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Quantifying Brand-Building in Online Advertising - Brand Effectiveness Score: A Novel Framework for Measuring and Optimizing Brand Health in Digital Advertising

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Abstract: The article presents an analysis of the possibilities for quantifying brand-building effectiveness in online advertising and substantiates the concept of the integrated tool Brand Effectiveness Score (BES). The study is based on an interdisciplinary approach that combines theories of digital brand management, models of personalization and advertising informativeness perception, meta-analytical data on creative media, and methods of analyzing user-generated content in social media. Particular attention is paid to comparing the influence of cognitive and affective factors, including the variables "personalization," "informativeness," "flow," and "privacy concern," as well as the role of the advertising medium and linguistic signals of user content. It is shown that cognitive drivers (informativeness and brand transparency) strengthen positive attitudes, while mediators such as flow and metaphorical media carriers increase the resilience of brand associations and stimulate electronic word-of-mouth. The necessity of including linguistic indicators from social media (e.g., Temporal Topic Variability) as predictors of consumer preference dynamics and loyalty is substantiated. It is revealed that the key condition for successful calibration of Brand Effectiveness Score (BES) is the integration of multi-level signals, while accounting for sample limitations and the risk of publication bias. The article will be useful for specialists in marketing and digital communications, brand management

researchers, digital advertising analysts, and practitioners developing systems for monitoring and evaluating the effectiveness of advertising campaigns.

Keywords: brand-building, online advertising, personalization, informativeness, creative media, social media.

Introduction

Modern online advertising practices are undergoing profound changes under the influence of developing digital technologies, the rapid growth of interactive platforms, and the increasing complexity of media consumption. In a highly competitive environment for user attention, the ability of advertising campaigns to form stable brand associations and strengthen brand trust is of particular importance [2]. This is driven by the need to evaluate not only direct response metrics but also long-term effects related to brand perception, its values, and its emotional appeal.

The complexity of measuring the effectiveness of brand-building is amplified by numerous factors, from the high variability of user data and the unpredictability of audience reactions to the difficulties in capturing the impact of new advertising formats [4]. At the same time, tasks related to determining the strength of brand associations, attitude towards the brand, and willingness to engage require high accuracy and stability of assessment. Under these conditions, methods based on the integration of behavioral and cognitive indicators, capable of accounting for the dynamics of digital signals and the specifics of new media, come to the forefront.

Alongside this, the method of forming the initial information, primarily the quality of user content analysis and consideration of the advertising media's context, plays a major role in the reliability of the assessment. Insufficient accuracy in accounting for these parameters can lead to distorted results and a reduction in the validity of strategic decisions, which is critically important for long-term planning of marketing investments.

The objective of this study is to analyze the possibilities of quantitatively assessing the effectiveness of brand-building in online advertising and to introduce and substantiate the concept of 'Brand Effectiveness Score (BES)' as a basis for measuring and optimizing brand health in the digital environment. Brand Effectiveness Score can be thought of as a comprehensive framework for measuring brand-building in digital advertising. It integrates cognitive drivers (personalization, informativeness, transparency), affective mediators (flow, attitudes), creative media effects (metaphor, surprise), and linguistic signals from social media to provide a unified assessment of brand health. BES captures both short-term brand attitudes and long-term shifts in consumer preferences, offering a reliable tool for evaluating and optimizing digital brand equity.

Materials And Methods

The methodological foundation of this study is formed at the intersection of the theory of digital brand management, the analysis of user behavior in media, and meta-analytic approaches to assessing advertising effects. This is necessitated by the interdisciplinary nature of the task of quantitatively assessing brand-building effectiveness in online advertising. The primary tool is the analysis of scientific literature dedicated to the personalization of advertising messages, the structure of brand associations, the influence of media context, and the peculiarities of new communication formats.

The study relies on sources covering a wide range of topics, from audience segmentation strategies and channel synergy to the mechanisms of brand perception in interactive environments. The work of Ahmadi I. [1] examines the problems of selecting target segments in conditions of an excessive number of targeting options, which helps to refine the methodology for assessing audience relevance. The study by Becker M. [2] focuses on the consistency of advertising content and its role in maintaining or undermining brand trust. The article by Bell

J. [3] proposes the concept of media archetypes and complex channels, revealing the methodological foundations for studying the synergistic effects of online

communications. The work of Chen T. [4] demonstrates the importance of the narrative perspective in storytelling advertising for shaping attitudes towards a brand, which provides a benchmark for analyzing qualitative variables in the construction of metrics.

