New Trend to Evaluate the Management of Companies: An Application of the Methodologies of Radar Chart

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Abstract   The methodology of radar chart arises as an alternative answer to traditional measures on management of companies' activities. How to answer to market disruptions? It is a question solved by this methodology, which allows us to measure the management of each area represented on a radar chart by applying principles of plane geometry. In this methodology, a decision on a management area affects to the result of other areas because it has a multidirectional effect. Its application is carried out on a Spanish company.

Keywords   Management, Strategic Analysis. Financial Analysis. Multidirectional Decisions. New Methodology

1. Introduction

The financial crisis is a point and apart on assessment the financial positions of companies. In this situation it possible takes two roads. One of them is to generate a new monetary theory or consider interest negative rates as new criteria of valuation, and the other is generating a different form to measure the decision making. The last position is the road begun on this paper.

This new methodology allows us to generate objective, independent and normalized indicators to measure the management of each one of the areas represented on a radar chart. So the first step will be to present theoretical conclusions on the application of theory of cosine and sine of the plane geometry. These conclusions act as theoretical propositions which explain why a company reaches a financial situation.

Normally, financial situations are due to the conditions of economic sectors and a radar chart shows how companies play under them, but now on each one of its management areas.

It is necessary to indicate that the value represented on each radial axis is the average period of maturation obtained from the accounts of financial statements. This means that it is not a weighted average of management times of the company activity and because of this, there are relations between each radar chart and each financial situation.

The second step is to apply this methodology on a current case of a Spanish company. The study period includes the years before and after the financial crisis. The radial indicators will be compared to rates of returns to understand the decisions of the company. This company is el Corte Ingles, a department stores company which bases its activity on loyalty of customers and on the high specialization of its employees.

Finally, the conclusions explained the last considerations over the radial methodology.

2. Materials and Methods

When an average periods of maturation is displayed on an axis of a radar chart, an accountant can see the result of management made by a company on a market. This position is similar to the visual analysis made by a specialist doctor on diagnosis by image. When the doctor sees an X-ray film or a result of a Magnetic Resonance Imaging, he takes a perception on a level of risk and then, he contrasts this perception against some indicators of your area of knowledge.
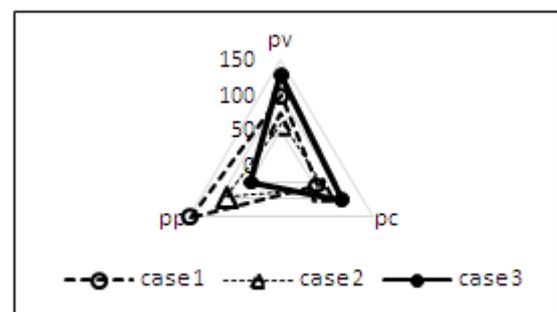

Figure 1.   Radar Charts

One time an accountant sees the radar charts on figure 1, he knows that the company responds on different ways on its activity. The distances from the centre of the radar chart are indicating that there are conditions of market acting on the management of company. Previous works by Perez (1-4) confirm the above phrase as the study of several economic

sector, and allows him to know the adjustment of the company to economic environments, as well as what is the financial situation adopted by the company to carry out its economic activity.

In this paper, we are going see what has been said and also the return on assets and on the equity of company according its result of management will be both explained, because this company can establish conditions on market given its capacity to bring together a high level of customers. At same time, we can study the consequences of a financial crisis on the management of this company.

2.1. The Characteristics of the Subject of Study

The management of El Corte Ingles will be studied along ten years, including the period of financial crisis from 2000 to 2012. The table 1 presents some statistical descriptors of the company to understand our interest on the study of its management.

Table 1. Accounting magnitudes

Accounts/Parameters	Average	Standard derivation	Coefficient of variation
Operating revenue	10317965	1921289	0,186
EBIT	428050	88593	0,207
Total assets	9440324	2818400	0,299
Employees	56679	6260	0,110

The Pearson's coefficients of variation indicate the stable behaviour of sales and employment level, and are showing there is a management strategic during the period of study around of these variables.

The table 2 presents statistical descriptors for liability accounts to know financial positions of companies along of period to study.

Table 2. Accounting magnitudes of liability

Accounts/Parameters	Average	Standard derivation	Coefficient of variation
Equity	4436464	1033799	0,233
Fixed liabilities	1673219	913262	0,546
Liquid Liabilities	3330641	970309	0,291

Again, we can see that a fixed liability has big differences with the rest of the financial variables, through simple parametres. That is, the company does not change its financial position on the short term to maintain a sales and employment level, according to its strategy of customer loyalty. The variations of other variables are covered by external long-term financing, so the analysis of the financial leverage has interest on the management result.

