
Dark social: The biggest missed opportunity in digital marketing

Received (in revised form): 6th March, 2020



Ammarah Marjan

Doctoral Researcher, London South Bank University, UK

Ammarah Marjan is a Doctoral Researcher and Associate Lecturer at London South Bank University Business School. Her research focuses on online loyalty programmes and involves the scientific replication and extension of empirical norms to the management of loyalty relationships in the customer base. Prior to her career in academia, Ammarah worked as a trade marketer at Nestlé S.A., where she designed strategies to increase the sales and visibility of Nestlé brands in key local and international accounts.

London South Bank University, 103 Borough Road, London SE1 0AA, UK
Tel: +44 799 951 6924; E-mail: marjana@lsbu.ac.uk



Charles Graham

Senior Lecturer in Marketing, London South Bank University, UK

Charles Graham is a Senior Lecturer in Marketing at London South Bank University Business School and an adjunct research fellow at the Ehrenberg-Bass Institute, University of South Australia. His research interests include long-term behavioural brand loyalty, competitive market structure modelling and effective brand portfolio management. Before becoming an academic, Charles spent nearly 15 years marketing national and international premium grocery and foodservice brands.

London South Bank University, 103 Borough Road, London SE1 0AA, UK
Tel: +44 781 063 7244; E-mail: grahamca@lsbu.ac.uk



Margaret Bruce

Professor of Digital Strategy, London South Bank University, UK

Margaret Bruce is Director of the Brandmovers Institute for Digital and Creative Economy and Professor of Digital Strategy at London South Bank University. Her previous roles include Deputy Vice-Chancellor of Derby University, leading research, innovation and enterprise, and Pro Vice-Chancellor of UCLan, leading research and innovation. She has also worked as a research professor at Manchester University, where she produced eight books and over 200 papers relating to design and innovation management, fashion marketing and branding. Professor Bruce has received a number of honorary professorships in recognition of her academic contribution.

London South Bank University, 103 Borough Road, London SE1 0AA, UK
E-mail: brucem3@lsbu.ac.uk



Andrew Mitchell

Founder, Brandmovers Inc., USA

Andrew Mitchell has over 25 years of global digital engagement experience with some of the world's leading marketers, and has worked on digital promotions for a diverse portfolio of global clients. His areas of expertise span multiple industries, including consumer goods, entertainment, retail, travel and financial services. Andrew earned his doctorate for studies in identifying and developing digital technology that can be deployed and measured across various digital and social media channels. Dr Mitchell founded Brandmovers in 2003 and has since expanded across multiple continents and industries. He is a Chartered Marketer and a graduate of Manchester University and the Harvard Business School.

Brandmovers Inc., 590 Means St, Suite 250, Atlanta, GA 30318, USA
Tel: +1 678 525 7003 (2); E-mail: amitchell@brandmovers.com

Abstract Following the widespread adoption of closed social media apps, marketers can no longer easily track outbound sharing of website links, or inbound traffic resulting from those shares — so-called dark social. This social traffic is misclassified in Google Analytics as ‘direct’, and little is currently known about its volume or relative behaviour, and therefore how to manage it effectively. This study aims to contextualise the typical contribution of the direct channel to total website reach, identify the relative contribution of (true) direct traffic and estimate the volume of dark social traffic. Traffic flows totalling over 3 million hits were observed over two years on five websites. The results suggest that the direct channel can contribute over one-third of total traffic and, according to the authors’ estimate, an inbound dark social component of almost one-fifth. This is little understood at present, and the article proposes a future research agenda to develop theory in the area.

KEYWORDS: dark social, web traffic, Google Analytics, direct traffic, social media, e-WOM

INTRODUCTION

The acquisition of web traffic is vital for every online business.¹ A website visitor could mean a sale, advertising revenue, user registration or simply exposure to the brand.² In common with most communication channels, the higher the volume of visitor traffic, the larger the impact of any communication, message or promotion, and the greater the probability of achieving the desired outcome. Online marketers therefore invest considerable resources in measures to improve traffic through a variety of channels and need to understand which ones are most effective for any given objective.

There is some consensus that publishing effective content on a website is essential.^{3,4} For visitors, it conveys detailed information to encourage visits, meanwhile for marketers, it indexes the site on search engines using keywords and descriptions. As information search is often the first step for users to find any website, quality content is published to augment web ranking through search engine optimisation (SEO). However, SEO alone is no guarantee of traffic⁵ as the internet is a crowded environment, and search engine rankings require large and continual investment. Evidence also suggests that search may not be effective in generating conversions from first-time visitors, although

repeat visitors may use search engines as navigational tools.⁶ Marketers are therefore focused on creating shareable interactive content⁷ to achieve substantial reach in a short period at a low cost.⁸

Social sharing is when customers and influencers leverage social media to build natural linkages to content through electronic word-of-mouth (e-WOM), social buzz or publicity.⁹ Effective content encourages brand mentions and engagement¹⁰ and ‘virality’ in turn affects inbound traffic.¹¹ A single content share may bring a significant number of inbound visitors following a unique URL. Unlike traditional marketing, the results of digital activities can therefore be measured in real time as reach is usually trackable and conversions are easily quantified.¹²

Google Analytics (GA) is a standard tool for identifying the origin of traffic by time, and its distribution by channel. GA defines six sources of traffic commonly managed to drive volume: paid and organic search, e-mail, social, referral and direct. The first five are well researched, but there are unanswered questions about the last. The direct channel originally contained traffic that had typed a URL into a browser or clicked on a previously saved bookmark, but following the growth of private messaging

platforms such as Snapchat and WhatsApp it now also contains click-through traffic from links shared in those networks, which can no longer be tagged with the tracking codes used by GA. This inbound traffic in the direct channel is therefore not easily accounted for or managed.

Madrigal¹³ coined the term ‘dark social’ to describe this inbound source. He contrasted it with public (trackable) sharing and click-through from social media platforms such as Facebook or Twitter.¹⁴ By 2016, 84 per cent of outbound link-sharing from websites (measured as copied and pasted URLs) was transmitted through dark social,¹⁵ hence any resulting *inbound* traffic generated from those shared links has become invisible to GA except as direct.

Users consider closed networks such as WhatsApp to be important spaces because they value their private worlds.¹⁶ For the users of information, these channels provide privacy, concealing the consumption of content from external information sources. For managers, however, it is critical to understand the underlying meaning in traffic volume and flow, and three questions arise in the context of dark social.

First, it is not known yet if 84 per cent of outbound sharing is consistently high across all types of websites. It might be that sharing varies by product category (eg links to fashion and cosmetics websites might be shared more in closed channels than links to garage services). Management benchmarks in this area would provide useful norms for objective setting. Secondly, the quality of that traffic may be important. According to Madrigal,¹⁷ much dark social traffic is likely to be positive e-WOM, and perhaps motivating communication.¹⁸ One might in fact suppose that *any* direct traffic is likely to be closer to conversion. This is because it is either ‘traditional direct’ — purposefully returning visitors, or because it is dark social, motivated by recommendation. To date, little is known about the relative quality of direct traffic across website types, for example, its

page views, bounce rates and conversion. Thirdly, some investigation of the volume of the *inbound* dark social traffic within the direct channel is needed to confirm its continuing significance and to provide insight as to whether and how it should be managed.

