
Conceptual reasons beyond technology for the delayed progress and innovation in marketing science

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Abstract In general, much of the traditional marketing science practice prior to the 20th century (and perhaps even throughout) remained hidebound by rules of thumb and lack of information, perhaps because of a lack of technology that enables the diffusion and sharing of information across geographies, people and disciplines. This has been true across general market and culturally specific research. Technological advancements have made possible the broader sharing of information, and increased computational power has made possible its measurement. Yet the expected changes in marketing science applications have not been seen empirically. Some of those transformations should already have taken place. That would, however, require organisations to remain open minded and not risk averse (or at least risk neutral), as many of the rewards of advanced analytics may not be obvious in the short term, especially as new investments to build the capabilities have to be made up front — this is a chicken and egg problem. The author of this paper has identified three syndromes as the culprits of delayed progress and innovation in marketing science: syndication, academic and practitioner syndromes. Most of the shortcomings have been due to the self-imposed simplicity of the marketplace (especially in CPG) by addressing only the demand side, often overlooking the supply chain side.

KEYWORDS: marketing science, risk, marketing mix, trade, supply chain, technology

INTRODUCTION

My intention is to have a somewhat informal dialogue around some (personally considered) major actionable issues in the

marketing science¹ practice, which I have come across over my years as a researcher. Under the marketing science definition we would expect (as John Roberts and his

colleagues well point out) that any marketing scientists should be seeking to impact marketing practice.

Bringing awareness among marketing scientists/researchers (academics and practitioners) that we could be doing much better research is the main objective. This is not an easy task as I could have spent the length of this paper in addressing only one issue on one topic at its deepest levels. I cover instead a few set of issues and topics related to the measurement of a company's dollar investments to drive business, but just skimming the surface.

Hence, the level of detail at which it is written assumes the reader has a good grasp of the few methods herein mentioned and that the reader also knows the mathematical and statistical inner workings of each method and their applications. This paper does not go in depth into the details around any specific type of approach as a substitute for another. Each topic's shortfalls will be discussed in more detail at a different time.

In general, much of the traditional marketing practice prior to the 20th century (and perhaps even throughout the middle) remained hidebound by rules of thumb and lack of information, perhaps because of a lack of technology that would enable the diffusion and sharing of information across geographies, people and disciplines. This has been true across general market (GM) and culturally specific (CS) research.²

Information technology, especially since the mid-20th century, has given the marketer new channels of communication as well as enhanced means of aggregating and analysing marketing data. We have seen that, as summarised by Moore's and Metcalfe's laws and the law of continuous connectivity, analysts' effectiveness and efficiencies have significantly increased (see Figures 1 and 2).³ As a result we should have expected or expect proportional transformations around the way market research was/is done over the years.

Additionally, following advancements in information technology, specialisations

have emerged (sales versus marketing and advertising versus retailing) and re-combined (business development).

Yet we have not seen the expected changes in marketing science applications empirically. Some of these transformations should already have taken place. That would, however, require organisations to remain open minded and at least risk neutral as many of the rewards of advanced analytics may not be obvious in the short term, especially as new investments to build capabilities have to be made up front — this is a chicken and egg problem.

In turn, delays in investments to build new capabilities further delay the adoption rate of new approaches and ideas, which has been the main reason for the lack of progress in marketing and economic practice applications. Perhaps all of this is a marketing science Gordian knot. Slicing through it, I have identified three major syndromes which could nicely explain and summarise the delayed progress and innovation in marketing science. Breaking down the issues into these three separate ailments also allows us properly to address them accordingly:

- *Syndication syndrome*. The 'syndication syndrome' slows the adoption of new methods because large research/consulting companies want to commoditise or standardise existing methods as much as possible.
 - Consulting/suppliers (such as Nielsen, IRI, Millward Brown, Kantar and GFK, to name a few servicing the CPG industry) spend large sums of dollars and time at any given point building capabilities and 'solutions' that address the lowest common denominator. They try to stay away from customisation as much as possible because that erodes their margins. The more anyone in their teams spends on any given project, the lower their margins become (if they do not keep charging for the follow-ups).

