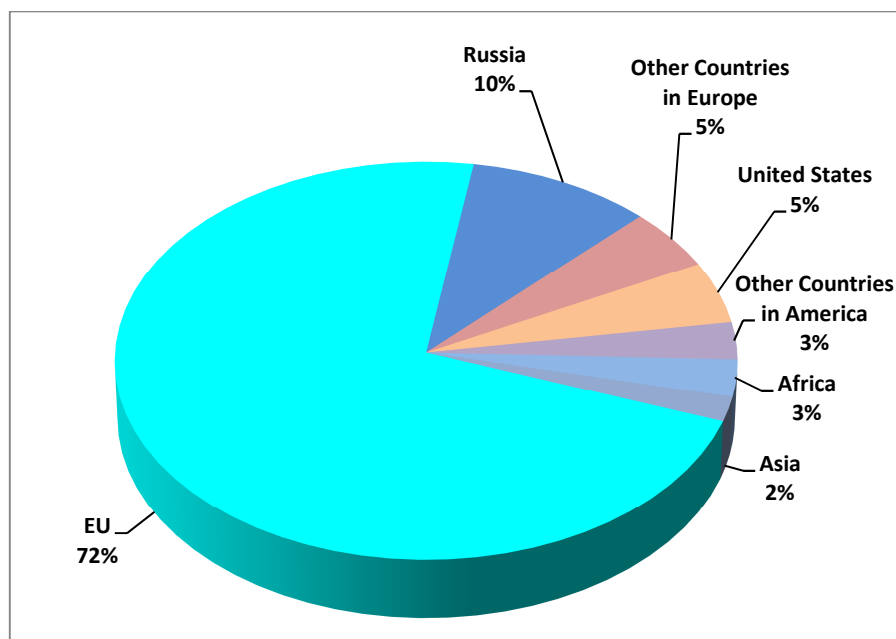


Figure 1: Distribution of Moroccan food exports by destination in the world (average for the period 2009-2011)

To support the growth of the Moroccan food industry, the government is implementing a program to develop Food-Industrial Platforms (6 agro-food poles) and seafood processing (2 Fish Hub), providing infrastructure and services at the best international standards [3]. The increase of exportations of food industry is strongly linked, among other things, to the compliance to good manufacturing and hygiene practices. The establishment of food safety management system can open new opportunities for companies and increase its longevity and profitability.

ISO 22000 version 2005 standard specifies requirements for a food safety management system when an organization needs to demonstrate its ability to control food safety hazards in order to ensure that food is safe at the time of human consumption [4]. Food chain, scope of this standard is divided into 13 categories. Each one of them has a code which is a letter from A to M. Annex A of ISO 22003 version 2007 represents food chain categories classification.

## MATERIALS AND METHODS

This study was conducted during the period from January 2013 to March 2014. Referring to the database of Commerce and Industry Ministry "List of companies of food sector in 2010," which was sent to us by email from Mr. Youssef LAKBIDA in 16<sup>th</sup>, January 2013 and the 2011 then 2013 version of KOMPASS<sup>®</sup> software.

The following information is provided from the Ministry database for 2081 companies;

- Corporate name,
- Address,
- Telephone,
- Fax,
- Manager name,
- Email address,
- Tax ID,
- Form,
- Big sector,
- Area Code,
- Sector,
- Subsector code,
- Subsector,
- Activity Code,
- Activity,
- City.

KOMPASS<sup>®</sup> software, in its two versions used, contains the following descriptions of companies:

- Corporate name,
- Form,

- Creation year,
- Capital,
- Trading license,
- Trade register,
- Type of activity,
- Import - Export,
- Bank,
- Activity,
- Products and Service,
- Executives and managers,
- Address,
- Telephone,
- Fax.