This approach to the behaviour of the company has not weighted up of economic and monetary perturbations because it aims to present a first opinion for management of El Corte Ingles. The statistical descriptors have a longitudinal character in table 1 and 2, but as the financial leverage has relevance on behaviour of this company, it is

necessary to evaluate the annual situation through a cross analysis. The indicators obtained through the radar's methodology will allow us to do two kind of analysis.

All the information of the company has been obtained from the data base SABI (Analysis System of Iberian Balances) and the financial situation is represented in the figure 2 according to the relative value of assets and liability accounts on financial statements.
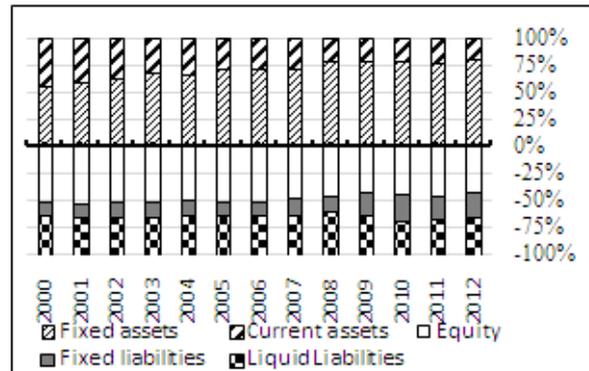

Figure 2. The financial situation of company

The situation of the company has financial difficulties at the short term because step by step, its working capital decreases, the credit default of 2012 is higher than in previous years [5] and the long term financing takes more relevance. The 2013 is a year to change the financial structure of the company [6, 7]. The causes of why the company achieves this situation are possible to measure and explain through the radar's methodology.

2.2. The Methodology of Radar Chart

The radar chart methodology is based on the display of the average period of maturation of a company on each axis of a radar chart. The average period of maturation is obtained as a relation between accounts of annual statements of Balance and Profit and loses through the general relations 1.

$$ri = \frac{EF \ or \ FF}{AAB} \ ; \ pi = \frac{time}{ri} \qquad (1)$$

i=s (sales), p (payment), c (collect)

The variables of relations 1 represent:
- EF= Economic flows or economic transaction
- FF= Financial flows or financial transactions.
- AAB= Average of Account Balance or current debtor and creditors and stocks.
- Time= the temporal unit to measure the time that company take to present its financial statements.

Relations 1 represent the dynamic behaviour of the company. The first part of relations 1 (ri) represent the number of times that an account of current liability or assets is moved to its respective economic (EF) or financial (FF) flow. The average period of maturation (pi) is the time in which a rotation is done.

On each axis of a radar chart there is a relation between

two indicators that must satisfy.

$$ri * pi = 365 \qquad (2)$$

The limit of each axis of figure 1 is 365, so it is easier to understand the dynamic behaviour of companies. When a radar chart is concentrated according to its centre, case 2 on figure1, the dynamics of the company is higher than the situation in cases 1 and 3 in figure 1.On the other hand, the value of the average period of maturation does not have to be transformed to include its measure in a radar chart, as it occurs in other areas of knowledge to represent all variables that study the behaviour of an object or subject of research.

Under this condition, it is possible to apply this methodology because there is a relation between the measure of activity and the financial position of the company. If a simple or weighted average of maturation periods is applied on this methodology, there will never be a relation between the radar chart and the financial situation of the company, because in the last case, the period of maturations will be a statistic variable, but not an accounting variable. For example, a cash payment takes a zero value to obtain the payment period as a statistic variable, but the average period of maturation will never be a zero value because the expression 2 will never be fulfilled.

2.3. The Radar Variables

The radar variables are obtained according to the following steps:

1. Application of cosine theorem to obtain perimetre distances.
2. The financial significance of perimetre distance.
3. Application of sin theorem to obtain the internal angular coefficients.

The distance between two contiguous axes is named "perimetre distance" (PDk). According to figure 1, there are three PD: perimetre distance of sales (PD1), monetary (PD2) and purchases (PD3). Those distances can be obtained through the following expression 3.

$$PDk^2 = pi^2 + pj^2 - 2 \cos 120 * pi * pj \qquad (3)$$

K = 1 (sales), 2 (monetary or financial); 3 (purchases)
i=j= s (sales), p (payment), c (collect); i≠j.

