

FUZZY LOGIC ANALYSIS OF EFFECTIVENESS OF THE INTERNET ADVERTISING FORMATS IN INTERACTIVE TELEVISION

Рассматривается актуальная маркетинговая проблема, связанная с оценкой эффективности интернет-рекламы в формате интерактивного телевидения. Предложен метод для принятия решений при размещении заказа, основанный на многозначной логике и позволяющий эффективно использовать субъективную экспертную информацию.

In a context of technological convergence, the users indistinctly can accede to audiovisual contents through the television and Internet. The object of present work is evaluating the effectiveness of the Internet advertising formats in Interactive Television.

The new techniques derived from multivalent logic are an interesting alternative for decision making through order versus classical methods. Therefore, after the treatment of subjective expert input the results reveal that Internet advertising formats are not effectiveness in Interactive Television and it is necessary adapt them for improve the effectiveness of this formats to inform, persuade and remember.

1. Introduction

The changes produced in the development of different technologies of diffusion of the television (cable, satellite, TDT, ADSL, DVB-H, etcetera), the digitalization of the signal, the high definition (HDTV) and 3D, the convergence with Internet, the multimedia hard disks, the Personal Video Recorders (PVRs), as well as, the concentration in great multimedia groups and the appearance of new operators as Hulu, Netflix and Google TV, have modified the current panorama. All it has multiplied the number of television sets and the form of access and consume the audiovisual contents. In this environment we think that Internet business models as Google Search and advertising formats as Search sponsorship and others can be use in the Interactive Television, keep in mind the convergence of business models of both technologies.

Therefore the object of present work is study the effectiveness of the Internet advertising formats in the Interactive Television.

Following we review the efficacy measures of the advertising formats in others researches, after we propose the methodology for the analysis and contrast the hypothesis. Finally expose the conclusions and involvements for the advertising industry and future research possibilities.

2. Advertising effectiveness

Along the literature appreciate different measures of advertising effectiveness. Lavidge and Steiner (1961) use the Hierarchy Effects Model to measure the effects of the advertising in the phases of the process of disposition to the purchase: awareness, knowledge, taste, favourable attitude towards the product or feeling, conviction and purchase.

Stewart and Furse (1986) use the measures of efficacy proposed by the Research Systems Corporation: comprehension, persuasion and remember, to measure the efficacy of 1059 television commercials.

Aaker, Batra and Meyers (1992), as well as, Díez de Castro, Martín Armario and Sánchez Franco (2002) it proposes the use of variables related to profitability and the sales to measure the advertising effectiveness. Shelter in Clarke (1986) and Farbey (1994) warning about the difficulty to insulate the effects of the advertising effort in the sales, as well as, the delay of its effects.

This research uses, to measure the efficacy of the advertising formats, the basic ends of promotion instruments introduced by Kotler (1989): inform, persuade and remember, similar to the measures used by Stewart and Furse (1986).

3. Methodology

In order to analyzing the effectiveness of the Internet advertising formats in Interactive Television, propose a specific objective: determine if the Internet formats can be effective in Interactive Television or if it is necessary adapt them.

The hypotheses H_1 , H_2 and H_3 will be allow determine that the Internet formats are less-effectiveness in Interactive Television and therefore it is necessary an adaptation.

H_1 : The Internet formats occupy the first positions of the ranking of less-effectiveness in the ability to inform.

H_2 : The Internet formats occupy the first positions of the ranking of less-effectiveness in the power of persuasion.

H_3 : The Internet formats occupy the first positions of the ranking of less-effectiveness in the ability of making remember.

For the contrast of this hypotheses proposes analyze the efficacy of advertising formats, we keeping in mind, for a side, the importance that has the features that compose them to get inform, persuade and remember; for other, the desirable level of the feature that it must have to get it, and finally the degree which the advertising formats meet those features.