In a first step, we merged both databases (received from ministry and from KOMPASS<sup>®</sup> software) to have a single database of 2676 companies. These companies are spread throughout Moroccan territory and all of them are operating in food industry. Information required for our study are:

- Corporate name,
  - Activity,
  - City.
- Next step consist of classifying these companies one by one according to the thirteen categories of the food chain laid down in Annex A of ISO 22003 version 2007 standard:

**Table 1: Food chain categories**

Category codes	Categories	Examples of sectors
A	Farming (Animals)	animals; fish; egg production; milk production; beekeeping; fishing; hunting; trapping
B	Farming (Plants)	fruits; vegetables; grain; spices; horticultural products
C	Processing 1 (Perishable animal products) including all activities after farming, e.g. Slaughtering	meat; poultry; eggs; dairy and fish products
D	Processing 2 (Perishable vegetal products)	fresh fruits and fresh juices; preserved fruits; fresh vegetables; preserved vegetables
E	Processing 3 (Products with long shelf life at ambient temperature)	canned products; biscuits; snacks; oil; drinking water; beverages; pasta; flour; sugar; salt
F	Feed production	animal feed; fish feed
G	Catering	hotels; restaurants
H	Distribution	retail; outlets; shops; wholesalers
I	Services	water supply; cleaning; sewage; waste disposal; development of product, process and equipment; veterinary service
J	Transport and storage	transport and storage
K	Equipment manufacturing	process equipment; vending machines
L	(Bio)chemical manufacturing	additives; vitamins; pesticides; drugs; fertilizers; cleaning agents; biocultures
M	Package material manufacturing	packaging material

In the table work, we identified four pillars, namely: category codes, corporate name, activity and city.

**Table 2: Database model**

Category codes	Corporate name	Activity	City
B	AGRODELICES	VEGETABLES TRANSFORMATION & PRESERVING	LAAYOUNE
E	HUILERIE AKNOUCH LHADI	OLIVES OIL PRODUCTION	MEKNES

## RESULTS AND DISCUSSION

The 2676 companies subject of this study are divided throughout the 13 categories of ISO 22003 Version 2007 and in 128 cities and villages spread out all Moroccan surface. The results are:

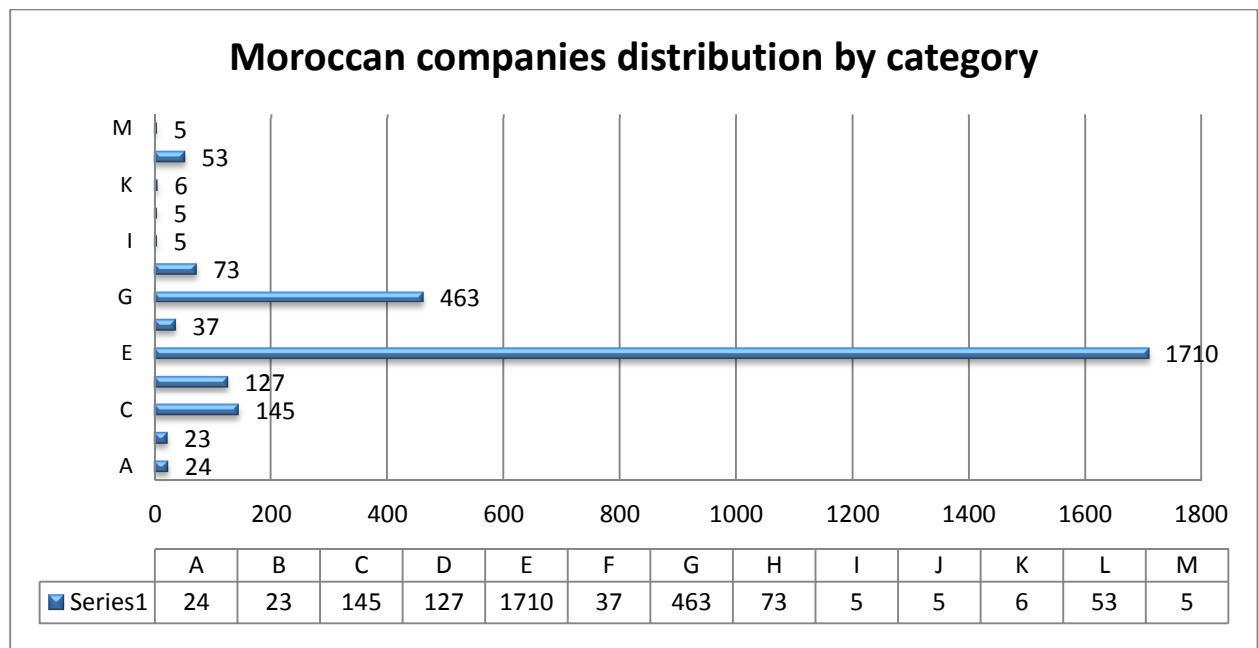


Figure 2: Moroccan companies distribution by category

Table 3: Number and percentage of companies by category

Category	Companies number	Percentage
A	24	0,9%
B	23	0,9%
C	145	5,4%
D	127	4,7%
E	1710	63,9%
F	37	1,4%
G	463	17,3%
H	73	2,7%
I	5	0,2%
J	5	0,2%
K	6	0,2%
L	53	2,0%
M	5	0,2%

The following table shows companies distribution by city and category.

Table 4: companies ranking by city and by category

City	A	B	C	D	E	F	G	H	I	J	K	L	M	Total
AFOURER							1							1
AGADIR	2	3	7	3	72	1	49	3	1	1	1		1	144
AHFIR					1									1
AIN ATIQ								1						1
AIT MELLOUL				1	4		1	1					1	8
AKNOUL					3									3
AL HOCEIMA			1		22	1								24
ANEZI					4									4
ASILAH							1							1
ASNI							1							1
City	A	B	C	D	E	F	G	H	I	J	K	L	M	Total
AZEMMOUR					3							1		4
AZILAL					13		1							14
AZROU							2							2
BAB BERRED					2									2
BEJAAD					1									1
BEN SLIMANE					22	1						1		24
BENI-MELLAL		1	1	4	51	3	6							66
BENSLIMANE					1									1
BERKANE		1			5	1		1						8
BERRECHID	1			2	21	3	2					2		31
BIR J'DID	1													1

BNI BOUFRAH					1										1
BNI OURIAGHEL					10										10
BNI-MOUSSA					3		1								4
BIOUGRA		1													1
BOU AHMED							1								1
BOUKNADEL							1								1
BOUIZAKARNE					1										1
BOUJDOUR					5										5
BOULEMANE					1										1
BOUZNKA					3	1									4
BZOU					1										1
CASABLANCA	7	9	9	7	293	5	65	46	1	4	5	13	3		467
CHEFCHAOUEN					3		2								5
CHTOUGA-AIT BAHA					1										1
DAKHLA			6		20										26
DAR BOUAZZA			1				3	1							5
DRIOUCH					1										1
EL ARBA DU GHARB					1										1
EL GARA					4		1					1			6
EL HAJEB					3		1								4
EL JADIDA	2			1	39		6								48
EL KALAA DES MGOUN							1								1
EL KELAA DES SRAGHNA					9										9
EL KSIBIA					3										3
ERFOUD							6								6
ERRACHIDIA					11		2								13
ESSAOUIRA				1	46		9								56
ESSEMARA					1										1
FES	1		5	2	117	2	24	4				2			157
FQUIH BEN SALAH				1	11										12
City	A	B	C	D	E	F	G	H	I	J	K	L	M	Total	
GHAFAI					12										12
GUELAIA			8		3		1								12
GUELMIM			6		7										13
GUERCIF					1										1
HAD SOUALEM	2				2							1			5
IFNI					3										3
IFRANE					4		1								5
IMOUZZER EL KANDER					1		1								2
INEZGANE			4	3	14		1	1							23
JRADA			1		2										3
KARIA BA MOHAMED					1										1
KENITRA		1	5	8	41	3	2					5			65
KHEMISSSET				13	5										18
KHENIFRA					1		1								2
KHOURIBGA			8	2	23		2								35
KSAR EL KEBIR			2		2										4
LAAYOUNE			10	6	77	3	6					2			104
LAKHSAS				1	1										2
LARACHE			1	1	18	1		1				1			23
LOUDAYA			1		1										2
LOUTA			1		1										2
MARRAKECH		1	18	11	90		70	8				4			202
M'DIQ	1						2								3
MEKNES		2	1	2	52		7					1			65
MERZOUGA							1								1
MIDELT							1								1
MOHAMMEDIA			1	1	38		1	1							42
MOQRISSET					6										6
MOULAY DRISS ZERHOUN							1								1
MOULAY YACOB					3		2								5
NADOR			2	3	38	1	3	1				2			50
NOUACEUR				2	4		2								8
OUAD AMLIL					5										5
OUAOUZAGHT				1	1										2
OUARZAZATE				1	5		11								17
Oued ZEM					1										1
OUEZZANE					2										2
OUDJA	1		4	1	33	1	8	1				1			50
OULAD JEMAA LEMTA					2										2
OULED TAIMA		1													1