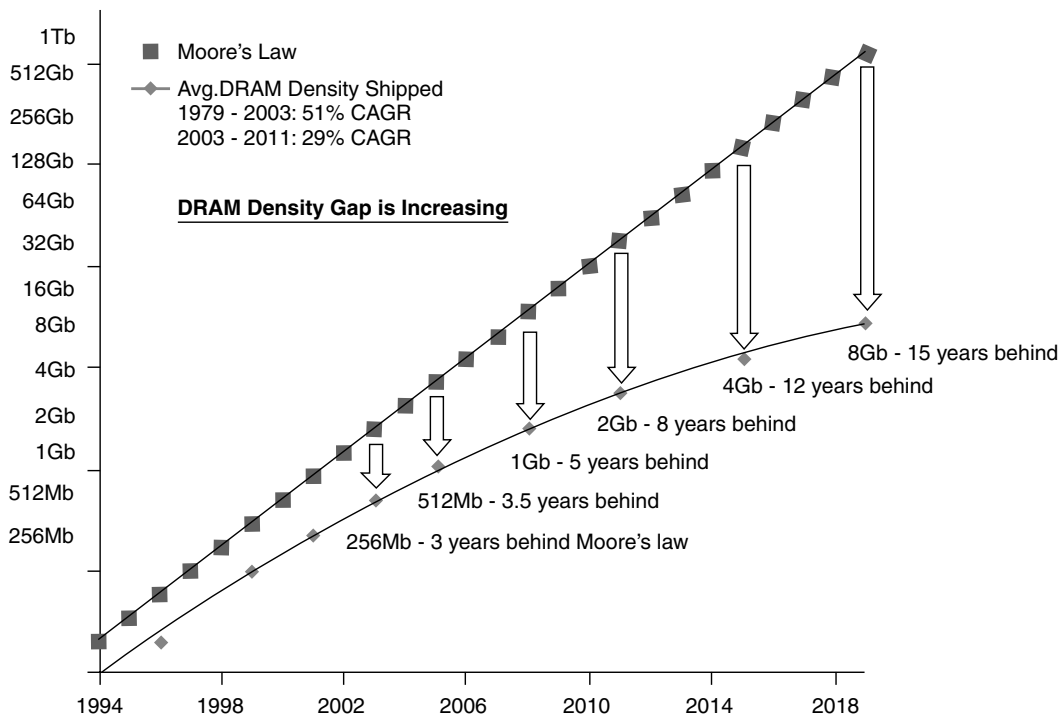


Figure 1: Moore's law

Note: Transistor density on integrated circuits doubles about every two years

Source: <http://www.netlist.com/media/blog/hypercloud-memory-scaling-the-high-density-memory-cliff> (accessed 24th October, 2014)

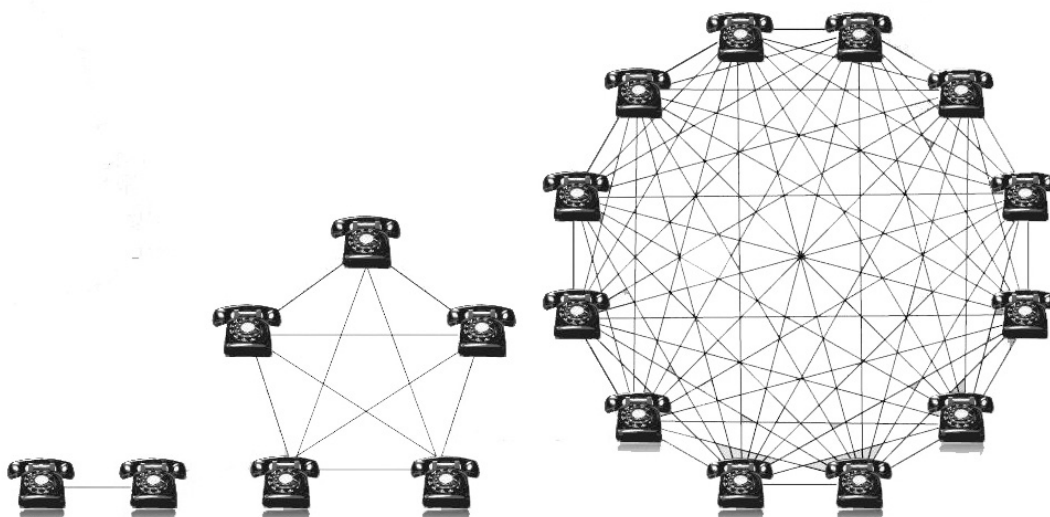


Figure 2: Metcalfe's law. Example: two telephones can make only one connection, five can make 10 connections and 12 can make 66 connections

Note: Value increases with n^2

Often any of their solutions are sold over and over for years with minimum change. In fact many of them have shifted their analytical practices to India or China in search of talented book-smart analysts, often with little practical knowledge of the local idiosyncrasies they are solving for. Any new method that may not be easily operationalised through their already-existing analytical infrastructures tends to be dismissed, thus delaying the adoption of anything that could be meaningful to the client but not profitable for them.