An area of growing importance for brand marketers is online customer loyalty programmes. Loyalty programmes are defined as structured marketing efforts designed to encourage behavioural loyalty to a brand by rewarding members for repeat purchase.¹⁹ Repeat traffic is of particular concern in such schemes because their main objective is to build customer brand engagement through the reward-programme website. Creative content, rewards and scheme satisfaction can be considered as drivers of sharing by existing scheme members — sharing which would then be expected to manifest as inbound dark social traffic in the direct channel of the scheme website. In this context, ‘traditional’ direct channel traffic may be higher than on transactional websites, and its behaviour of greater interest.

The aim of the present study is to investigate the distribution of new and repeat direct traffic over time to establish the likely contribution of dark social to web traffic growth. By comparing traffic on three reward programme and two transactional websites over eight quarters, the research: (1) investigates the relationship between, and importance of, new and returning visitor traffic as website reach grows and declines; (2) identifies the relative contribution of the direct traffic to this volume and (3) estimates broadly the volume of dark social traffic.

Quarterly attraction rates of one-time visitors are found to be surprisingly high on all websites observed, while the direct channel is substantial, fairly stable, and about twice as important to loyalty-promotion (44 per cent) as to transaction (26 per cent) websites. Inbound dark social traffic is likely to be of a significant volume within this distribution and this study suggests a

methodology for future research to extend that finding in more detail. The implication is that the repeat visit rate contributes little to the quarterly reach of the website, thus highlighting the importance of dark social in contributing visitors. In the next sections, this study provides an overview of the literature framing the research questions, followed by a summary of the method and data sources employed. It then discusses the findings and their implications, and a summary of further research envisaged.

THEORETICAL CONTEXT

The move to closed network communications

Evidence shows that open network communications have stagnated in many countries, but at the same time, the use of closed network communications like private messaging continues to increase.²⁰ Compounding this, Facebook has suffered a number of data privacy scandals in recent years.²¹ Many studies consider ‘privacy’ — that is, the ability to control one’s personal information^{22–24} — to be a primary reason for the adoption of closed networks, as such networks provide enhanced privacy, more convenience, and less possibility to be misunderstood.²⁵ For example, WhatsApp offers a cheaper, advertisement-free alternative to texting, complete with end-to-end encryption, ensuring that only the recipients of the conversation can read the messages.²⁶

While some are concerned about protecting personal data, for others this is linked to networking with existing social connections already using dark social channels. Having joined a closed channel, usage may become habitual,²⁷ especially for mobile social apps that are accessed frequently and daily. The rapid adoption of dark social channels has provided plentiful opportunities to communicate with a high degree of privacy,²⁸ while Lankton *et al.*²⁹ find that established habit is a predictor of

the intention to continue using a particular channel. Appiah³⁰ even considers that extrication becomes quite impossible until a substitute is introduced. The implication is that dark social sharing is a novel, substantial but well established aspect of online consumer behaviour, and thus a new challenge that marketing must now harness or at least understand.

Challenges with dark social

Dark social has been differentiated from ‘dark participation’, where users exploit closed channels to undertake anti-social behaviours. This can be in-channel itself — such as when people spread misleading information, engage in media manipulation or online harassment through social media platforms,^{31,32} or it can be in support of offline activities. For example, in 2012, rioters in London organised themselves by using the BlackBerry closed messaging service; more recently, democracy protesters in Hong Kong, extinction rebellion activists in London, revolutionaries in Armenia and Occupy movements in Nigeria have all used private messaging to organise pop-up protests that quickly outflanked the authorities.^{33,34} Social media can clearly be used as a force that motivates social behaviours, sometimes with dramatic results, and closed messaging leaves police and marketers with the same problem of attribution.

Closed network communications present marketers with three specific challenges to attributing marketing outcomes to their marketing interventions. First, dark social channels make it difficult for management to track what type of brand content is being shared on private messaging, much less how it is discussed.³⁵ Managing the effectiveness of creative content is, therefore, less precise. Secondly, if marketing is excluded from the conversation in closed channels, it constrains opportunities for linking marketing messages and brand promotions to communities in wider spheres.³⁶ Thirdly, closed channels

may well limit the diversity of e-WOM and customer brand endorsement that users are exposed to, thus raising questions about the effectiveness and value of earned media and ‘virality’.³⁷ The lack of traceability means managers are unable to evaluate the response to their content strategy directly through web analytics in any detail.

In response to these challenges, some big and small brands are entering dark social spaces to encourage brand-related conversations. For example, brands can employ market research such as interviews and focus groups with participants in group chats by leveraging Facebook Messenger chatbots and WhatsApp Business API solutions. This may have some benefits, such as an additional brand touch point and opportunity for feedback-oriented marketing. However, research argues that this may not be effective on the basis that people would not communicate freely and that attempting to bulk message will trigger the blocking of business numbers.³⁸ Furthermore, malfunctioning chatbots and unanswered questions would negatively impact customer experience and data protection would be a concern.³⁹

Google Analytics and web-traffic channels

Marketers typically measure the sources of their website traffic using web analytics tools. Objective statistical traffic data is freely available through Google Analytics, which is considered the most sophisticated tool available⁴⁰ and the global industry standard. GA uses a page-tagging technique to provide a set of standard measures⁴¹ commonly adopted across the industry. In a GA-enabled website, every visitor is tracked from their immediately preceding source and medium,^{42,43} for example a Google search resulting in a click-through from an AdWord.⁴⁴ There are six main sources: search, referral, display advertising, e-mail, social and direct, and GA data allows management to assess the contribution of

each to overall traffic volume and evaluate investment in traffic-driving measures. The literature suggests that these sources differ systematically as to quantity and quality of traffic delivered, and this study will now review each in turn:

- *Search* traffic (ie traffic delivered by internet search engines) is, according to Baye *et al.*,⁴⁵ the largest channel. The source of search traffic can either be organic (in which case results depend upon the effectiveness of search engine optimisation) or sponsored (paid).⁴⁶ Search traffic has been extensively studied^{47–49} and the general consensus is that the top position on the search result is not necessarily the most profitable.^{50,51} One reason is that many users conducting ‘informational’ searches have little awareness of the brand they eventually visit⁵² and are only on the first step of their customer journey.
- *Referral* traffic originates from domains other than search engines or social media, from where users have encountered links of interest and clicked through.⁵³ Examples include content on influencer sites such as Pinterest, Google Images or text links included in websites or blogs. Referral traffic may thus consist of users who have already acquired awareness and interest in the linked brand to visit its site.⁵⁴
- *Display* traffic is acquired in response to a call to action in digital display advertising — any advertisement presented in graphic form, including banners. Display advertising is usually placed within the content of a website to target specific buyers.^{55,56} It is not treated as referral traffic because the advertisement is not part of the site but rather viewed from the advertising server. Although prone to significant levels of waste, some display traffic may be visiting the website with a developed purchase intention.
- *E-mail* is thought to generate website traffic at rates as high as 16 per cent,⁵⁷ and

is often used to maintain the transactional propensities of existing customers⁵⁸ by presenting discounts or offers. For these reasons, e-mail traffic is likely to be close to conversion, and e-mail campaigns are therefore cost-effective.