OULAD TAYEB					2		1								3
City	A	B	C	D	E	F	G	H	I	J	K	L	M	Total	
OULMES					1		1							2	
RABAT	1		4	4	50		21	1	2			3		86	
ROMMANI					1									1	
SAFI			7	5	28		5							45	
SAIDIA							1							1	
SALE			1	3	30		2	1				1		38	
SEFROU					20	1								21	
SETTAT			1	3	60									64	
SIDI ALLAL TAZI					1									1	
SIDI BOUZID							1							1	
SIDI KACEM			1	3	10		1					1		16	
SIDI SLIMANE		1			1									2	
SIDI SMAIL					1									1	
SKHIRATE	1		2	3	12	1	2							21	
SOUK TLET EL GHARB				2	5									7	
TAFROUAT							1							1	
TAINASTE						1								1	
TAHLA					2									2	
TAMANAR				1	3	1								5	
TAN TAN					1									1	
TANGER			3	2	27		24		1			1		58	
TAN-TAN	1				7		7							15	
TAOUNATE					5		15							20	
TAOURIRT					2		9							11	
TARGUIST					3		5							8	
TAROUDANNT					3		3							6	
TAZA		1			9		26							36	
TEMARA	3	1				1	2							7	
TETOUAN			15	12	59	4	12	1				5		108	
TINGHIR							2							2	
TISSA				1	5		1							7	
TIT MELLIL					2									2	
TIZNIT			8	10	44	1	4					5		72	
TNINE OURIKA							1							1	
ZAGORA					1		5							6	
ZNATA					2									2	

The following table shows companies repartition, all categories confused, according to their location in Morocco.

Table 5: Companies number by city

City	Companies number	Percentage	Cumulative percentage
CASABLANCA	467	17,45%	17,45%
MARRAKECH	202	7,55%	25,00%
City	Companies number	Percentage	Cumulative percentage
FES	157	5,87%	30,87%
AGADIR	144	5,38%	36,25%
TETOUAN	108	4,04%	40,28%
LAAYOUNE	104	3,89%	44,17%
RABAT	86	3,21%	47,38%
TIZNIT	72	2,69%	50,07%
BENI-MELLAL	66	2,47%	52,54%
KENITRA	65	2,43%	54,97%
MEKNES	65	2,43%	57,40%
SETTAT	64	2,39%	59,79%
TANGER	58	2,17%	61,96%
ESSAOUIRA	56	2,09%	64,05%
NADOR	50	1,87%	65,92%
OUDJA	50	1,87%	67,79%
EL JADIDA	48	1,79%	69,58%
SAFI	45	1,68%	71,26%
MOHAMMEDIA	42	1,57%	72,83%
SALE	38	1,42%	74,25%
TAZA	36	1,35%	75,60%
KHOURIBGA	35	1,31%	76,91%
BERRECHID	31	1,16%	78,06%
DAKHLA	26	0,97%	79,04%
AL HOCEIMA	24	0,90%	79,93%
BEN SLIMANE	24	0,90%	80,83%