- *Academic syndrome.* The ‘academic syndrome’ contributes to this delay through the reward which academics endure for maintaining a self-imposed myopia and intellectual monotheism, oversimplifying the marketplace.
 - The endurance of the ‘intellectual stickiness’ of any given school and academic representing it often does not deal with a variety of ideas. Most well-known academics have professed one philosophy which is defended at all costs. For example, see Robert Lucas and his theory of rationality: I doubt he would just abandon his own theory and agree with Dan Ariely’s theory of irrationality. Lucas himself challenged Keynesian economics with his own ‘Lucas critique’. The same applies between Bayesians and Classicists. The point is that most academics ‘ride’ one philosophy, especially if they become well known because of it. In turn, that may cause the rejection of other philosophies which may be better suited to advance the practice of marketing science for whatever the topic under discussion is.
- *Practitioner syndrome.* The ‘practitioner syndrome’ occurs when market researchers are not open to new and/or better approaches. They do what they’ve always done.
 - This may be the most pervasive syndrome, as it often involves a form of

ignorant resistance on the part of the practitioner and/or a latent resistance due to the risk of making an upfront investment with an uncertain payoff. Similarly to the academic syndrome, practitioners who have made a name within a given organisation have done it by professing a limited set of practical philosophies and/or project deliveries, perhaps becoming successful through a set of project deliveries that go with the political grain of the corporate culture. Such wins often involve a type(s) of analyses they would likely not change for anything, despite the fact that the new approach could be better for the company in the longer term, and/or because when it comes down to the risk of investing in an unknown, the vast majority of market researchers/analysts do not have the authority and security to make these upfront dollar investments.

One can argue that all of these syndromes can be easily overcome, but why haven’t they, then? Perhaps it is not that easy. For example, from personal experience, the practitioner syndrome can be overcome through the implementation of an internal (speaking from the POV of someone who works on the client side) consultancy model which constantly identifies quick, fast ‘wins’; through each new iteration of a project deliverable the new approaches are introduced. Perhaps the reason why this is not typically done is because the amount of energy that it takes to be constantly internally selling and delivering can be overwhelming.

Are these syndromes real? Yes, and they each have real practical consequences (individually or in any combination), all of which have costly inefficient and ineffective investments. We have all experienced them and they can be summarised as follows:

- Circular administrative references with perceived progress leading to costly

incorrect business decisions.

- For example, a lack of integrated analytical constructs in the traditional marketing mix fails to incorporate the current and emergent market and marketing dynamics. Think of traditional media versus emergent media. Most constructs cannot measure paid, owned, earned and shared in the same structural forms as television, print and radio.
- Inability to correctly understand and quantify investment opportunities across the supply chain. If I have extra dollars where do I invest them?
 - How can we answer this question without complete information? To add complexity, think of adding trade measures, own and competitive, to a system that cannot measure the media fundamentals. As a result, managers do not know what works and what does not work and often make wrong choices based on inaccurate information.
- Inefficient and ineffective insights through conventional research methods or data which we know is biased (syndicated panel for example).
 - Traditional focus groups, panel data and lengthy questionnaires wonder about attitudes and predict behaviour, when it should be the other way around. This is the well-known issue of stated versus observed behaviour.

All of these issues are naturally pervasive for the general market. What do you think happens when we address any multicultural group and/or a changing demography in the marketplace? What kind of challenges arise when we factor in consumer acculturation, generational levels and life stages, among others? Will that make the measurement harder to operationalise? I guess these are rhetorical questions intended to continue to make the point about how far we have not really come when we try to answer straightforward questions.

Keep this in mind as we continue our discussion, because over time we have followed the approach of ‘one size fits all’, generalising implications and insights from a general market to specific evolving demographic groups and/or changing demographics. This causes us to err and lose relevancy with those important demographic groups.