- *Social* traffic arrives from social network sites such as Facebook or YouTube. This channel has attracted great interest in the literature as brand marketers are able to leverage the follower networks of popular influencers in order to gain low-cost reach. Marwick⁵⁹ and Senft⁶⁰ have identified self-branding and source credibility effects in relation to follower numbers and influence. Others report e-WOM through social media to be an effective brand communication^{61–63} and a strong influence on purchase intention.^{64–66} The effectiveness of e-WOM in driving traffic depends on a combination of engaging content,^{67,68} and ‘virality’ — the ability of an initial outbound share of a URL to return exponentially as inbound traffic from many users, many not connected directly to the initiator.⁶⁹
- *Direct* traffic originally consisted of users who had typed an address into their browser or clicked on a bookmark. At the very least, such users must therefore already be aware of the website brand, and in the case of a bookmark are highly likely to be purposeful repeat visitors^{70,71} and already engaged with it. Since the mass adoption of closed communication networks, however, this channel now also contains dark social traffic.⁷² Evidence suggests that private messaging makes up more than 80 per cent of all social activity and has eclipsed open sharing. The inevitable result is an increased level of dark social referral⁷³ with no tracking information about its source aggregated into the direct channel. For reasons identified earlier, this traffic is likely to be both significant in volume and somewhat higher in propensity to convert, meaning

the direct channel is an important but perhaps neglected traffic source.

RESEARCH AIM AND QUESTIONS

In summary, it is widely agreed that acquiring and maintaining website traffic is by far the most important role for digital marketing.^{74–76} Given the rapid pace of change in digital communications, the competition for attention and the widespread adoption of closed networks, this task has become more challenging. In this context, the aim of this study is to progress knowledge and understanding of direct channel traffic, and specifically, to describe the characteristics of direct and dark social traffic in order to define a future research agenda.

To meet this aim, three questions are addressed. First, digital marketers are concerned with the quality as well as the quantity of traffic arriving on websites from various sources.⁷⁷ It is also generally acknowledged that repeat traffic represents an initial return on website marketing investment⁷⁸ because it stays on the website for longer,⁷⁹ and is more likely to convert than new visitors. Repeat traffic also provides the foundation for growth in total reach. Repeat traffic is, therefore, a marker of traffic quality, and so marketers must balance resources between acquisition and retention, particularly where the repeat is an end in itself (eg in affiliate loyalty programmes). In order to provide a context to this study, it is important initially to establish the contribution to website growth and decline over time of new and returning visitors. The first research question is, therefore:

RQ1: What is the scale of new traffic acquisition relative to repeat traffic?

Many authors have noted that the direct channel has attracted little research attention compared with SEO, paid search, advertising

and influencer marketing.^{80–83} One reason may be that direct traffic appears to be an unavoidable inconvenience, because it is not directly manageable. This is an important oversight. To address it, this study evaluates traffic on two types of website, ie transactional and loyalty-promotion, to compare the relative quality and volume. It is hypothesised that the direct channel is likely to be more valuable on loyalty than transactional websites, and further, far from being a ‘dustbin’ of different sources that are otherwise unattributable, for transactional the direct channel is likely to contain traffic well advanced on its customer journey, and for promotional marketers it is likely to be the source for engaged repeat visitors. Management benchmarks for its relative size and contribution to website performance would be useful, hence the following is posed:

RQ2: What is the relative size of the direct channel?

A recent industry report estimated open and closed social communication to be in a ratio of 1 to 4.⁸⁴ As conversations on social media frequently refer to brands,⁸⁵ they are likely to be influential on consumers purchase intentions⁸⁶ and may include link-sharing by way of recommendation. The increasing anonymity of these conversations now channelled through closed network sharing might even make e-WOM recommendation more trustworthy and reliable;⁸⁷ therefore, dark social has been called the ‘biggest missed opportunity in marketing’.⁸⁸ Although the quality of this traffic may be desirable, its volume is not yet well understood. Little research has yet addressed the virality of the shared links — the volume of inbound dark social traffic. This extra component of direct traffic is also likely to consist of new but potentially valuable visitors if cued by e-WOM recommendation. It is an important area for study thus the following is posed:

RQ3: What is the proportion of dark social traffic in the direct channel?

The next section details the method employed to answer these research questions. This is followed by the findings and finally a discussion of the implications for theory and practice.

METHOD

Research approach

Digital technologies allow marketers to reach consumers instantaneously. However, the work of turning the resulting multitude of touch points and noisy data into less speculative, simpler and meaningful insight is becoming increasingly challenging. Taming the sheer volume of available data is critical in order to discover the story therein.

The marketing scientist Andrew Ehrenberg^{89,90} has made numerous comments on how the routinely poor presentation of marketing data only makes the data harder to understand. According to Ehrenberg, reducing data to meaningful summaries and tabulating the information clearly allows the analyst (and their audience) to see the patterns and associations that become the basis of insight and (for pure researchers) of future empirical generalisations. Norms, regularities and exceptions become inter-ocular when presented in this way — they hit the audience between the eyes, without the need to resort to complex statistical models.

When investing in the marketing mix to move aggregate market behaviour, managers are also more interested in the big picture — the main effects and regularities revealed through such analysis — rather than exceptions to the over-riding patterns. For the theorist, those exceptions are important if they lead to knowledge of boundary conditions to the main patterns observed, but identifying norms and regularities is often the first task in a data-driven study. For practitioners, the clear patterns often revealed

through data reduction can be missed due to ‘woods for the trees’ errors, although they have led to some of the most robust and widely adopted laws in marketing.⁹¹

Ehrenberg’s approach is the method of the natural scientist — theory (eventually) follows from observations, pattern identification, and replications in many differentiated sets of data.⁹² The authors adopt that process here, beginning with observations in many sets of the website traffic data used to establish evidence of aggregate regularities in traffic flows.

Data

To answer the three research questions, observations of inbound traffic were made on a sample of five websites of different sizes and types using GA metrics. These websites are differentiated by size, location, traffic strategy and marketing objectives. Three are loyalty/reward programme websites; one is internally facing; one is a leisure service; and one a fashion brand. In all cases, eight quarters of consistent data are available, and while traffic volume in four grew substantially over the time frame, for one it declined. The average volume of direct traffic for each site is also identified as a differentiating factor, as this is the main focus of the study.

The routes (channels) users took to reach a given website were observed and successive quarters analysed using GA’s channel acquisition report. This describes the absolute volume and distribution of users across each channel including the direct traffic containing the dark social source. It is then possible to examine the behaviour of said traffic by website, channel and by period on a number of standard measures of engagement including page views, sessions, repeats within and beyond the quarter and transactions undertaken.

To generate many sets of comparable data and identify regular patterns, observations were aggregated in quarters, and the metrics recorded in time series. This allowed for

a differentiated replication study covering 40 (5 × 8) sets of data, encompassing many thousands of website hits.