Table 3. Kinds of financial slacks

Positive financial slack	Negative financial slack
PD2>PD3>PD1	PD1>DP3>DP2
PD3>PD2>PD1	PD1>DP2>DP3
PD3>PD1>PD2	PD2>DP1>DP3

A perimetre distance measures the dynamic behaviour on an area of management, and its differences measure the financial slack on each area. When the perimetre differences (pdk) are positive, there is financial sufficiency on an area. Thus, if pd2 (pd3-pd1=pd2) is positive the company has

financial sufficiency in the financial area, but it do not know if this sufficiency is obtained with the result of the management activity or it is due to external financing of this area. To measure the last condition, it must know the orientation of the perimetre distances through angular coefficients of geometric figures forming a single radar chart. The table 3 presents the 6 different kinds of financial slack.

In Figure 1 we can see that the cases 1 and 2 show positive financial slacks and case 3 has a negative financial slack. The best financial position of table 3 is PD2>PD3>PD1 and applying the sine theorem, the table 4 shows the conditions that allow us to know if an area has financial sufficiency from its management result, and the figure 3 shows where the angular coefficients are on a radar chart.
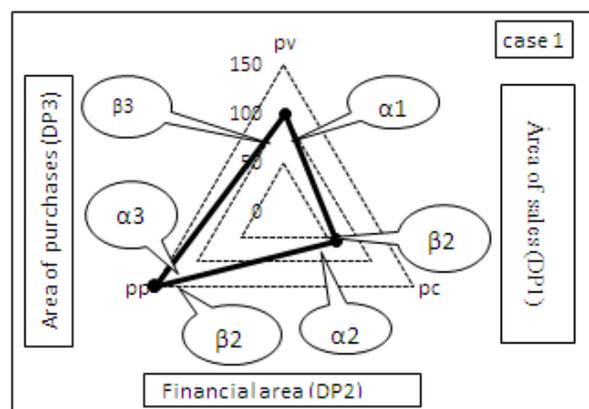

Figure 3. The angular coefficients

The theorem of sine is the expression 4, where the subscripts represent the same concept as in expression 3.

$$\frac{PDk}{sine\ 120} = \frac{pi}{sine\ \alpha k} = \frac{pj}{sine\ \beta k} \qquad (4)$$

Through applying the expression 4 over the inequality of table 3 of the above paragraph (PD2>PD3>PD1), we can obtain the conditions for measuring the liquidity of the result and of the financial sufficiency in each of the areas represented in a radar chart, as it is shown in Figure 3.

The management result is obtained by the relation of accounts that measures the level of management activity. These accounts are in annual account of profits and losses and have been deducted from expression 4 as it has been demonstrated on Perez`s works cited above. Thus, to measure the activity on each area in table 4, the several results of management are measured through variables of Purchases (P), Cost of Good Sales (CGS) and Sales (S).

Table 4. Conditions of financial management.

Areas	NC		LR	FS
Sales	α1≤30	β1>30	α2/β3>1	CGS/S<β2/α3<1
Financial	α2≥30	β2<30	β1/α3>1	P/S<α1/β3<1
Purchases	α3≤30	β3>30	α1/β2>1	P/CGS<β1/α2<1

The conditions of financial management are shown in

table 4 to each area: the necessary conditions (NC) of angular coefficients, the conditions of liquidity of management result (LR) and the conditions of financial sufficiency (FS). The angular conditions indicate us if a management area is financially sufficient (FS) whenever its result satisfies the conditions of liquidity (LR) to the activity of the company, and thus this area does not need an external financing.

Finally, there is a relation to control the result obtained in all processes of application in this methodology. This expression is number 5

$$\frac{Sine\ \beta 1}{Sine\ \alpha 1} * \frac{Sine\ \beta 2}{Sine\ \alpha 2} * \frac{Sine\ \beta 3}{Sine\ \alpha 3} = 1 \qquad (5)$$

From expression 5 it is possible to draw an indicator that lets us know the liquidity of the company's activity, comparing the multiplication of the relation of the angular coefficients with the result of financial area. This matter is given because the perimetre difference of financial area may be explained as a linear combination of other perimetre differences represented on a radar chart. The expression 6 shows this measure.

$$\frac{\beta 1}{\alpha 1} * \frac{\beta 2}{\alpha 2} * \frac{\beta 3}{\alpha 3} < 1 < \frac{P}{S} \qquad (6)$$

3. The methodological Application

3.1. The Visual Analysis

In this section we are going to see the behaviour of El Corte Ingles through radar charts, which are shown in figure 4. Firstly, we can see how the level of sales and payment periods are maintained during all the analysis. Secondly, as we have said above, this company has as a characteristic customer loyalty, and the collect period is adaptable to the needs of customers according to moments of financial market.

This strategy has the problem to maintain the payment period constant to guarantee the liquidity of creditors. So, there is not an adaptation between liquidity conditions that the company offers their creditors and the conditions of liquidity that the company offers to their debtors and customers.

When this behaviour is not proportional, it makes an unbalance which can be covered by external finance to management activity, justifying a kind of financial cost.