In my experience I have seen a lot of bad research, especially when it comes to measuring a company’s dollar investments on things like trade and/or media — specifically, major problems with traditional approaches to some widely utilised marketing tools such as marketing mix modelling (MMM; see Figure 3). The main reason is that mostly, and by design, MMM measures the partial set of mix variables and any emergent variable is left aside:

- As evaluated by *most* major suppliers/consultants: there is an oversimplification of the marketplace to a ‘two-dimensional construct’ (in which one dimension is sales and the other dimension is the marketing variables affecting sales). This was helpful 30 years ago thanks to Little & Guadagni:

‘Decision models are for solving problems ... They should include the variables and phenomena that are vital for the problem at hand, i.e. controllable activities like price, promotions, and advertising ... The most used choice model is the logit.’^{4,5}

Ironically, this statement is still true today. What are not, are the underlying ‘structural’ statistical forms we continue to use.

- For example, the emergence of digital activities and/or changing demographics complicates the mathematics behind Guadagni and Little’s (1983) classic Logit equation (reconstructed here from Guadagni and Little’s Table 1⁴):

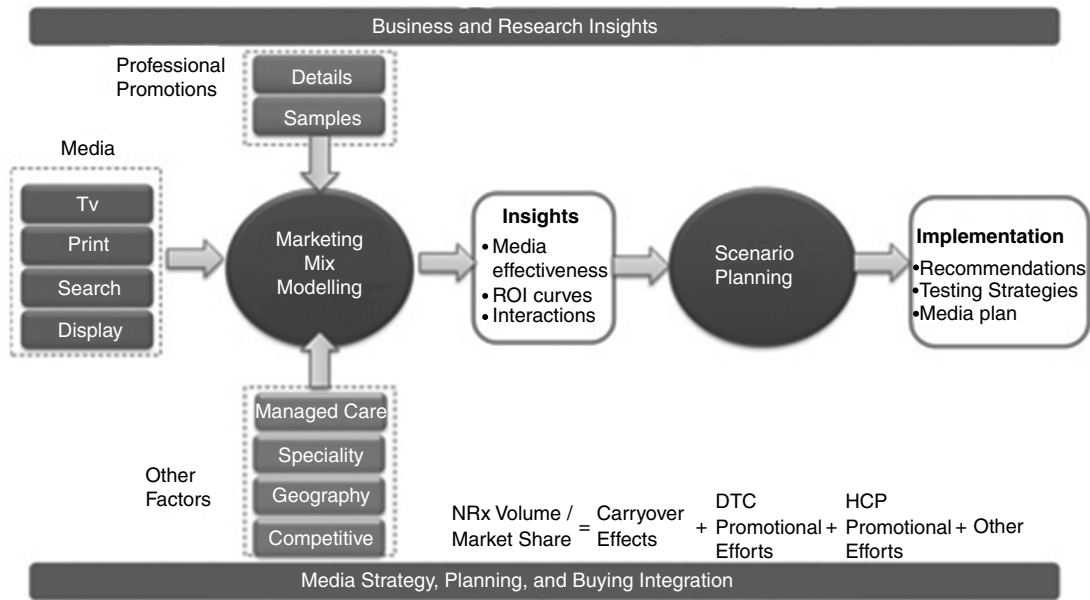


Figure 3: Marketing mix modelling

γ (Sales, as aggregated individual Logit-transformed purchase probabilities) = Brand-size constants + $3.92x_1$ (Brand Loyalty) + $2.97x_2$ (Size Loyalty) + $2.11x_3$ (Promotion) + $29.21x_4$ (Promotional price cut) – $29.94x_5$ (Regular depromoted price) – $0.22x_6$ (Prior promotional purchase) – $0.46x_7$ (Second prior promotional purchase)

Certainly the point is not to abandon MMM; instead, how do we improve it? For example, if we add any emergent variable from digital (paid, owned, earned or shared) we would not be able to properly quantify or decompose their volume contributions. Why? Partially because most major dollar investments on certain variables that happen to occur simultaneously with those with less dollar investments (and therefore less ‘weights’) tend to pick up most of the parametric variation and significance. This causes the smaller invested variables in the models to drop out due to lack of significance when in reality they could be driving business results. Additionally, many new more complicated statistical models

have been developed over the years but they do not address the full picture yet (most are demand centric). I will go into more detail about this next.

In general, we look at the consumer takeaway (in CPG using Nielsen or IRI syndicated data) and try to find sales causation or correlation with point of sale (POS) variables (such as features, features and displays, price discounts, displays) and/or media variables (television, radio, print, paid digital, paid Facebook, among others). But what happened to the supply side? If you think about it, there are distributor, retailer and ultimately shopper/consumer interactions not accounted for in a demand-centric analysis. Such interactions should be a key component in retail’s use of data analytics. We should use better inclusion of supply-side data dynamics in order to understand the full picture and make better, more effective and efficient decisions.

