Applying an automatic approach for showing up the hidden themes in financial marketing research (1961–2010)

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ABSTRACT

This paper analyses the academic research conducted in financial marketing from 1961 to 2010. To do so, an automatic approach for detecting and visualising the hidden themes is applied. This automatic approach, based on co-word analysis, combines performance analysis and science mapping. It permits visualising the division of the financial marketing research (FMR) into several subfields, and indicate the relationships between them. These outcomes are completed with a systematic review, where a content analysis is used to explore the type of methodologies and topics most frequently used.

The results allow us to identifying trends that will presumably be developed in FMR in coming years. In addition, these results also help both experts and novices to understand the current state of the art of FMR and to predict where future research could lead.

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1. Introduction

In general, the financial sector did not become highly competitive until some 20 years ago when the liberalisation of financial services and merger and acquisition actions led to increased competition, particularly in sectors such as banking, savings and loans, stock market investing, insurance companies, and others (Kamakura, Ramaswami, & Srivastava, 1991). In this new context, sectors with a high degree of competitiveness, is where marketing as a business strategy reaches its maximum meaning and development.

Discussions on the financial sector or system, and especially those from a marketing approach, usually refer solely to the banking sector (banks and savings banks) as this sector virtually controls and dominates the entire financial system. However, it is important to distinguish between bank marketing and financial marketing. The first type of marketing basically involves credit institutions, while the second is undertaken by any entity, company or agency that provides a range of financial products (Muñoz, 2011). In this paper, we have chosen this expanded vision of financial marketing.

A review (Tyler & Stanley, 1999) of the scientific literature shows that in past decades the scientific community paid scant attention to service markets in general and financial markets in particular, and even less attention to the topic of sector-based marketing. In spite of the difficulties involved in these markets, the literature specialised in financial marketing should not overlook analyses of the exchange relations that occur in them, which in turn serve to complement the debates in broader areas such as services marketing. For this reason, we consider that financial marketing deserves a detailed study of its past action lines as clues of what may be its future.

So, this paper analyses the research conducted in financial marketing research (FMR) by using academic publications. The analysis is organised into two parts. Part 1 of the study applies an automatic approach combining performance analysis and science mapping (Cobo, López-Herrera, Herrera-Viedma, & Herrera 2011a; Noyons, Moed, & Luwel 1999; Van Raan, 2005) for detecting and visualising conceptual subdomains and identifying the most prominent themes treated by FMR in the last 50 years. The analysis includes both content and citation analysis on the basis of the main academic publications on this topic from 1961 to 2010. Quantitative and qualitative measures are used to identify the most prominent themes. Quantitative data are used to put together closely related concepts (themes or clusters of topics), while qualitative indicators (i.e., those based on citations) are used to measure the quality and/or impact of the themes identified. The study also incorporates a thematic network to show, in a visual way, the associations between the main

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concepts treated by FMR. These outcomes are completed and enriched in Part 2 with a revision of 45 additional scientific papers that make reference to the methodological sophistication, type of methodologies used and the themes and content covered, clearly distinguishing between three periods: the eighties, the nineties and the new millennium. This review serves to enrich the results of the previous bibliometric analysis by identifying the evolution that has characterised this research effort and the research trends that will presumably be developed in this field.

The paper is structured as follows. Section 2 describes the main results and methodology and data used in part 1, while Section 3 shows the results of part 2. Section 4, discussion, summarises the most highlighting results, and finally, some conclusions are drawn.

2. Part 1: Bibliometric study through co-word analysis

This part is organised as follows. Section 2.1 introduces the analysis methodology, Section 2.2 describes the data set used in the study, in Section 2.3 describes the main results, including the most frequent journals, the main themes (and their areas), and the relationships between these themes and other directly linked concepts (thematic network).

2.1. Methodology

In this paper, we use a reduced version of the bibliometric approach proposed by Cobo et al. (2011a). This approach combines both performance analysis tools and science mapping tools to analyse a research field (Cobo, López-Herrra, Herrera, & Herrra-Viedma 2011c; López-Herrera et al., 2012), and detect and visualise its conceptual subdomains (particular topics/themes or general thematic areas) and thematic evolution.