The article by France S. [5], which systematizes approaches to measuring digital brand equity and defines directions for its further development, holds a special place. The study by Gu C. [6] analyzes user behavior in mobile interactive video advertising, which allows for the identification of engagement parameters

and their influence on the effectiveness of brand communications. The work of Mo

L. [7] examines the interrelationship of personalization, informativeness, privacy, and flow state as factors in the perception of online advertising. The materials by Swaminathan V. [8] show the applicability of thematic modeling of brand language in social media, which reveals the potential of analyzing user signals for brand-building strategies.

An additional methodological guide was the work of van Berlo Z. [9], in which a meta-analysis confirmed the role of creative media in strengthening brand associations and identified the moderators of these effects. The study by Yang Z.

[10] substantiates the applicability of signal theory to the analysis of brand perception in short-form videos, highlighting the factors of brand value and transparency as mediators of associative processes.

Thus, the methodological strategy is based on a comparative analysis of personalization models, concepts of digital brand equity, meta-analytic approaches to creative media, and signal-oriented models of perception in short-form videos. This approach allowed for the construction of an analytical structure necessary for identifying the factors influencing the effectiveness of brand-building and for forming the concept of BES as an integrated framework for assessing brand health in digital advertising.

Results

An analysis of the formation of user attitudes towards online advertising requires clarifying the role of constructs related to the perception of personalization, informativeness, flow state, and privacy. The empirical basis in this area was laid by the study of Mo L. [7], which proposed a structural model of the relationships between the perception of advertising message personalization, the cognitive and affective reactions of the audience, and the final attitudes. The model demonstrates that personalization triggers multidirectional mechanisms. Through an increase in informativeness, it enhances a positive attitude, but at the same time, it creates privacy concerns that can diminish the perception of the ad.

It was established that the positive effect is dominant, as it is through informativeness and immersion that personalization strengthens the final attitude towards the ad. This conclusion is fundamentally important for the development of the integral BES index, as it indicates the need to include the variables "personalization," "informativeness," "flow," and "privacy concerns" as signal components with clearly defined directions of influence. Table 1 presents the key paths and coefficients from the structural equation model, which allows for detailing the significance of each channel of influence.

Table 1 – Key paths and effects from the structural model of online personalization → ad attitudes (Compiled by the author based on source [7])

Path	β	Significance	Note
rsonalization → Perceived informativeness	0.361	p < 0.001	H1 supported
Perceived informativeness → Ad attitude	0.391	p < 0.001	H2 supported
ɔnalization → Privacy concerns	0.197	p < 0.001	H3 supported
Privacy concerns → Ad attitude	−0.28	p > 0.1	H4 not supported
Perceived ad informativeness → Flow	0.587	p < 0.001	H5 supported
Privacy concerns → Flow	−0.119	p < 0.001	H6 supported
Flow → Ad attitude	0.555	p < 0.001	H7 supported

sonalization → attitude via informativeness	+0.256	—	ve overall effect
lization → attitude via privacy	−0.058	—	ive overall effect

Note: β indicates the standardized regression coefficient in the SEM model.

The data considered allow us to assert that the constructs of personalization and informativeness form the core of the positive mechanism, while privacy concerns play a secondary role, manifesting in a weak and statistically insignificant influence on attitudes. In contrast, flow acts as a key mediator, accumulating the positive effects of informativeness and partially neutralizing the negative impact of privacy concerns.

A comparison with a broader body of research confirms the significance of these findings. For example, the study by Ahmadi I. [1] emphasizes that the complexity of selecting segments enhances the importance of accurate personalization, and the work by Becker M. [2] shows that content consistency increases the stability of the perception of advertising messages. The study by Gu

C. [6] highlights that interactive videos stimulate attention to the brand precisely through cognitive channels, similar to the construct of informativeness. Finally, the meta-analysis by van Berlo Z. [9] established that the mediator of the effectiveness of creative advertising is the effect of surprise, which resonates with the role of the flow state as an activation of cognitive-affective attention.

Consequently, the development of BES requires consideration of the balance between cognitive and emotional channels of influence. The empirical base [7] indicates the dominance of the positive pathway of personalization through informativeness and flow over the negative channel of privacy concerns. This allows these constructs to be considered fundamental for a signal model for assessing brand-building in digital advertising.

The study of creative media formats allows the media carrier to be identified as an independent factor influencing brand strength. The meta-analysis by van Berlo Z. [9] shows that the use of unexpected physical objects as advertising media

leads to a statistically significant increase in the strength of brand associations (r_c

= 0.20) and the overall effectiveness of persuasive impact (r_c = 0.15). The effect is particularly pronounced in relation to electronic word-of-mouth, where the integrated indicator reaches r_c = 0.35, indicating the ability of such formats to strengthen cognitive connections and stimulate the active dissemination of messages in the user environment [9].