Mean quarterly website reach in the sample ranged from under 1,000 visitors to over 300,000; four of the websites were increasing in size while the fifth was declining over the eight quarters observed. The target markets varied from global, US and UK only, and two types of commercial websites were investigated for further comparison: two transactional and three loyalty-promotion. Finally, the main traffic-driving strategy for each was identified from agency interviews. The resulting differentiated study design (Table 1) then allowed for any traffic effects to be compared between website types and across multiple variables.

For each site, traffic data was aggregated quarterly for new and repeating visitor numbers, by source, to identify traffic dynamics and compare overall traffic driving strategy effects on each. A coefficient of variation (CV) metric was used to compare the distributions of traffic obtained through different channels, independent of the website type to confirm the agency traffic strategy reports. The CV is the ratio of the standard deviation of outcomes to their mean and expresses the level of dispersion in that variable.⁹³

The principal benefit of using a CV is that it is unit-less, hence it allows comparison of dissimilar variables in ways that other methods cannot.⁹⁴ Calculating a CV for each channel over time on each website (Table 2) revealed that the biggest traffic-driving effects were obtained from investment in display advertising (1.8), paid search (1.4) and e-mail campaigns (1.0), while direct channel traffic volumes typically varied very little (0.3). One implication of the low CV is that any social campaign manifesting in dark social sharing has only a limited effect, although these data say little about the level of ongoing ‘organic’ sharing in the channel, as is addressed in the next section.

Table 1: Sample specification — three loyalty and two transactional websites

<i>Brand type</i>	<i>Reach</i>	<i>Size ('000s/Q)</i>	<i>Time (Qs)</i>	<i>Growth Q1-Q8 (%)</i>	<i>Traffic strategy</i>
A: Customer loyalty	Global	330	8	39	Referral
B: Employee loyalty	Global	27	8	57	PPC and display
C: Affiliate loyalty	US	15	8	69	Referral and PPC
D: Fashion	UK	5	8	68	Social and organic
E: Specialist film rental	UK	1	8	-50	Referral and PPC

PPC, pay-per-click.

Table 2: Coefficients of variation in website traffic over eight quarters by channel

	<i>Display</i>	<i>Other</i>	<i>Paid</i>	<i>E-mail</i>	<i>Social</i>	<i>Referral</i>	<i>Organic</i>	<i>Direct</i>
Affiliate		1.5		1.3	0.7	0.2	0.1	0.1
Customer		2.4		1.2	0.5	0.4	0.3	0.1
Fashion	2.8	1.4	2.2	0.8	0.3	0.3	0.2	0.2
Employee	0.8	1.0	0.6	0.7	0.7	1.7	1.8	1.0
Film					1.8	1.1	0.7	0.3
Mean CV	1.8	1.6	1.4	1.0	0.8	0.7	0.6	0.3

CV, coefficient of variation.

FINDINGS

This section addresses the three research questions in turn.

Attraction

The first finding confirms the overwhelming importance of attracting 'new' traffic (defined by Google as visitors not identified as being on the site in the previous two years). On average, 82 per cent of site visitors in each quarter observed were (initially) 'new'. That metric systematically dropped below 80 per cent on the customer loyalty websites, with a corresponding increase in repeat visits, but even here the average attraction rate in each quarter was as high as 78 per cent. This finding is surprising because it means that both growing and declining website performance (even on relatively high-traffic websites) requires a constant and cumulative and ongoing build in reach. The proportion of new visitors on each website remained broadly constant over each of the eight quarters, even as absolute quarterly traffic volume became quite dynamic, and yet that proportion is surprisingly high for individual

websites (including busy ones) in a period as long as a quarter. Eight in ten visitors in each quarter had not been on the site in the previous two years.

Repeat rates

The second findings relate to repeat visit rates. The metrics obviously reflect a high but constant visitor churn from quarter to quarter, indicated by the attraction rates previously noted. Perhaps unsurprisingly, there was a real difference between transactional and loyalty websites. Repeat metrics on loyalty-promotional sites were around 50 per cent higher than on the transactional sites. These higher rates may reflect the popularity of the loyalty programmes, manifested in the form of customers checking in to view their reward balances.

The second research question was posed to establish the role of the direct channel in driving this high volume of new traffic in each quarter. The distribution of total traffic by channel is shown in Table 4, which clearly supports the prior literature. The direct

channel was found to be substantial, carrying 37 per cent of total observed website visitors. Table 3 shows it accounted for 26 per cent of transaction and 44 per cent of promotion traffic in the sample and remained stable.

It could be argued that customers engaged with loyalty promotions would bookmark those websites in order to track progress more easily. The results indicate that a high proportion of all web traffic is stimulated to visit by offline as well as online cues (as bookmarks exist on the browser, and addresses are typed from memory), traffic which might be thought to consist largely of repeat visitors. It is therefore a surprising anomaly that contrary to both Plaza⁹⁵ and Pakkala *et al.*,⁹⁶ direct traffic has a *far lower* repeat rate than the website average, deviating by 50 per cent from the mean. On the other hand, this means that it plays a more important role than expected in delivering new visitors in each quarter, and particularly in relation to its relative size. It is worth noting that just under half (44 per cent) of all promotional website visitors are arriving from the direct channel.

Dark social

There may be several reasons for the volume of promotional website visitors arriving from the direct channel. One may be misclassification: cookies are set to identify repeat visitors and if these are deleted when a browser history is cleared, repeat visitors may then be identified as new. As in Habib *et al.*,⁹⁷ it is assumed that this is not a major bias in the data, but noted as a question for further research. A second reason may be the presence of a dark social component in the direct channel, as the prior research^{98,99} was conducted before the widespread adoption of closed media.

Table 5 lists the main media channels of open network communications ('light social'). Inbound social media traffic in these channels is attributed to a recognised source and is recorded in the social channel on the analytics platform. These are compared with sources of closed network communications (dark social). This inbound traffic is recorded in the direct channel with no attributable source of origin. Table 5 reports the relative usage by consumers and market share.

Table 3: Returning visitors by quarter — total website vs direct channel

	Channel size		Repeat rates		
	Social	Direct	Website	Direct	Repeat deficit
	(%)	(%)	(%)	(%)	(%)
Promotional	3	44	22	14	42
Transactional	17	26	14	10	29

Table 4: Distribution of channel traffic in an average quarter

	Direct	Search Organic	Paid	Referral	Social	Display	E-mail
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Film	24	45	0	29	2	0	0
Fashion	27	22	2	17	26	1	5
Affiliate	48	21	0	27	2	0	2
Customer	72	3	0	19	5	0	0
Employee	12	7	44	2	3	26	1
Mean	37	20	9	19	8	5	2

Table 5: Light and dark social media

Open network communications*	%	Closed network communications**	%
Facebook	65	WhatsApp (2009)	29
Twitter	13	Facebook Messenger (2011)	25
Pinterest	11	WeChat (2011)	21
Instagram	4	Skype	6
Tumblr	3	Snapchat	6
YouTube	3	Viber	5
Other	1	LINE	4
		Telegram	4

*Market share held by the leading social networks in the UK as of November 2018.