The analysis is based in two basic assumptions: first, overcoming the desirable level of the feature does not penalize the effectiveness of the format, and second, there is no characteristic that has a minimum level of compliance.

The analysis of the formats effectiveness start with a fuzzy subset for describing (Kaufmann et al., 1986) formed with a referential composed by 41 features, 18 are related with the format (fiction images, real images, corporate typography, head, body of text, real slogan, colour, video, animation, music, voice in off, free duration, duration 20", duration 20", full screen, 1/4 screen, 1/2 screen, 3/4 screen); 8 are related with the context of insertion of the format (before the content, after the content, in advertising bloc, affinity of the context, immersion in the context, exhibition on the content, exhibition outside of content, message personalization ability); and 15 are related with its interactive ability (manipulate the content, manipulate the product, manipulate the realization, linearity, navigation by menu, browser navigation, the presence of links, data entry, immediate response, response post, reply by same media, reply through other channel, leaving the television flow, keep contact with the image, keep contact with the sound).

Keep in mind the 34 formats of Referential set (Kaufmann et al., 1986) F:

$$F = \{F_1, F_2, F_3, \dots, F_{32}, F_{33}, F_{34}\}.$$

And the 3 proposal objectives:

$$O = \{O_1, O_2, O_3\}.$$

Experts suggest the principal features than configure the advertising formats and value all elements of the referential set for completing the characteristic membership functions (Kaufmann et al., 1986) of each fuzzy subset, so much of the formats:

$$F_n = \begin{array}{|c|c|c|c|c|} \hline C_1 & C_2 & \dots & C_{m-1} & C_m \\ \hline \mu_{C_1}^{(n)} & \mu_{C_2}^{(n)} & \dots & \mu_{C_{m-1}}^{(n)} & \mu_{C_m}^{(n)} \\ \hline \end{array}$$

Being $\mu_{C_i}^{(n)}$ valuations between [0, 1], m the number of features and n number of advertising formats.

As of the proposal objectives:

$$O_p = \begin{array}{|c|c|c|c|c|} \hline C_1 & C_2 & \dots & C_{m-1} & C_m \\ \hline \mu_{C_1}^{(p)} & \mu_{C_2}^{(p)} & \dots & \mu_{C_{m-1}}^{(p)} & \mu_{C_m}^{(p)} \\ \hline \end{array}$$

Being $\mu_{C_i}^{(p)}$ valuations between [0, 1], m the number of features and p number of advertising formats.

After the description by fuzzy subsets of all formats and the three specifics objective (table 1). Adequacy Ratio with Convex Weighting), experts have decided to weight each feature of each objective by convex weighting (Gil Lafuente, 1997):

$$\omega_n = \frac{u_n}{\sum_{i=1}^n u_i}.$$

Obtaining:

$$\omega_1 = \frac{v_1}{\sum_{i=1}^n v_i}, \omega_2 = \frac{v_2}{\sum_{i=1}^n v_i}, \dots, \omega_m = \frac{v_m}{\sum_{i=1}^n v_i}.$$

In this case, it made "subweight" and "sub-subweight" according to feature sets analyzed (table 1).

Obtained the total of the necessary information, find the Adequacy Ratio with Convex Weighting (Gil Lafuente, 2002) that relate each of the formats of the analysis with the three previously established objectives, because the experts consider that, if the awarded value to the feature of the format exceed the objective, the degree of "proximity to the ideal", must follow being the maximum (if $\mu_{C_i}^{(n)} \geq \mu_{C_i}^{(p)}, \Pi_i (n \rightarrow p) = 1$):

$$\Pi_i (n \rightarrow p) = \omega_i [1 \wedge (1 - \mu_{C_i}^{(p)} + \mu_{C_i}^{(n)})].$$

Thus, it will obtain the coefficient between the objective 1 and the format 1:

$$\Pi (O_1 \rightarrow F_1) = 0,633$$

and, in the same way, all the remainders (table 1. Adequacy Ratio with Convex Weighting).