Radar charts B offer the best financial positions because they are more concentrated than other radar charts. That is, the perimetre distance of the sales area (PD1) is shorter than other period on radar charts A and B, and the company will have more liquidity on the periods of radar chart B and, at same time; the management activity is more dynamic than in other years. Now, we need to know what consequences this strategy has through an individual evaluation of each radar chart.
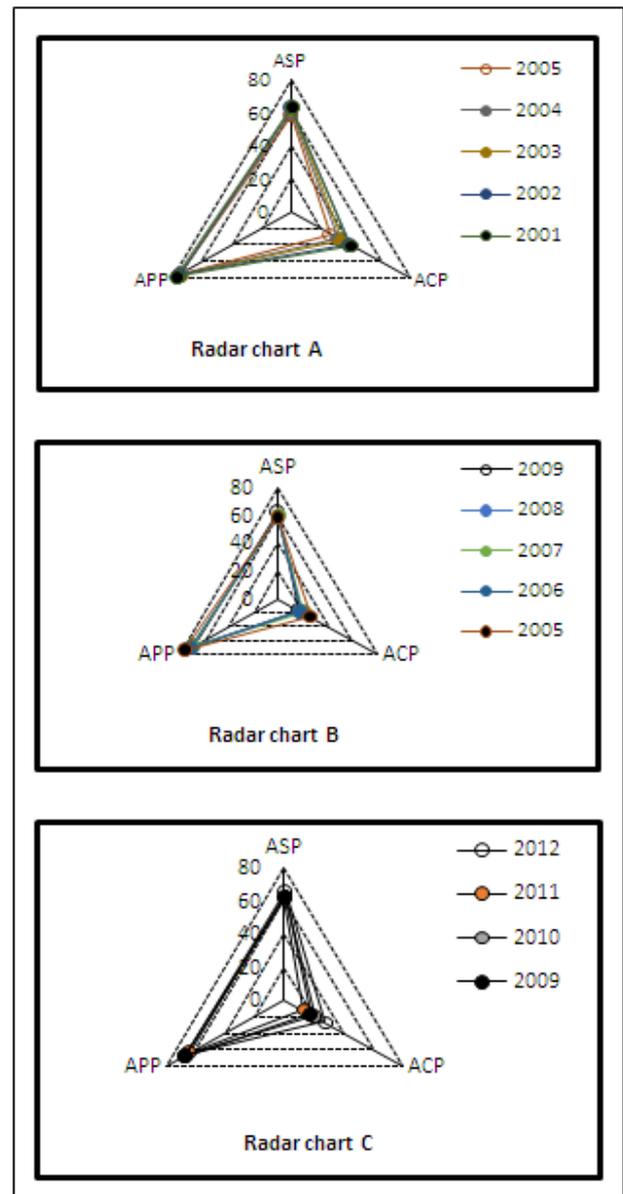

Figure 4.   The angular coefficients

3.2. The Analytical Analysis

To know the quality of the management on each area, the result of application of the radar's methodology under the conditions stated in above table 4 is presented in the annex.

The liquidity of the result remains constant only in the purchasing area for all the years considered in the analysis. This management based on flexibility of customer portfolio presents the risk that liquidity of purchases area cannot be sufficient to cover the result of management in the sales area. Consequently, the financial area presents difficulty of liquidity and, in this situation, the kind of external funding takes relevance.