**Most popular mobile messaging apps worldwide October 2018, based on number of monthly active users.

Data source: www.statista.com

A rough initial sense of dark social traffic volumes might be obtained by identifying this ‘new’ component in the direct channel, and there are some signposts for this in Table 3. First, the social channel is sizable (17 per cent) in the transaction websites because they are using a social strategy with visible sharing. The promotion sites are not, and therefore it is possible that the distribution of traffic between social and direct may give a clue as to the likely contribution of dark social traffic to total website visits, putting it in the region of 17–18 per cent. This is a high proportion of traffic, unaccounted for on many websites, and likely to be non-repeating visitors, as the differential in repeat rates implies. Therefore, dark social is a significant research issue.

DISCUSSION AND IMPLICATIONS

To date, the dark social problem has received little attention in academic research (although one recent exception is Swart *et al.*¹⁰⁰). The present research contributes to the knowledge on the topic. The study now discusses the implications of the findings, and their limitations in order to outline a suggested research agenda to investigate dark social traffic in more detail.

The study confirms that even on successful and busy websites, repeat traffic in

any quarter is typically but surprisingly low: around eight in ten are ‘first-time’ visitors in successive quarters, and so the effectiveness of any marketing communication on the website must depend on reaching large numbers at a low frequency. The question of effective frequency is one that still concerns advertising and media planners (see a recent meta-analysis by Schmidt and Eisend¹⁰¹), and that debate may well inform further study of website effectiveness. The focus of the present study, however, was on reach and acquiring website traffic in the first place.

Much research effort has been expended on every traffic source *apart* from the direct channel, but this study shows that the direct channel is typically substantial, being more important on average than total search. Secondly, unlike other channels that respond dramatically to online marketing investment, traffic in the direct channel appears to vary little in proportion to total traffic; and thirdly it is likely to contain a substantial proportion of dark social traffic, that is, earned reach. In short, the direct channel — particularly its dark social component — warrants managerial action and further investigation, not least in light of the total requirement for new visitors each quarter and the relatively high level of new traffic that it contains.

Implications of dark social traffic for managers

The implications for management in these findings are first that the direct channel is a potentially overlooked traffic source that calls for management. The findings imply that the direct channel should not be overlooked as it contains substantial referred social traffic and may amount to over one-third of all visitors. Social traffic is, of course, manageable. The temptation for researchers and managers to disregard direct traffic probably arose because it could not be directly manipulated in the same way as organic search or display traffic.¹⁰² However, its dark social component now means that this is no longer the case, albeit with the proviso that its effectiveness cannot yet be measured.

A starting point for practitioners here is therefore to identify the volume and identity of dark social traffic on the firm's website. One or two major firms have addressed this issue and developed proprietary technical solutions, but for small to medium-sized enterprises, these solutions are expensive and have not been widely adopted. Alternative measures might include reducing outbound dark social URLs by incorporating visible share buttons on web pages. This could discourage pasting links into closed applications. Providing an identifiable URL button with a referral tag directly to a dark social channel like WhatsApp or Facebook Messenger would enable analytics tools to track the source of any inbound traffic from that link. It may also be possible to filter dark social traffic out of analyses, simply by excluding metrics for visitors landing on the homepage. This would allow managers to distinguish between *true* direct (typing a URL or bookmarking a link) and dark social; however, this may not be reliable as the dark social traffic could also result from an outbound homepage link share.

Implications for marketing theory

This research is one of the first studies to apply an empirical generalisation approach

to the study of digital marketing,¹⁰³ seeking regularities and norms in many sets of data that build through further replication into robust and useful evidence of aggregate regularities in traffic flows. On this basis it has directly explored differences in the outcomes of marketing interventions by channels, comparing loyalty-promotion and transactional websites over two years in time series. This method lends itself to the data-rich context of digital marketing, and further work in this vein is now called for.

The study establishes that dark social traffic is likely to consist of high-quality visitors. Even though this lacks traceability through web analytics tools, theoretical understanding can be drawn using the social network theory (SNT). The theory describes the network of ties connecting individuals and has also been applied to social media to identify the relative effectiveness of weaker and stronger ties in virtual networks.¹⁰⁴ Within this network of ties, some individuals possess a more central position than others that enables them to reach a large number of network participants to disseminate information.¹⁰⁵ These individuals are considered opinion leaders and are of great interest to contemporary marketers for product recommendations. SNT reinforces the power of social media in diffusing opinions — through friend lists or followers¹⁰⁶ and driving traffic — over one website share that may bring significant inbound traffic following a unique URL — the definition of virality.

The research has contributed to the understanding of earned media and the virality of content through social networks. Further research is now needed that brings knowledge of SNT to bear on the problem of valuing and managing dark social traffic.

LIMITATIONS

A limitation of the approach taken in the current study is that although aggregate observations of around 3 million website hits

were made, further differentiated replications are required. The aim is to eventually develop robust empirical generalisations that will be helpful at the firm level.¹⁰⁷ The approach recommended^{108,109} is to undertake replication and extension studies in many and varied sets of data to develop and then test useful benchmarks and underlying explanatory theories.

The authors believe that this study has confirmed the importance of the question, and the volume of direct traffic justifies the article's title. To address the limitations of this study, two routes are defined for further inquiry.

First, although this study makes a rough estimation of dark social volumes, a reliable and precise method is needed to define it accurately. One method is by tagging a copied and pasted URL's from a focal website as it leaves. The virality of that individual link can then be assessed as it returns in terms of inbound volume and timing within the direct channel. This also separates non-dark social traffic and allows differential modelling of onsite behaviour. By separating the channel traffic in this way, one can observe relative onsite behaviour on a number of measures including page views, bounce rates, repeat visits and conversions.

Secondly, bookmarks and typed links are largely prompting repeat visits to known websites. This type of behavioural loyalty in the direct channel is likely to be near habitual and various highly generalised stochastic models could be usefully extended to benchmark visits to individual websites or when distributed among competing websites. Examples include the NBD¹¹⁰ or the NBD-Dirichlet.¹¹¹ If the underlying theories extend successfully, this will give a better understanding of what can be achieved in this component, encouraging further extension to other channels, and linking understanding of digital marketing with well-established existing behavioural theories.

Acknowledgments

The authors would like to thank Dr Andrew Mitchell, CEO Brandmovers Inc. and founding Chairman of the Brandmovers Institute at London South Bank University for co-funding this study, and five anonymous companies for permission to access data.