INEZGANE	23	0,86%	81,69%
LARACHE	23	0,86%	82,55%
SEFROU	21	0,78%	83,33%
SKHIRATE	21	0,78%	84,12%
TAOUNATE	20	0,75%	84,87%
KHEMISSSET	18	0,67%	85,54%
OUARZAZATE	17	0,64%	86,17%
SIDI KACEM	16	0,60%	86,77%
TAN-TAN	15	0,56%	87,33%
AZILAL	14	0,52%	87,86%
ERRACHIDIA	13	0,49%	88,34%
GUELMIM	13	0,49%	88,83%
FQUIH BEN SALAH	12	0,45%	89,28%
GHAFAI	12	0,45%	89,72%
GUELAIA	12	0,45%	90,17%
TAOURIRT	11	0,41%	90,58%
BNI OURIAGHEL	10	0,37%	90,96%
EL KELAA DES SRAGHNA	9	0,34%	91,29%
AIT MELLOUL	8	0,30%	91,59%
BERKANE	8	0,30%	91,89%
NOUACEUR	8	0,30%	92,19%
TARGUIST	8	0,30%	92,49%
SOUK TLET EL GHARB	7	0,26%	92,75%
TEMARA	7	0,26%	93,01%
City	Companies number	Percentage	Cumulative percentage
TISSA	7	0,26%	93,27%
EL GARA	6	0,22%	93,50%
ERFOUD	6	0,22%	93,72%
MOQRISSET	6	0,22%	93,95%
ZAGORA	6	0,22%	94,39%
BOUJDOUR	5	0,19%	94,58%
CHEFCHAOUEN	5	0,19%	94,77%
DAR BOUAZZA	5	0,19%	94,96%
HAD SOUALEM	5	0,19%	95,14%
IFRANE	5	0,19%	95,33%
MOULAY YACOUB	5	0,19%	95,52%
OUAD AMLIL	5	0,19%	95,70%
TAMANAR	5	0,19%	95,89%
ANEZI	4	0,15%	96,04%
AZEMMOUR	4	0,15%	96,19%
BNI-MOUSSA	4	0,15%	96,34%
BOUZNKA	4	0,15%	96,49%
EL HAJEB	4	0,15%	96,64%
KSAR EL KEBIR	4	0,15%	96,79%
AKNOUL	3	0,11%	96,90%
EL KSIBIA	3	0,11%	97,01%
IFNI	3	0,11%	97,12%
JRADA	3	0,11%	97,23%
M'DIQ	3	0,11%	97,35%
OULAD TAYEB	3	0,11%	97,46%
AZROU	2	0,07%	97,53%
BAB BERRED	2	0,07%	97,61%
IMOUZZER EL KANDER	2	0,07%	97,68%
KHENIFRA	2	0,07%	97,76%
LAKHSAS	2	0,07%	97,83%
LOUDAYA	2	0,07%	97,91%
LOUTA	2	0,07%	97,98%
OUAOUZAGHT	2	0,07%	98,06%
QUEZZANE	2	0,07%	98,13%
OULAD JEMAA LEMTA	2	0,07%	98,21%
OULMES	2	0,07%	98,28%
SIDI SLIMANE	2	0,07%	98,36%
TAHLA	2	0,07%	98,43%
TINGHIR	2	0,07%	98,51%
TIT MELLIL	2	0,07%	98,58%
ZNATA	2	0,07%	98,65%
AFOURER	1	0,04%	98,69%
AHFIR	1	0,04%	98,73%
AIN ATIQ	1	0,04%	98,77%
ASILAH	1	0,04%	98,80%
ASNI	1	0,04%	98,84%