Before getting conclusions, the evolution of the management results on the financial area are shown on graphs of figure 5.
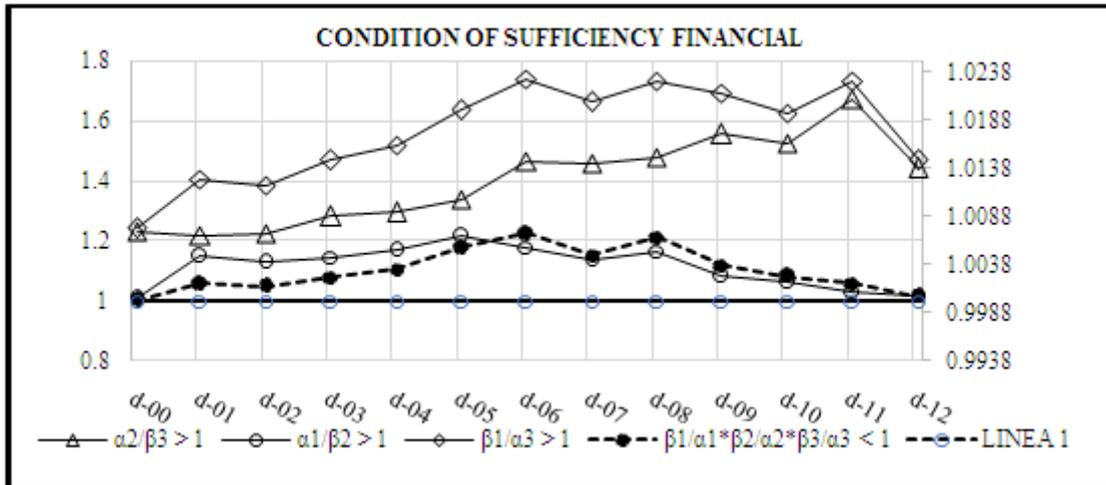
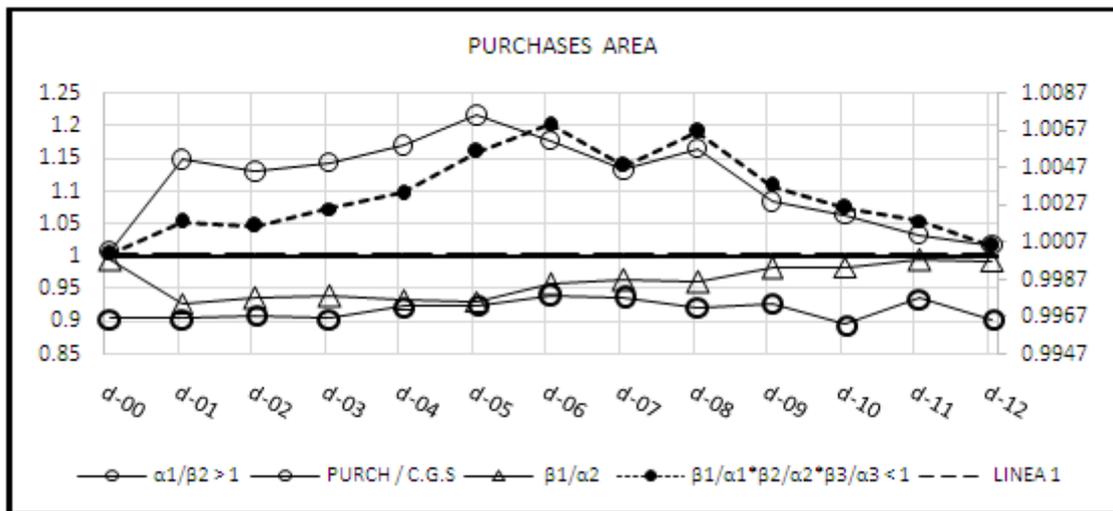**Figure 5.** The angular coefficients of sufficiency condition

Figure 6. The financial sufficiency and liquidity conditions or results in purchases area.

The financial and sales areas have been analyzed on figure 5, and their conditions of financial sufficiency ($\beta1/\alpha3>1$; $\alpha2/\beta3>1$) have the same evolution. These coefficients are higher than 1 and they indicate that the company has financial sufficiency. Nevertheless, these two areas do not fulfill the condition of liquidity on its management results, and thus its financial sufficiency is covered by an external financing.

The relation between two areas is normal because, as it has been seen on figure 4, the average period of collect makes that the financial and sales areas vary simultaneously when it approaches the centre of the axis of the radar chart. Moreover, the coefficients of the collection period on the radar chart measure the management result of the purchases area, thus there is a proportional and multidirectional relation in the activity of company.

The condition of financial sufficiency ($\alpha1/\beta2>1$) on purchases area takes the same tendency as the result of the liquidity of the company ($\beta1/\alpha1* \beta2/\alpha2* \beta3/\alpha3<1$), which is measured on the secondary axes in figure 5. This situation is critical for the company in the last years.

In order to know what the consequences from these two indicators are, the evolution of the situation in the purchases area is shown in figure 6, where two kinds of periods can be studied. One period is covered from 2000 to 2005, and the other is covered from 2006 to 2012. The first period is characterized by the increase of financial sufficiency ($\alpha1/\beta2>1$) and the conditions of the liquidity of the result ($\beta1/\alpha2>CGS/C$) take a good positions along the period of study. From 2005 to 2012 the liquidity of result loses quality because the relation $\beta1/\alpha2$ approaches to one.

The evolution of the indicator $\beta1/\alpha1* \beta2/\alpha2* \beta3/\alpha3$ is opposite to the evolution of the liquidity of the result in the purchases area ($\beta1/\alpha2$), as it can be seen on figure 6. From 2001 to 2005, the liquidity of the result of the company does not meet condition 6, because the indicator $\beta1/\alpha1* \beta2/\alpha2* \beta3/\alpha3$ is ever higher than 1 and increases up to 2005. From 2006 to 2012 the result of company neither meet the

condition 6, but the indicator β1/α1* β2/α2* β3/α3 is even higher than 1 and decreases up to 2012. So, the company improves the liquidity on its general result. That is to say, there is a change on the management in the last years and the quality of the liquidity of the result improves on sales and financial areas to compensate the losses of liquidity on the result of the purchases area.