Further analysis shows that the key moderator is the use of metaphor, that is, the coherence between the message and the chosen media carrier. The congruence of the metaphor enhances both the strength of associations and the overall persuasive effectiveness. At the same time, the role of the exposure factor was identified: indirect channels (e.g., social media and print representations) enhance the effect on associations, but their influence on persuasive impact indicators has not been statistically confirmed [9]. The empirical data suggest that the strength of the media carrier as a proxy for brand equity is determined by the novelty and cognitive meaningfulness of the "carrier–message" link. Table 2 examines how metaphor and exposure type modify the effects of creative media advertisements.

Table 2 – Integrated effects of creative media advertising (Compiled by the author based on source [9])

Indicator	ntegrated effect (r_c)	Comment
Brand association strength	0.20	nt increase compared to traditional media
suasive effectiveness (overall)	0.15	Significant increase

— Ad attitude	0.19	Significant increase
— Brand attitude	0.09	Significant increase
— Purchase intentions	0.07	Significant increase
tronic word-of-mouth (eWOM)	0.35	Strongest effect

Note. Moderator effects were established qualitatively: metaphor (media–message congruence) strengthens both associations and persuasion; indirect exposure (social media, print) strengthens associations but shows no significant effect on persuasion; brand familiarity does not act as a moderator [9].

The data presented confirm the hypothesis that the effectiveness of brand-building in the online environment is not limited to direct response indicators. The way a brand signals through its chosen media carrier is of paramount importance. The results show that metaphor and the element of surprise act as critical mechanisms that form a stable memory of the brand.

Additionally, the linguistic parameters of communication in social media function as proxy indicators of brand strength. The study by Swaminathan V. [8] demonstrated that the Temporal Topic Variability (TTV) indicator can predict future shifts in consumer preferences (β = 45.09), Net Promoter Score (β = 21.20), and the dynamics of loyalty/"lapsed" behavior (β = 18.84), with all effects being statistically significant at the p < .01 level. These data justify the inclusion of a block of social media indicators in the BES model, where the variability of linguistic signals is considered an early predictor of changes in brand equity.

Thus, combining the media carrier and language allows them to be viewed as complementary proxies for brand strength. The carrier determines the cognitive strength and willingness to disseminate messages, while the language captures the dynamics of perception in online communities. Together, these parameters form the basis for an integrated assessment within the framework of BES.

Discussion

The concept of BES is formed as an integral framework for assessing the effectiveness of brand-building in digital advertising, relying on empirically confirmed signals. The main requirement for the architecture of such an index is its reliance on validated blocks that have already demonstrated their predictive power in research [7,10].

The results in the area of personalization and brand transparency confirm that these factors are the drivers of associations. The study by Yang Z. [10] showed that the perceived value of short-form videos (PV) positively influences both brand transparency (β = 0.66, p < 0.001) and the perception of its value (β = 0.52, p < 0.001), and ultimately, the strength of associations (β = 0.32, p < 0.001). The "utility/personalization" block and the related "transparency" indicator can be integrated into BES as central nodes for building associative capital.

The study by Mo L. [7] established that informativeness is the main channel for transmitting the positive influence of personalization on attitudes, mediated through the flow state. This result confirms the need to include the "informativeness → flow state → attitudes" chain in the core of BES.

The meta-analysis by van Berlo Z. [9] showed that creative media carriers enhance both the strength of brand associations and persuasive effectiveness, with the key triggers being elements of surprise and metaphor. Linguistic signals from social media act as an "external radar," capturing early shifts in brand positioning. The study by Swaminathan V. [8] showed that the Temporal Topic Variability (TTV) indicator predicts future changes in preferences (β = 45.09, p < .01), Net Promoter Score (β = 21.20, p < .01), and the dynamics of the proportion of "lapsed users" (β = 18.84, p < .01). These results justify the inclusion of a separate block of social media indicators in BES. Table 3 summarizes the quantitative benchmarks that can serve as an empirical basis for specifying calculations in BES.

Table 3 – Quantitative benchmarks for BES components from short-video and social media analytics (Compiled by the author based on sources: [2, 8, 10])

Path / indicator	Estimate / significance	Context
PV → Brand transparency	0.66, p < 0.001	AMOS model
PV → Brand value	0.52, p < 0.001	—
arency → Brand association	0.38, p < 0.001	—
value → Brand association	0.17, p < 0.001	—
PV → Brand association	0.32, p < 0.001	—
Sub-paths: pp→trans 0.22*; pu→trans 0.25*; pi→trans 0.44*	all p < 0.001	rsonalization/usefulness/interactivity → transparency
v 0.15*; pi→bv 0.46*; pp→bv 0.05 (n.s.)	see p-levels	Determinants of brand value
associations: pu 0.22*; pp 0.16*; pi 0.07 (p=0.06)	—	Interactivity → brand association not significant
nd preference (t+1)	β = 45.09, p < .01	IV-GMM, cluster-SE
TTV → Δ NPS (t+1)	β = 21.20, p < .01	—
TTV → Δ lapsed users (t+1)	β = 18.84, p < .01	—

Table 3 demonstrates quantitative benchmarks for the "transparency/value/associations" nodes [10] and for the social media predictors (TTV → changes in brand metrics) [8]. These indicators can be used by BES as empirical anchors when calibrating indicators, ensuring a balance between cognitive, media-behavioral, and linguistic sources of signals.