BEJAAD	1	0,04%	98,88%
BENSLIMANE	1	0,04%	98,92%
<b>City</b>	<b>Companies number</b>	<b>Percentage</b>	<b>Cumulative percentage</b>
BIR J'DID	1	0,04%	98,95%
BNI BOUFRAH	1	0,04%	98,99%
BIOUGRA	1	0,04%	99,03%
BOU AHMED	1	0,04%	99,07%
BOUKNADEL	1	0,04%	99,10%
BOUIZAKARNE	1	0,04%	99,14%
BOULEMANE	1	0,04%	99,18%
BZOU	1	0,04%	99,22%
CHTOUGA-AIT BAHA	1	0,04%	99,25%
DRIOUCH	1	0,04%	99,29%
EL KALAA DES MGOUN	1	0,04%	99,36%
ESSEMARA	1	0,04%	99,40%
GUERCIF	1	0,04%	99,44%
KARIA BA MOHAMED	1	0,04%	99,48%
MERZOUGA	1	0,04%	99,51%
MIDELT	1	0,04%	99,55%
MOULAY DRISS ZERHOUN	1	0,04%	99,59%
OUED ZEM	1	0,04%	99,63%
OULED TAIMA	1	0,04%	99,66%
ROMMANI	1	0,04%	99,70%
SAIDIA	1	0,04%	99,74%
SIDI ALLAL TAZI	1	0,04%	99,78%
SIDI BOUZID	1	0,04%	99,81%
SIDI SMAIL	1	0,04%	99,85%
TAFROUAT	1	0,04%	99,89%
TAINASTE	1	0,04%	99,93%
TAN TAN	1	0,04%	99,96%
TNINE OURIKA	1	0,04%	100,00%

In Figure 3 below are the 25 cities representing 80% of the companies studied. Pareto Principle is an analysis method used to classify causes of a dysfunction, a problem, an incident or a situation, in descending order. In many cases, a large proportion of the results is due to a small proportion of resources or causes. [5]

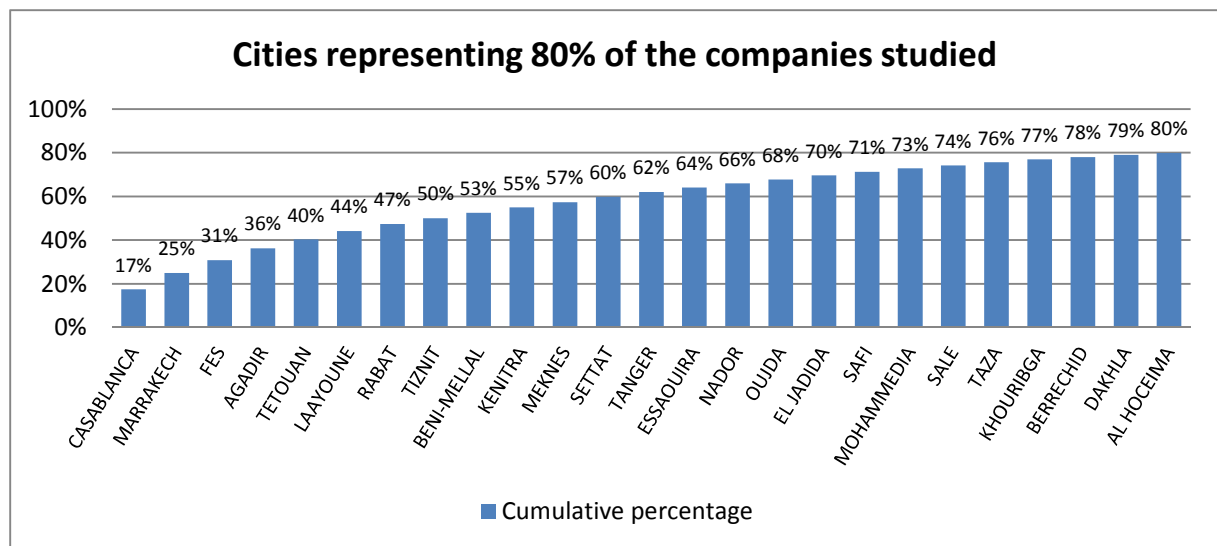


Figure 3: Cities representing 80% of companies studied

This study shows that the distribution of Moroccan companies varies widely according to two criteria: ISO 22003 version 2007 categories and geographical location.