4. Resolution

The table 2 (Effectiveness advertising formats keep in mind proposal objectives), show the coefficients obtained for each advertising formats that indicate its ability to inform, persuade and remember, where 0 means that the format is not able to get the purpose end while 1 indicates that the format can get the totality of the purpose end. In any format are given maximum coefficients, so that it could venture to say that does not exist a format that allows get an absolute objective.

We add the row labelled "Total" to facilitate the selection of the format for the totality of its objectives, because the consulted experts accept a trade off between objectives.

With the results of the table 3 (Top 10 Less-Effectiveness advertising formats keep in mind proposal objectives) we contrast the hypothesis H₁, H₂ and H₃.

H₁: The Internet formats occupy the first positions of the ranking of less-effectiveness in the ability to inform. The cursors (0,483), nested links (0,572), TV-Mail signatures (0,586) and the TV-Mail (0,589) are in the top 10 of this ranking.

Table 2

Effectiveness advertising formats keep in mind proposal objectives

Objective	Formats	
	Format	Value
Inform	Advertorials	0.633
	Self-promotions	0.687
Persuade	Banners	0.568
	Animated banners	0.544
Recall	Bartering	0.716
	Mask of entrance	0.593
Total	TV-Mail	0.589
	Morphing	0.557
	Cursors	0.483
	DAL	0.816
	Sponsorship	0.602
	TV-Mail Signatures	0.586
	Impulse Response	0.713
	Infomercial	0.669
	Interstitials	0.592
	SM S messages & plus lines	0.637
	Microprograms	0.605
	Microsite	0.788
	Mini-Dal	0.761
	Netsted links	0.572
	Active sponsorship	0.671
	Search sponsorship	0.619
	Interactive sponsorship	0.617
	Passive sponsorship	0.589
	Product placement	0.544
	Publirreportage	0.605
	Rich media banners	0.605
	Overlays	0.594
	Interactive spot	0.521
	Spots	0.874
	Telepromotion	0.653
	Telescoping ads	0.647
	Teleshopping	0.639
	TV Site	0.668
		0.761

H₂: The Internet formats occupy the first positions of the ranking of less-effectiveness in the can of persuasion. The couriers (0,392), nested links (0,456), signatures of dressing and softening fabric and fibres TV (0,484) and the TV post (0,492) are in the top 10 of this ranking.

H₃: The Internet formats occupy the first positions of the ranking of less-effectiveness in the ability of remember. The cursors (0,595), nested links (0,617), sponsorship searches (0,647) and the TV-Mail (0,662) are in the top 10 of this ranking.

Table 3

Top 10 Less-Effectiveness advertising formats keep in mind proposal objectives

Ranking	Inform			Persuade			Recall		
	Formats	Interactive	Puntuations	Formats	Interactive	Puntuations	Formats	Interactive	Puntuations
1	Cursors	OK	0,483	Cursors	OK	0,392	Cursors	OK	0,595
2	Layers	NO	0,521	Layers	NO	0,421	Netsted Links	OK	0,617
3	Animated Banners	OK	0,544	Netsted Links	OK	0,456	Layers	NO	0,619
4	Product placement	NO	0,544	Passive sponsorship	NO	0,471	Banners	OK	0,641
5	Morphing	NO	0,557	Animated Banners	OK	0,484	Animated Banners	OK	0,644
6	Banners	OK	0,568	Sgn in TV-mail	OK	0,484	Search results sponsonship	OK	0,647
7	Netsted Links	OK	0,572	Sponsorship	NO	0,485	Interactive sponsonship of contents	OK	0,652
8	Sgn in TV-mail	OK	0,586	Banners	OK	0,487	TV-mail	OK	0,662
9	Passive sponsorship	NO	0,589	TV-mail	OK	0,492	Passive sponsorship	NO	0,680
10	TV-mail	OK	0,589	Search results sponsonship	OK	0,497	Sgn in TV-mail	OK	0,680

We can confirm the hypotheses H₁, H₂ and H₃. Then we can affirm that the Internet formats are less effectiveness of the advertising formats analyzed to inform, persuade and remember. Therefore they need adaptations to be effectiveness in the Interactive Television.