References

1. Khanna, S. and Wahi, A. K. (2018) 'Website attractiveness in e-commerce sites: Key factors influencing the consumer purchase decision', in: Khahna, S. and Wahl, A. (eds) 'Mobile Commerce: Concepts, Methodologies, Tools, and Applications', IGI Global, Hershey, PA, pp. 394–403.
2. Ortiz-Cordova, A. and Jansen, B. J. (2012) 'Classifying web search queries to identify high revenue generating customers', *Journal of the American Society for Information Science and Technology*, Vol. 63, No. 7, pp. 1426–1441.
3. Montoya-Weiss, M. M., Voss, G. B. and Grewal, D. (2003) 'Determinants of online channel use and overall satisfaction with a relational, multichannel service provider', *Journal of the Academy of Marketing Science*, Vol. 31, No. 4, pp. 448–458.
4. Thongpapanl, N. and Ashraf A. R. (2011) 'Enhancing online performance through website content and personalization', *Journal of Computer Information Systems*, Vol. 52, No. 1, pp. 3–13.
5. Zhang, S. and Cabage, N. (2017) 'Search engine optimization: Comparison of link building and social sharing', *Journal of Computer Information Systems*, Vol. 57, No. 2, pp. 148–159.
6. Jansen, B.J., Spink, A. and Pedersen, J. (2005) 'A temporal comparison of AltaVista web searching', *Journal of the American Society for Information Science and Technology*, Vol. 56, No. 6, pp. 559–570.
7. Lambrecht, A. and Tucker, C. (2013) 'When does retargeting work? Information specificity in online advertising', *Journal of Marketing Research*, Vol. 50, No. 5, pp. 561–576.
8. Tucker, C. E. (2015) 'The reach and persuasiveness of viral video ads', *Marketing Science*, Vol. 34, No. 2, pp. 281–296.
9. Li, K., Lin, M., Lin, Z. and Xing, B. (2014) 'Running and chasing: The competition between paid search marketing and search engine optimization', in 'Proceedings of the 47th Hawaii International Conference on System Sciences, Big Island, Hawaii, 6th–9th January', pp. 3110–3119.
10. Fulgoni, G. M. (2015) 'How brands using social media ignite marketing and drive growth: Measurement of paid social media appears solid but are the metrics for organic social overstated?', *Journal of Advertising Research*, Vol. 55, No. 3, pp. 232–236.
11. Tellis, G. J., MacInnis, D. J., Tirunillai, S. and Zhang, Y. (2019) 'What drives virality (sharing) of online digital content? The critical role of information, emotion, and brand prominence', *Journal of Marketing*, Vol. 83, No. 4, pp. 1–20.

12. Campbell, T., Shaw, B., Rao, A. and Klink, J. (2019) 'Evaluating promotional efforts for driving traffic to an extension outreach website', *Journal of Extension*, Vol. 57, No. 3, pp.1–7.
13. Madrigal, A. (2012) 'Dark social: We have the whole history of the web wrong', *The Atlantic*, 12th October, available at: <https://www.theatlantic.com/technology/archive/2012/10/dark-social-we-have-the-whole-history-of-the-web-wrong/263523/> (accessed 3rd March, 2020).
14. Swart, J., Peters, C. and Broersma, M. (2018) 'Shedding light on the dark social: The connective role of news and journalism in social media communities', *New Media and Society*, Vol. 20, No. 11, pp. 4329–4345.
15. Corry, W. (2016) 'Research: Dark social dominates UK mobile sharing activity/RadiumOne', *The Marketing Blog*, available at: <https://www.themarketingblog.co.uk/2016/06/research-dark-social-dominates-uk-mobile-sharing-activity-radiumone/> (accessed 3rd March, 2020).
16. *Ibid.*, ref. 14 above.
17. *Ibid.*, ref. 13 above.
18. Filieri, R. and McLeay, F. (2014) 'E-WOM and accommodation: An analysis of the factors that influence travellers' adoption of information from online reviews', *Journal of Travel Research*, Vol. 53, No. 1, pp. 44–57.
19. Uncles, M. D., Dowling, G. R. and Hammond, K. (2003) 'Customer loyalty and customer loyalty programs', *Journal of Consumer Marketing* Vol. 20, No. 4, pp. 294–316
20. Newman, N., Fletcher, R., Kalogeropoulos, A. and Nielsen, R. (2019) 'Reuters Institute Digital News Report 2019', Reuters Institute for the Study of Journalism, Oxford
21. Stutzman, F. D., Gross, R. and Acquisti, A. (2012) 'Silent listeners: The evolution of privacy and disclosure on Facebook', *Journal of Privacy and Confidentiality*, Vol. 4, No. 2, pp. 7–41.
22. Jacobson, J., Gruz, A. and Hernández-García, Á. (2020) 'Social media marketing: Who is watching the watchers?', *Journal of Retailing and Consumer Services*, Vol. 53, No. 1, available at: <https://www.sciencedirect.com/science/article/pii/S0969698918307744> (accessed 2nd September, 2020).
23. Boyd, D. and Marwick, A. E. (2011) 'Social privacy in networked publics: Teens' attitudes, practices, and strategies', Paper Presented at the Oxford Internet Institute Decade in Internet Time Symposium, Oxford, 22nd September.
24. Stutzman, F., Vitak, J., Ellison, N. B., Gray, R. and Lampe, C. (2012) 'Privacy in interaction: Exploring disclosure and social capital in Facebook', Paper Presented at the Sixth International AAAI Conference on Weblogs and Social Media, Dublin, 4th–7th June.
25. Chris, L. A. (2015) 'Influence of social media on study habits of undergraduate students in Kenyan universities', *International Journal of Novel Research in Humanity and Social Sciences*, Vol. 2, No. 4, pp. 42–55.
26. Ermoshina, K., Musiani, F. and Halpin, H. (2016) 'End-to-end encrypted messaging protocols: An overview', in 'International Conference on Internet Science', Springer, Cham, pp. 244–254.
27. Peters, C. and Schröder, K. (2018) 'Beyond the here and now of news audiences: A process based framework for investigating news repertoires', *Journal of Communication*, Vol. 68, No. 6, pp. 1079–1103.
28. Hsiao, C. H., Chang, J. J. and Tang, K. Y. (2016) 'Exploring the influential factors in continuance usage of mobile social apps: Satisfaction, habit, and customer value perspectives', *Telematics and Informatics*, Vol. 33, No. 2, pp. 342–355.
29. Lankton, N. K., McKnight, D. H. and Thatcher, J. B. (2012) 'The moderating effects of privacy restrictiveness and experience on trusting beliefs and habit: An empirical test of intention to continue using a social networking website', *IEEE Transactions on Engineering Management*, Vol. 59, No. 4, pp. 654–665.
30. Appiah, M. K. (2016) 'Influence of WhatsApp on study habit of university students in Ghana', *International Journal of Research in Economics and Social Sciences*, Vol. 6, No. 3, pp. 280–292.
31. Westlund, O. and Ekström, M. (2018) 'News and participation through and beyond proprietary platforms in an age of social media', *Media and Communication*, Vol. 6, No. 4, pp. 1–10.
32. Quandt, T. (2018) 'Dark participation', *Media and Communication*, Vol. 6, No. 4, pp. 36–48.
33. Meinecke, S. (2015) 'FireChat: How to chat without WiFi or a signal', available at: <https://www.makeuseof.com/tag/firechat-chat-without-wifi-signal/> (accessed 3rd March, 2020).
34. Uwalaka, T. and Watkins, J. (2018) 'Social media as the fifth estate in Nigeria: An analysis of the 2012 Occupy Nigeria protest', *African Journalism Studies*, Vol. 39, No. 4, pp. 22–41.
35. Hatch, C. (2019) 'Come to the dark side: Explaining dark social's impact', available at: <https://www.disruptiveadvertising.com/social-media/dark-social/> (accessed 2nd September, 2020).
36. *Ibid.*, ref. 14 above.
37. Romao, J. (2018) 'Why it's time to shine the light on "dark social"', available at: <https://www.martechadvisor.com/articles/social-media-marketing-2/why-its-time-to-shine-the-light-on-dark-social/> (accessed 2nd September, 2020).
38. Morimoto, M. and Chang, S. (2006) 'Consumers' attitudes toward unsolicited commercial e-mail and postal direct mail marketing methods: Intrusiveness, perceived loss of control, and irritation', *Journal of Interactive Advertising*, Vol. 7, No. 1, pp. 1–11.
39. Zumstein, D. and Hundertmark, S. (2017) 'Chatbots — An interactive technology for personalized communication, transactions and services', *LADIS International Journal on WWW/Internet*, Vol. 15, No. 1, pp. 96–109.
40. Dyrli, O. E. (2006) 'How effective is your website? Free online tools help measure site success', *District Administration*, Vol. 42, No. 9, p. 72.
41. Nakatani, K. and Chuang, T. T. (2011) 'A web analytics tool selection method: An analytical