For the first criteria, categories of Moroccan food companies, the analyze of Figure 2: " Moroccan companies distribution by category" and Table 3: "Number and percentage of companies by category" demonstrate that category "E "( Processing 3 (Products with long shelf life at ambient temperature -canned products; biscuits; snacks; oil; drinking water; beverages; pasta; flour; sugar; salt-)) is strictly majority compared to others (63.9%), followed



by the category "G" (Catering -hotels; restaurants-) 17.3%. The cumulative percentage of these two categories is 81.2% of the companies studied. The Pareto chart highlights the elements (effects and failure modes) the most important of a problems which need to be focused on priority improvement efforts. This analysis is also known as 80/20 law, which postulates that 80% of the effects are attributable to only 20% of cases [6]. Therefore this analysis will focus more on these two categories.

The fact of having 1710 companies from 2676 of the database are in the category E can be explained by the strong dominance of processing in the Moroccan food industry. While analyzing E category, we find that mainly small and medium sized industries such as bakeries and pastry are the majority: 849 companies (equivalent of 49.64%) and flour mills: 182 companies (10.64%) of Class E. the rest of companies in this category is divided between various classes such as: canned goods (fish, capers, jams, olives, tomatoes, etc.), biscuits and sweets/chocolate manufactories, oil mills (table, olive and argan), breweries, etc.

The second category in term of units number in this study is "G" category related to catering and hotel business with 463 sites across 67 city and town. Those numbers, 463 sites and 67 cities and towns, represent only hotels and restaurants in database of companies studied. 66% of them (305 units) are hotels and restaurants and 33% (153 units) are represented by cake shops. This sector is related to Moroccan global strategies as part of its development including Azur Plan which has as object developing tourism. Note that only classified hotels and some riads are included in this study. Those unclassified as well as guest houses, holiday cottages and inns are not considered.

For the second criteria, geographic location, the economic capital of Morocco, Casablanca, is the city where the 13 categories are represented. Among the 128 city and village of the study, 467 companies are established in Casablanca alone (equivalent of 17.45% of all companies). PARETO diagram, Figure 3: "Cities representing 80% of the companies studied," summarizing Table 5: "Companies number by city" shows us that 80% of databases companies are spread over 25 city from Tangier in the north to Dakhla in the south. The center and the eastern region are also present (Fes, Meknes, Bni Mellal, Oujda, Al Houceima). We could say that the decentralization policy followed by Morocco start making results. However, there are no villages are among the top 25, that means that the rural sector is still far from industrialization and instead serves as a source of raw materials (agriculture and cattle farming in general). Moroccan tourist cities: Marrakech, Fes and Agadir are ranked 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> respectively in this study. This can be explained by the dominance of G category (restaurants and hotels) in these cities to be up to their position as recognized international tourist cities.

## CONCLUSION

All categories of ISO 22003 and all cities, and even many villages are represented in this study via their food industry. This diversity of Moroccan food industry, in categories and in location, reflects the evolution of exports and imports for agriculture and food processing. Exchange Office, "Office des Changes", numbers show that imports of food, beverage and tobacco products have recorded a decline of 14.6% between 2012 and 2013. Against exports of Moroccan food industry that increases from year to other. Between 2012 and 2013 the variation was +11% against +6.5% and +6.9% respectively between 2011/2012 and 2010/2011. Morocco recorded a coverage rate of 93.9% (value of imports / value of exports) at the food, beverages and tobacco products (knowing that for tobacco there is only imports and no exports) [7].

This coverage rate has a relation with national strategies (Green Morocco Plan, Emergency, Halieutis and Azur Plan). The fact that Morocco has no oil resources, push it to develop its industrial capacity to satisfy internal needs and also to be competitive in the export market.

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