As it is shown on figure 2 and 4, on 2005 there is a change of management, and this change has been evaluated by the comparison of the situation between years of the period of study. This kind of evaluation is longitudinal but it is possible to make a transversal evaluation, according to the individual significance of each angular ratio.

This change of management takes relevance on the employment level and the profitability of the company. These effects will be analyzed in the following section to compare the effectiveness of this methodology.

3.3. The Consequences of Management

Two kinds of factors affect the management results. One is due to the conditions of the market, and the other is due to the conditions of the management results which are related to the profitability of the company.

The liquidity on the sales area has changed in the last years as it has been seen on radar chart C in figure 4, but the financial management adopted on the portfolio of customers depends on the conditions of the financial market because the sales level is maintained along the analyzed years, according to the result of table 1, and as the customer loyalty has relevance on the strategic behaviour of El Corte Ingles, the management decisions have been applied on the economic factors.

The effect of the financial market on the sales area is studied through the correlation of coefficients among the angular indicators and financial indicators of monthly and quarterly series 1.3 of Bank of Spain [11]. The Annex 2 shows the result of coefficients of correlations and the table ANOVA of regression model, where data series of household indebtedness in relation to GPI has the highest level of coefficient as an independent variable, and the angular coefficient of the sales area ($\alpha2/\beta3 > 1$) is the dependent variable. The regression model obtained is the expression 7, where the data 2011 has not been considered because it is an outlier.

$$\frac{\alpha2}{\beta3} = 5,18316 * 10^{-7} * SI_{1_{3.46}}{}^3 - 1,118761276 \quad (7)$$

SI_1_3.46   Cuentas   financieras   trimestrales. Endeudamiento de los hogares e ISFL. Porcentaje sobre el PIB. (Quarterly financial accounts. Debt financing by households on Nonprofit entities. Percentage of GDP).

The above paragraph confirms the flexibility of the financial conditions of the sales area and thus this factor of activity takes relevance on the evolution of the management activity of the company.

The employment level and the ratio of liquidity of the

company management result are shown in figure 7. The first indicator is displayed on the secondary axis of ordinates as a dotted line, and the ratio that measures the liquidity of the result is displayed on the main axis of ordinates and it is displayed with a continuous line.
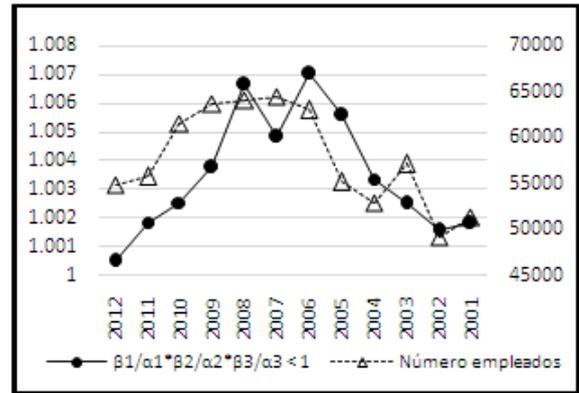
Figure 7.   The evolution of employments.

The level of employment takes significance on the evaluation of the management result of the company, and according to the evolution of the product of angular relations. When the company loses the liquidity of result, the employment level increases, as it occurs from 2001 to 2008, and when the management result gains on liquidity, on years 2009 to 2012, the employment in the company decreases. That is to say, the level of employment is the factor that presents flexibility of adaptation to the management result of the company, and we know that the employment increase along the period between 2001 and 2008 presents an inadequate situation.

The return on assets (ROA) and the return on equity (ROE) are shown in figure 8 to measure the relevance of investment, the other factor of management. The ROA and ROE are displayed on secondary axis of ordinates, with a dotted line, and we can see that these indicators have the same tendency. That is to say, the economic result (ROA) is conditioning the equity result (ROE) with a financial leverage higher than one.

Figure 8.   The evolution of returns of Equity and Assets.