- hierarchy process approach', *Internet Research*, Vol. 21, No. 2, pp. 171–186.
42. Pakkala, H., Presser, K. and Christensen, T. (2012) 'Using Google Analytics to measure visitor statistics: The case of food composition websites', *International Journal of Information Management*, Vol. 32, No. 6, pp. 504–512.
 43. Plaza, B. (2009) 'Monitoring web traffic source effectiveness with Google Analytics: An experiment with time series', *Aslib Proceedings*, Vol. 61, No. 5, pp. 474–482.
 44. Kapoor, K. K., Dwivedi, Y. K. and Piercy, N. C. (2016) 'Pay-per-click advertising: A literature review', *The Marketing Review*, Vol. 16, No. 2, pp. 183–202.
 45. Baye, M. R., De los Santos, B. and Wildenbeest, M. R. (2016) 'Search engine optimization: What drives organic traffic to retail sites?' *Journal of Economics & Management Strategy*, Vol. 25, No. 1, pp. 6–31.
 46. Kaushik, A. (2010) 'LDS (Mormon) Church knows SEO with Avinash Kaushik', Google, at SES Chicago 2010, available at: <http://www.youtube.com/watch?v=DjWInquqhMA> (accessed 2nd September, 2020).
 47. Berman, R. and Katona, Z. (2013) 'The role of search engine optimization in search marketing', *Marketing Science*, Vol. 32, No. 4, pp. 644–651.
 48. Jerath, K., Ma, L. and Park, Y. H. (2014) 'Consumer click behavior at a search engine: The role of keyword popularity', *Journal of Marketing Research*, Vol. 51, No. 4, pp. 480–486.
 49. Yao, S. and Mela, C. F. (2011) 'A dynamic model of sponsored search advertising', *Marketing Science*, Vol. 30, No. 3, pp. 447–468.
 50. Agarwal, V., Bell, G. W., Nam, J. W. and Bartel, D. P. (2015) 'Predicting effective microRNA target sites in mammalian mRNAs', *elife*, Vol. 4, No. 1, article e05005, available at: <https://elifesciences.org/articles/05005> (accessed 2nd September, 2020).
 51. Jeziorski, P. and Segal, I. (2015) 'What makes them click: Empirical analysis of consumer demand for search advertising', *American Economic Journal: Microeconomics*, Vol. 7, No. 3, pp. 24–53.
 52. Liu, J. and Toubia, O. (2018) 'A semantic approach for estimating consumer content preferences from online search queries', *Marketing Science*, Vol. 37, No. 6, pp. 930–952.
 53. Strzelecki, A., Furmankiewicz, M. and Ziuziański, P. (2016) 'The use of management dashboard in monitoring the efficiency of the internet advertising campaigns illustrated on the example of Google Analytics', *Studia Ekonomiczne*, Vol. 6, No. 296, pp. 136–150.
 54. Patil, K. P. and Puri, P. (2015) 'Small and medium enterprises (SMEs) key challenges and innovative approach for using social media marketing (SMM)', *Journal for Studies in Management and Planning*, Vol. 1, No. 5, pp. 450–460.
 55. Aslam, B. and Karjaluoto, H. (2017) 'Digital advertising around paid spaces, e-advertising industry's revenue engine: A review and research agenda', *Telematics and Informatics*, Vol. 34, No. 8, pp. 1650–1662.
 56. Kantrowitz, A. (2015) 'Inside Google's secret war against ad fraud', *Ad Age*, 18th May, available at: <https://adage.com/article/digital/inside-google-s-secret-war-ad-fraud/298652> (accessed 2nd September, 2020).
 57. Kumar, A. and Salo, J. (2018) 'Effects of link placements in e-mail newsletters on their click-through rate', *Journal of Marketing Communications*, Vol. 24, No. 5, pp. 535–548.
 58. Chittenden, L. and Rettie, R. (2003) 'An evaluation of e-mail marketing and factors affecting response', *Journal of Targeting, Measurement and Analysis for Marketing*, Vol. 11, No. 3, pp. 203–217.
 59. Marwick, A. E. (2015) 'Instafame: Luxury selfies in the attention economy', *Public Culture*, Vol. 27, No. 1, pp. 137–160.
 60. Senft, T. M. (2008) 'Camgirls: Celebrity and Community in the Age of Social Networks', Peter Lang, Durham, NC.
 61. Bickart, B. and Schindler, R. M. (2001) 'Internet forums as influential sources of consumer information', *Journal of Interactive Marketing*, Vol. 15, No. 3, pp. 31–40.
 62. Kumar, N. and Benbasat, I. (2006) 'Research note: The influence of recommendations and consumer reviews on evaluations of websites', *Information Systems Research*, Vol. 17, No. 4, pp. 425–439.
 63. Zhang, J. Q., Craciun, G. and Shin, D. (2010) 'When does electronic word-of-mouth matter? A study of consumer product reviews', *Journal of Business Research*, Vol. 63, No. 12, pp. 1336–1341.
 64. Chan, Y. Y. and Ngai, E. W. (2011) 'Conceptualising electronic word of mouth activity', *Marketing Intelligence & Planning*, Vol. 29, No. 5, pp. 488–516.
 65. Copley, P. (2015) 'For the love of AIDA — Developing the hierarchy of effects model in SME social media marketing strategy', Paper Presented at the Institute Small Business and Entrepreneurship (ISBE) Conference, Glasgow, 11th–12th November.
 66. See-To, E. W. and Ho, K. K. (2014) 'Value co-creation and purchase intention in social network sites: The role of electronic word-of-mouth and trust — A theoretical analysis', *Computers in Human Behaviour*, Vol. 31, pp. 182–189.
 67. Hoffman, D. L. and Fodor, M. (2010) 'Can you measure the ROI of your social media marketing?', *MIT Sloan Management Review*, Vol. 52, No. 1, pp. 41–49.
 68. Nelson-Field, K. and Sharp, B. (2013) 'Viral Marketing: The Science of Sharing', Oxford University Press, Melbourne.
 69. Jenkins, H., Ford, S. and Green, J. (2018) 'Spreadable Media: Creating Value and Meaning in a Networked Culture', NYU Press, New York, NY.
 70. *Ibid.*, ref. 37 above.
 71. *Ibid.*, ref. 38 above.
 72. *Ibid.*, ref. 14 above.
 73. McCabe, K., Steidl, P. and McInnes, N. (2016) 'WARC webinar: Understanding dark social: Changing how brands think about branding', available at: <https://www.warc.com/content/paywall/article/warc-webinars/>