Additionally, think how a global business presence complicates things further, especially when we try to measure the investments we make to drive business in different countries. This is perhaps because

we are consciously trying to simplify and that is why in the CPG industry we have mostly kept a self-imposed simple view of the world and we focus primarily on the demand side for measurement.

How many times have we heard the seemingly benign question: ‘How do our marketing investments affect the product from the moment it leaves the factory to the moment it gets to consumers’/ shoppers’ hands?’ It is practically impossible to answer this question with the current methodologies, at least without making major assumptions surrounding the analytical approaches used to answer it.

How do we measure traditional events (trade deals) that have not occurred? Can we generalise between GM and CS groups? No, it would not be recommended. Here I suggest that instead you try supplementing any MMM with choice modelling (as an example). Use discrete choice to capture future events, evaluate consumer’s utilities and cross-validate by using parametric/non-parametric Frequentist or Bayesian analyses.

- What about the emergent and ever-changing digital ecosystem?⁶ What about multicultural events which have different types of content and messaging and

executions? For example, this paper would recommend using a mix of agent-based modelling (ABM) and artificial neural nets (ANN). The reason is that this ‘hybrid’ mixed approach:

- allows us directly to ‘bring to life’ real *characteristics and behaviours*, letting us model how individual groups (segments/demographics) within a lifelike environment respond to different media (consider it ‘a mix within the mix’);
- allows us to model *consumer and media interactions*, uncovering the hidden influences among individuals and their responses to different media mixes; this is not possible with traditional MMM (see Figure 4);
- ABM and ANN approaches are *adaptive to the changing marketing environment* and provide results in days not months (data availability permitting);
- allows us to *simulate/test ‘on the go’* the effectiveness of alternative media — digital, OOH, FSIs, etc.

So what do we do? I believe we must evolve from a two-dimensional approach to multiple dimensions (see Figures 5 and 6). This requires organisations to remain open minded, as many of the rewards of