The tendency of rates ROA and ROE are inadequate

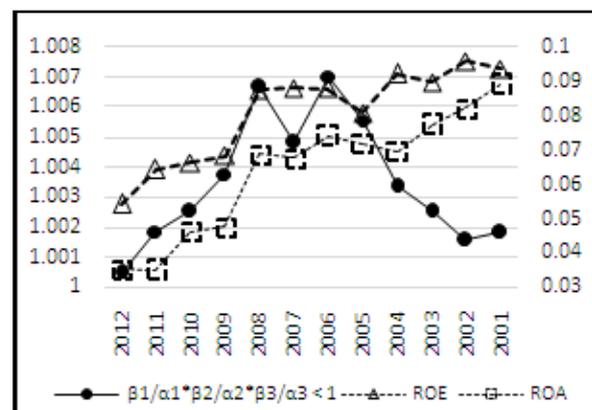according to the same level of employment on 2005 and 2012. As we can see on figure 7, these indicators have a different level. In other words, the financial return (annex1) takes relevance and the level of ROE depends on the effect of the financial leverage. Consequently, the return of the company depends on the financial market and the ratio β1/α1* β2/α2* β3/α3 indicates the inconsistency situation of the company regarding the result of its activity.

To reinforce the previous comment, we need to remember that the working capital decreases along the periods, as we have seen on figure 2, and the result of management does not achieve liquidity as we have seen in figure 6. In this situation, the loss of liquidity on the result makes that the equity must remain in the company because there is no liquidity. So the management of external financing takes relevance because the strategy of the company consists of maintaining the solvency of supplier's portfolio, even more when the purchases area offers liquidity to the activity of the company.

The financial situation of the company is confirmed through several actuations to lessen or reduce its financial situation. The company refinances its debt by 3.600 million euros on 2012 [8], a new debt refinancing occurs on November 14, 2013 [9] and the alienation of a building in December 2013 [10]. These decisions indicate that the management of buildings, where the El Corte Ingles makes

its activity, is the key to enhance the results of the management because this factor of activity does not have enough flexibility to adjust to economic shocks; moreover, when the Pearson's coefficients of variation sales and employment are more adjusted, how it show on table 1.

4. Conclusions

The radar methodology can explain the situation of a company and can help to make decisions to adjust its activity in order to justify its financial positions according to its management activity. This possibility can be applied over each decision made by the staff company and will allow them to know under what economic conditions they have to act on a market or an economic sector.

The methodology of radar charts can be applied to any economic matter that is subject to study. This methodology is very exigent given the character of its indicators, and it opens the door to implement a new method to measure the company management because any decision has multidirectional effects. Any management decision has multidirectional effects and we know that we cannot make decisions on an area without its effect on the rest of them.

Appendix 1

AVERAGE PERIOD OF MADURATON

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
ASP	66	63	63	63	59	60	59	59	60	63	63	64
ACP	27	13	20	17	18	21	19	26	31	34	40	40
APP	68	65	68	69	71	70	72	75	74	75	75	77

PERIMETRE DISTANCES

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
PD1	83,41	70,07	74,96	72,79	69,93	72,86	70,24	75,73	80,67	84,90	90,09	90,41
PD2	84,87	72,34	79,66	78,80	81,35	82,38	82,55	91,61	93,92	96,67	101,26	103,17
PD3	116,07	110,72	113,37	113,78	112,28	112,88	113,23	116,73	116,83	119,33	120,50	122,29

RESULTS OF APLYING SINE THEOREM AND NECESSARY CONDTIONS (NC)(1)

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Sineβ1/sineα1	**2,417**	**4,896**	**3,173**	**3,624**	**3,202**	**2,899**	**3,148**	**2,231**	**1,931**	**1,837**	**1,603**	**1,598**
sine β1	0,688	0,776	0,728	0,745	0,729	0,716	0,727	0,674	0,648	0,638	0,610	0,610
sine α1	0,285	0,158	0,230	0,205	0,228	0,247	0,231	0,302	0,336	0,347	0,381	0,381
Sineβ2/sine2	**0,405**	**0,197**	**0,293**	**0,251**	**0,261**	**0,297**	**0,262**	**0,350**	**0,421**	**0,454**	**0,525**	**0,515**
sine β2	0,280	0,153	0,216	0,190	0,196	0,218	0,197	0,250	0,288	0,305	0,339	0,334
sine α2	0,692	0,779	0,738	0,755	0,751	0,736	0,751	0,714	0,685	0,672	0,645	0,649
Sineβ3/Sineα3	**1,023**	**1,037**	**1,077**	**1,098**	**1,198**	**1,163**	**1,214**	**1,280**	**1,231**	**1,199**	**1,189**	**1,215**
sine β3	0,506	0,509	0,518	0,523	0,544	0,537	0,547	0,560	0,551	0,544	0,542	0,548
sine α3	0,494	0,491	0,481	0,477	0,454	0,462	0,451	0,437	0,447	0,454	0,456	0,451

The necessary conditions are fulfilled in all areas.

$$\text{Sine}\beta1/\text{Sine}\alpha1*\text{Sine}\beta2/\text{Sine}\alpha2*\text{Sine}\beta3/\text{Sine}\alpha3 = 1$$