A key stage in building a system of integral indicators is assessing the limitations of the available empirical data. Despite the convincing quantitative results, the validity and generalizability of the conclusions obtained require a cautious approach. In the study by Mo L. [7], the sample was formed primarily from Chinese students who actively interact with personalized advertising in an online environment. Similarly, the work of Yang Z. [10] relied on users of short-form videos from China, which raises the question of cultural specificity and the limited applicability of the results to other regions and audience segments. Thus, when including the identified "personalization → informativeness → flow → attitudes" pathways in BES, it is necessary to consider the national specifics of media consumption and the sociocultural context.

In the case of the meta-analysis by van Berlo Z. [9], a number of signs of publication bias were identified. The positive effects on brand associations, overall persuasive impact, and ad attitude were more pronounced, while some of the less significant or negative results may have been excluded from publications. This limits the ability to accurately recalculate the integrated coefficients and requires caution when using the r_c values as universal benchmarks. Nevertheless, the qualitative conclusions about the moderating role of metaphor and the media carrier retain their relevance,

especially when building accelerators in the BES model.

The study by Swaminathan V. [8], where linguistic signals from social media were analyzed on a dataset of tweets from 2011–2015 and with filtering by account identifiers, deserves special attention. Despite the statistical rigor (IV-GMM, clustered errors), the time lag and the specifics of the Twitter platform impose limitations on extrapolation. The validity of the Temporal Topic Variability (TTV) indicator was confirmed through BAV metrics (preferences, NPS, loyalty), but its transfer to more modern platforms (e.g., TikTok or WeChat) requires additional verification.

Given the identified limitations, the practical applicability of BES is determined by the ability to aggregate confirmed signals into a unified system. The "viewing and content" block (personalization and content utility → brand transparency and informativeness → flow and attitudes), verified by data from [1, 4, 7, 10], allows for the capture of cognitive and affective changes at the level of ad and brand message perception. The "media carrier" block (metaphor and element of surprise), based on the results of [9], functions as an amplifier, increasing the likelihood of associations and stimulating electronic word-of-mouth. The "UGC language" block (thematic structure and TTV variability), demonstrated in the study by Swaminathan V. [8], provides external monitoring of upcoming shifts in consumer preferences and brand perception.

Thus, despite the limitations of the samples, the risk of publication bias, and the specifics of the data sources, the integration of validated signals into BES remains a practical direction for developing a methodology for assessing digital brand equity. A system built on the combination of cognitive, media-behavioral, and linguistic indicators can be adapted for cross-cultural applications, providing further validation.

Conclusion

The analysis conducted has allowed for the construction of a conceptual basis for the development of the BES system as an integral tool for assessing the effectiveness of brand-building in digital advertising. Within the proposed model, it was possible to unite several critically important blocks: the perception of the utility and personalization of content, the informativeness and transparency of the brand as cognitive drivers, the flow state and attitudes as affective and behavioral effects, the peculiarities of the creative media carrier, and the linguistic signals of user-generated content as external accelerators and indicators. This integration forms a more holistic understanding of how digital formats shape brand equity and influence the stability of associative links.

BES can serve as a practical tool that aggregates multi-level signals and translates them into a unified assessment system. Its application can provide marketers and researchers with the ability to more accurately track the dynamics of brand perception, identify early signs of changing consumer preferences, and adjust their promotion strategy based on real patterns of interaction with the audience. An important feature of the proposed system is its ability to combine short-term indicators (attitudes, intentions, associations) with long-term predictors (trends in user language, brand transparency), which allows for the simultaneous handling of monitoring and strategic management tasks.

At the same time, the study has a number of limitations. Some of the empirical data used were collected from specific samples and cultural contexts, which reduces the possibility of direct generalization. Meta-analytic materials carry a risk of publication bias, which affects the accuracy of the integrated estimates. The linguistic indicators are based on data from past years and require additional verification for modern platforms and media formats. These limitations define the need for further validation of BES in different countries, on new samples, and in updated digital ecosystems.

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