5. Conclusions

The development of the research confirm the outlined hypotheses and we conclude that it is necessary an adaptation of the characteristics that compose Internet advertising formats to improve their effectiveness to inform, persuade and remember in the Interactive Television environment. Thus, formats like cursors, nested links, TV Mail and the TV Mail signatures, must adapt to navigation flows of the Interactive Television.

The fuzzy logic methodology used in this work allows easily and rapidly measuring the advertising format effectiveness. For this study, we have kept in mind three measures of advertising effectiveness, in future research be able to adding other measures attending the wellness of obtained results with the proposed methodology.

The study was conducted for the Spanish market of the television, but could extend to other markets, resulting a multi-market study that allows comparing their differences. In the same way, could extend the research to others sectors as mobile phones or videogames, in an environment of technology convergence.

References

- Aaker D.A., Batra R. and Myers J.G. Advertising management, Ed. Prentice-Hall, Englewood Cliffs, London, 1992.
- Aymerich L. Nous formats publicitaris en televisió interactiva, Barcelona, 2007.
- Clarke D.G. "Econometric measurement of the duration of advertising effect on sales", Journal of Marketing Research, 1986, Vol. 13, November, pp. 345–357.
- Díez De Castro E., Martín Armario E. and Sánchez Franco M.J. Comunicaciones de marketing: Planificación y Control, Ed. Pirámide, Madrid, 2002.
- Farbey A.D. How to Produce Successful Advertising, Kogan Page Limited, 1994.
- Gil Aluja J. "Selección de personal: el problema de la polivalencia y el de la uniformidad", Cuadernos CEURA, 1987.
- Gil Aluja J. The interactive management of human resources in uncertainty. Kluwer Academic Publishers, Dordrecht, Boston, 1998.
- Gil Lafuente J. Marketing para el nuevo milenio, Ed. Pirámide, Madrid, 1997.
- Gil Lafuente J. Algoritmos para la excelencia: claves para el éxito en la gestión deportiva. F.C. Barcelona, Barcelona, 2002.
- González López A. Nuevas formas de publicidad en la televisión interactiva, Tesis doctoral, Universidad Complutense de Madrid, Facultad de Ciencias de la Información. Madrid, 2002.
- Kaufmann A. and Gil Aluja J. Técnicas operativas de gestión para el tratamiento de la incertidumbre, Ed. Hispano-Europea, Barcelona, 1985, capítulo 25.
- Kaufmann A. and Gil Aluja J. Introducción de la teoría de los subconjuntos borrosos a la gestión de las empresas, Ed. Milladoiro, Santiago de Compostela, 1986.
- Kaufmann A. and Gil Aluja J. Técnicas de gestión de empresas. Previsiones, decisiones y estrategias, Ed. Pirámide, Madrid, 1992, pp. 285–295.
- Kotler Ph. Principles of Marketing, Prentice Hall, Englewood Cliffs, London, 1989.
- Lavidge R.J. and Steiner G.A. "A model for predictive measurements of advertising effectiveness", Journal of Marketing, 1961, October, p. 59.
- Stewart D.W. and Furse D.H. Effective Television Advertising: A Study of 1000 Commercials, Lexington Books, Lanham, 1986.
- Zadeh L. "Fuzzy sets as a basis for a theory of possibility", Fuzzy Sets and Systems, 1978, Vol. 1 (328).
- Zadeh L.A. "Fuzzy sets", Information and Control, 1965, Vol. 8 (3).
- Zimmermann H.J. Fuzzy Sets, Theory and its Applications, Ed. Springer, 4th edition, 2005.

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