SUFICIENT CONDITIONS: SUFFICIENCY FINANCIAL (SF) AND LIQUIDITY.OF RESULTS (LR)(2)

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
$\alpha1/\beta2 > 1$	1,0180	1,0327	1,0639	1,0836	1,1660	1,1333	1,1783	1,2159	1,1704	1,1443	1,1303	1,1483
PURCH / C.G.S	0,9038	0,9354	0,8956	0,9285	0,9220	0,9373	0,9401	0,9255	0,9235	0,9052	0,9096	0,9053
$\beta1/\alpha2$	0,9933	0,9944	0,9832	0,9814	0,9615	0,9645	0,9585	0,9314	0,9340	0,9393	0,9358	0,9284
$\alpha2/\beta3 > 1$	1,4405	1,6725	1,5224	1,5553	1,4768	1,4587	1,4663	1,3369	1,2940	1,2802	1,2238	1,2189
C.G.S / S	0,7799	0,4221	0,7906	0,7919	0,7877	0,7837	0,7863	0,7910	0,7797	0,7773	0,7758	0,7694
$\beta2/\alpha3$	0,5484	0,3003	0,4333	0,3845	0,4179	0,4585	0,4228	0,5578	0,6303	0,6578	0,7293	0,7288
$\beta1/\alpha3 > 1$	1,4671	1,7304	1,6238	1,6917	1,7334	1,6610	1,7398	1,6345	1,5196	1,4687	1,3854	1,4022
PURCH./ S.	0,7049	0,3949	0,7081	0,7353	0,7262	0,7346	0,7393	0,7321	0,7201	0,7037	0,7057	0,6965
$\alpha1/\beta3$	0,5444	0,2980	0,4250	0,3760	0,3992	0,4401	0,4024	0,5166	0,5867	0,6163	0,6814	0,6754
$\beta1/\alpha1*\beta2/\alpha2*\beta3/\alpha3 < 1$	1,0005	1,0019	1,0025	1,0038	1,0067	1,0048	1,0070	1,0056	1,0034	1,0025	1,0016	1,0018

The condition SF is fulfilled in all areas, and the condition LR is only fulfilled in purchase area.

THE RENTABILITY OF COMPANIES

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
ROA	0,0353	0,0350	0,0464	0,0475	0,0687	0,0676	0,0741	0,0720	0,0698	0,0775	0,0823	0,0891
RFC	0,0065	0,0458	0,0115	0,0077	0,0094	0,0158	-0,0054	-0,0206	0,0033	-0,0324	-0,0384	-0,0707
ROE	0,0543	0,0643	0,0662	0,0683	0,0876	0,0918	0,0930	0,0946	0,0919	0,0895	0,0934	0,0919

Appendix 2

AÑOS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SI_1_3.38	15,6	13,6	16,2	18,7	24	21,5	12,7	3,8	-0,7	-0,4	-2,4	-4,8
SI_1_3.39	16,5	14	17,1	20,5	27,1	22,6	13,8	5,2	-0,3	1,2	-0,9	-3,4
SI_1_3.46	55,9	59,7	64,7	70,9	78,2	85,6	88,9	88,7	91,1	91,9	89,5	87,6

SI_1_3.38 *Crédito por finalidades. A personas físicas. Tasa de variación interanual*. Creditpurposes. Natural persons. Interannualrate of variation.

SI_1_3.39 *Crédito por finalidades. A personas físicas. Adquisición de vivienda. Tasa de variación interanual*. Credit purposes. Natural persons. Acquisition of housing. Interannual rate of variation.

SI_1_3.46 *Cuentas financieras trimestrales. Endeudamiento de los hogares e ISFL. Porcentajesobre el PIB*.Quarterly financial accounts. Debt financing by households an Nonprofit entities. Percentage of GDP.

ANOVA TABLE

Regression Statistics	
Multiple correlation coefficient	0,981573755
Coefficient of determination R^2	0,963487037
R^2 adjusted value	0,959430041
Standard error	0,024374667
Number of Observations	11

ANALYSIS OF VARIANCE				(ANOVA)	
	Degree of freedom	Sum of squares	Mean squares	F	Critical value of F
Regression	1	0,141097294	0,141097294	237,4878003	8,92037E-08
Wastes	9	0,00534712	0,000594124		
Total	10	0,146444414			

	Coefficients	Standard error	Statistical t	Probability	Lowerr 95%	Higher 95%
interception	1,118761276	0,018985017	58,92864383	5,87941E-13	1,075814185	1,161708367
SI_1_3.46 ^3	5,18316E-07	3,36337E-08	15,41063919	8,92037E-08	4,42231E-07	5,94401E-07

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