- warc_webinar_understanding_dark_social_changing_how_brands_think_about_branding/108683_(accessed 2nd September, 2020).
74. *Ibid.*, ref. 40 above.
 75. Chaffey, D. and Smith, P. R. (2017) 'Digital Marketing Excellence. Planning, Optimizing and Integrating Online Marketing', 5th edn, Routledge Taylor & Francis Group, London and New York.
 76. Moran, M. and Hunt, B. (2014) 'Search Engine Marketing, Inc.: Driving Search Traffic to Your Company's Website', IBM Press, Crawfordsville, IN.
 77. Kannan, P. K. Reinartz, W. and Verhoef, P. C. (2016) 'The path to purchase and attribution modelling: Introduction to special section', *International Journal of Research in Marketing*, Vol. 33, No. 3, pp. 449–456.
 78. Budd, B. Q. (2012) 'Website data and uses for strategic marketing — A commercial experience', *International Journal of Management & Information Systems (Online)*, Vol. 16, No. 3, pp. 239–246.
 79. *Ibid.*, ref. 38 above.
 80. Sen, R. (2005) 'Optimal search engine marketing strategy', *International Journal of Electronic Commerce*, Vol. 10, No. 1, pp. 9–25.
 81. Xing, B. and Lin, Z. (2006) 'The impact of search engine optimization on online advertising market', in 'Proceedings of the 8th International Conference on Electronic Commerce: The New E-commerce: Innovations for Conquering Current Barriers, Obstacles and Limitations to Conducting Successful Business on the Internet, Fredericton, New Brunswick, 14th–16th August', pp. 519–529.
 82. *Ibid.*, ref. 42 above.
 83. Dinner, I. M., Heerde Van, H. J. and Neslin, S. A. (2014) 'Driving online and offline sales: The cross-channel effects of traditional, online display, and paid search advertising', *Journal of Marketing Research*, Vol. 51, No. 5, pp. 527–545.
 84. *Ibid.*, ref. 68 above.
 85. Wolny, J. and Mueller, C. (2013) 'Analysis of fashion consumers' motives to engage in electronic word-of-mouth communication through social media platforms', *Journal of Marketing Management*, Vol. 29, No. 5–6, pp. 562–583.
 86. Wang, X., Yu, C. and Wei, Y. (2012) 'Social media peer communication and impacts on purchase intentions: A consumer socialization framework', *Journal of Interactive Marketing*, Vol. 26, No. 4, pp. 198–208.
 87. Chu, S. C. and Choi, S. M. (2010) 'Social capital and self-presentation on social networking sites: A comparative study of Chinese and American young generations', *Chinese Journal of Communication*, Vol. 3, No. 4, pp. 402–420.
 88. Gilliland, N. (2018) 'Only 4% of marketers are taking dark social seriously', available at: <https://econsultancy.com/only-4-of-marketers-are-taking-dark-social-seriously/> (accessed 2nd September, 2020).
 89. Ehrenberg, A.S.C. (1975) 'Data Reduction', Wiley, London and New York, NY.
 90. Ehrenberg, A. (2001) 'Marketing: Romantic or realistic?', *Marketing Research*, Vol. 13, No. 2, pp. 40–42.
 91. Sharp, B., Wright, M., Kennedy, R. and Nguyen, C. (2017) 'Viva la revolution! For evidence-based marketing we strive', *Australasian Marketing Journal (AMJ)*, Vol. 25, No. 4, pp. 341–346.
 92. Sharp, B. and Wright, M. (1999) 'There are two types of repeat purchase markets', in 'Proceedings of the 28th European Marketing Academy Conference (Vol. 400)', Humboldt-University, Berlin, pp. 1144–1148.
 93. Brown, C. E. (1998) 'Coefficient of variation', *Applied Multivariate Statistics in Geohydrology and Related Sciences*, Springer, Berlin, Heidelberg, Chapter 13 pp. 155–157.
 94. Ahmed, S. E. (1995) 'A pooling methodology for coefficient of variation', *Sankhyā: The Indian Journal of Statistics*, Vol. 57(B), pp. 57–75.
 95. *Ibid.*, ref. 37 above.
 96. *Ibid.*, ref. 38 above.
 97. Habib, H., Colnago, J., Gopalakrishnan, V., Pearman, S., Thomas, J., Acquisti, A. and Cranor, L.F. (2018) 'Away from prying eyes: Analysing usage and understanding of private browsing', in 'Proceedings of the Fourteenth Symposium on Usable Privacy and Security, Baltimore, MD, 12th–14th August', pp. 159–175.
 98. *Ibid.*, ref. 37 above.
 99. *Ibid.*, ref. 38 above.
 100. *Ibid.*, ref. 14 above.
 101. Schmidt, S. and Eisend, M. (2015) 'Advertising repetition: A meta-analysis on effective frequency in advertising', *Journal of Advertising*, Vol. 44, No. 4, pp. 415–428.
 102. Marjan, A., Graham, C., Bruce, M. and Mitchell, A. (2019) 'Valuable traffic hidden in plain sight', available at: <https://www.linkedin.com/pulse/valuable-traffic-hidden-plain-sight-ammarah-marjan/> (accessed 3rd March, 2020).
 103. *Ibid.*, ref. 86 above.
 104. Spier, S. (2017) 'Collective Action 2.0: The Impact of Social Media on Collective Action', Chandos Publishing, Oxford.
 105. *Ibid.*, ref. 52 above.
 106. Winter, S. and Neubaum, G. (2016) 'Examining characteristics of opinion leaders in social media: A motivational approach', *Social Media Society*, Vol. 2, No. 3, pp. 1–12.
 107. Hanssens, D. M. (2009) 'Advertising impact generalizations in a marketing mix context', *Journal of Advertising Research*, Vol. 49, No. 2, pp. 127–129.
 108. Uncles, M. D. and Wright, M. (2004) 'Empirical generalisation in marketing', *Australasian Marketing Journal*, Vol. 12, No. 3, pp. 5–8.
 109. Uncles, M. D. and Kwok, S. (2013) 'Designing research with in-built differentiated replication', *Journal of Business Research*, Vol. 66, No. 9, pp. 1398–1405.
 110. Trinh, G., Rungie, C., Wright, M., Driesener, C. and Dawes, J. (2014) 'Predicting future purchases with the Poisson log-normal model', *Marketing Letters*, Vol. 25, No. 2, pp. 219–234.
 111. Goodhardt, G. J., Ehrenberg, A. S. and Chatfield, C. (1984) 'The Dirichlet: A comprehensive model of buying behaviour', *Journal of the Royal Statistical Society. Series A (General)*, Vol. 10, No. 1, pp. 621–655.