In our analysis, bibliometric maps are created using co-word analysis; a content analysis technique that is effective in mapping the strength of association between information items in textual data (Callon, Courtial, & Laville, 1991; Callon, Courtial, Turner, & Bauin, 1983; Coulter, Monarch, & Konda, 1998; Whittaker, 1989). Co-word analysis is a powerful technique for discovering, describing and visualising the interactions between words/terms/topics in different fields in scientific research (Bailón-Moreno, Jurado-Alameda, & Ruiz-Banos, 2006; Callon et al., 1991; Chen, Lin, & Yang, 2011; Leydesdorff & Zhou, 2008; López-Herrera, Cobo, Herrera-Viedma, & Herrera, 2010; López-Herrera et al., 2009; Meng, Lin, & Li, 2011; Muñoz-Leiva, Viedma-del Jesús, Sánchez-Fernández, & López-Herrera, 2011; Park & Lee, 2011; Viedma-del-Jesus, Perakakis, Muñoz, López-Herrera, & Vila, 2011; Wang & Ohsawa, 2012). This technique reduces a space of descriptors (or keywords) to a set of network graphs that effectively illustrate the strongest associations between descriptors (Coulter et al., 1998).

Additionally, it develops a performance analysis of specific themes using a series of basic bibliometric indicators. Three of the four phases proposed in Cobo et al. (2011a) are used in this paper:

Phase 1 (*Detect the research themes*). To do so, we first compute the co-occurrence matrix by assuming that the co-occurrence frequency of two keywords is extracted from the corpus of documents by counting the number of documents in which the two keywords appear together. Secondly, we compute the equivalence index among keywords (Callon et al., 1991), called eij: $e_{ij} = \frac{c_{ij}^2}{c_i \cdot c_j}$, where cij is the number of documents in which two keywords i and j co-occur and ci and cj represent the number of documents in which each one appears. At the end of this phase, we cluster keywords to topics/themes by using the simple centres algorithm (Coulter et al., 1998). As this algorithm automatically returns labelled clusters, a post-process to label the clusters is not needed. Such a process of clustering enables us to locate keyword networks that are strongly linked to each other and which correspond to interest centres or to research problems that are the object of significant investment by researchers.

Phase 2 (*Build strategic diagrams*). In the clustering process we obtain a set of interconnected networks or themes. In this context, each keyword network or theme can then be characterised by two parameters (Callon et al., 1991):

- *Centrality*: This measures the degree of interaction of a network with other networks and can be defined as: $c = 10 \cdot \sum e_{kh}$, where k is a keyword belonging to the theme and h is a keyword belonging to other themes. Centrality measures the strength of external ties to other themes. This value can be understood as a measure of the importance of a theme in the development of the entire research field analysed.
- *Density*: This measures the internal strength of the network and can be defined as: $d = 100 \cdot \frac{\sum e_{ij}}{w}$, where i and j are keywords belonging to the theme and w is the number of keywords in the theme. Density measures the strength of internal ties among all the keywords describing the research theme. This value can be understood as a measure of the theme's development.

In this context, *Isolated Networks* refer to networks that have low centrality values, while *Principal Networks* are those that have high centrality and high density values (for more detail see Callon et al., 1991).

A *strategic diagram* is a two-dimensional space built by plotting themes according to their centrality rank (c_r) and density rank (d_r) calculated as: $c_r = \frac{rank_i^c}{N}, d_r = \frac{rank_i^d}{N}$, where $rank_i^c$ is the position of theme i in the themes list in ascending sort of centrality, and $rank_i^d$ is the position of theme i in the themes list in ascending sort of density. N is the number of themes in the whole network, and is introduced to standardise the c_r and d_r values to the range [0,1].

An example of a strategic diagram is presented in Fig. 1. Thus, with both parameters a research field can be understood to be a set of research themes that are mapped in a two-dimensional space and classified into four groups (Callon et al., 1991):

I Themes in the upper-right quadrant are both well developed and important for the structuring of a research field. They are known as the motor themes of the speciality given that they present strong centrality and high density.
II Themes in the upper-left quadrant have well-developed internal ties but unimportant external ties and so are of only marginal importance for the field. These themes are very specialised and peripheral in character.
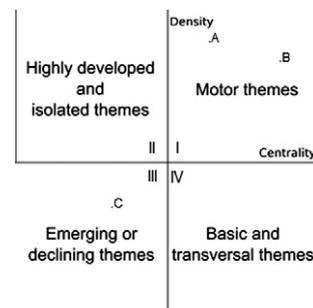

Fig. 1. Quadrants in a strategic diagram and an example.