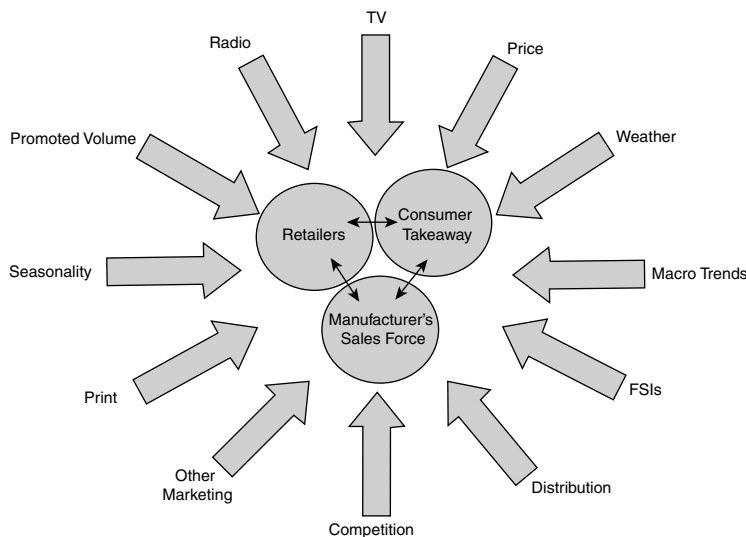


Figure 4: Supply chain framework: multiple dimensions and interrelated variables

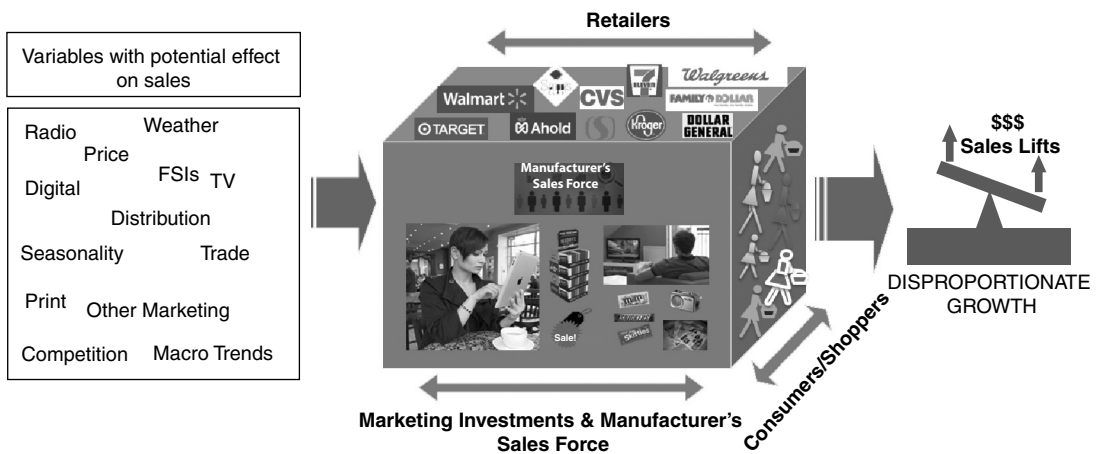


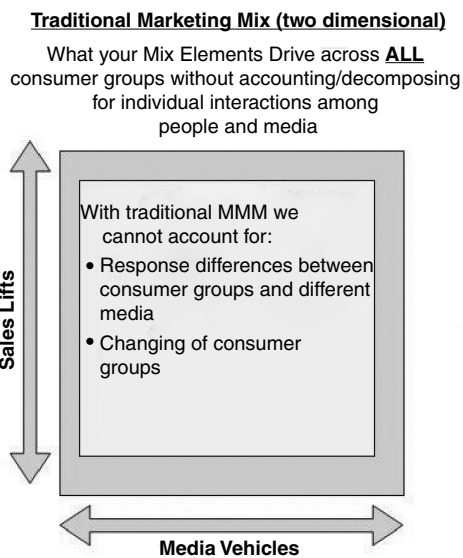
Figure 5: MMM viewed through multiple dimensions: consumers, retailers and marketing investments leading to higher sales lifts

advanced analytics may not be obvious in the short term, especially as new investments to build the capabilities have to be made up front. The situation becomes more complicated when we have to deal with multicultural/changing demographic datasets that contain less robust information to be analysed. Additionally, the changing demographics make the relationships between brands and shoppers/consumers more complicated because of the rate

at which any given message has to be changed/adapted.

I recognise that this is not for everyone because of the high complexity of execution and adoption, but consider:

- How and why can any alternative approach, such as ABM/ANN, incorporate emergent marketing dynamics?
- Are your current approaches flexible enough to approach and solve the problem



VS.



Figure 6: Comparison between traditional MMM and MMM supplemented with ANN/ABM

‘backwards’ (from the hypothesis) and ‘forwards’ (from the outcome)?

- Does it allow you to test ‘on the go’ and understand the impact by consumer segment and the corresponding ROI by each different scenario?

CONCLUSIONS

We need a paradigm shift in marketing science research. Solving to break the cycles on each of the syndromes is paramount in order to allow us to evolve the practice.

Because of the increased availability of information and computational power, all that hold us back would be a self-imposed sense of myopia based on a set of known analytical stereotypes. Now we have identified three syndromes representing the reasons holding us back, we cannot claim ignorance (ignorance is not bliss). Just as Steve Levitt writes on the second page of his *Freakonomics* book⁷, ‘conventional wisdom is often wrong’.

Perhaps we will never be able to completely remove all the syndromes, but some progress would be better than none. We also need to stop using excuses/justifications for not evolving. For example, the syndication syndrome can be justified in at least two different ways, one from the supplier side and another from the client side. A supplier will want to minimise customisation and standardise deliverables and offerings in order to fit their business model. Some customisation is necessary when dealing with some/most clients.

Any type of analytical stereotype we have formed over the years can be corrected to form a new one with the proper information. Through evolutionary processes all humans use stereotypes; they were part of our ability to survive and, as societies formed and evolved, our ability to form stereotypes remained. If there were no prior beliefs of knowledge about something we are trying to analyse for the first time, would we think about possible solutions in the same way?

A balance must be found along the way in which innovation and the progress of new ideas is allowed and implemented.

At the same time we do not just want to perpetually change everything along the way. That is not progress in the end.

Hence, we must think beyond ‘Frequentist’ and ‘Bayesian’ methods. Practitioners and academics have to engage in true discovery through marketing research. Adding a multicultural component to the mix certainly makes it even harder to address. We have to develop ‘flexible’ constructs that will allow us to incorporate the ever-changing multicultural dynamics related to life stages, lifestyles, acculturation levels and generational levels. We have a great opportunity to develop and adopt new methods and procedures in the multicultural space which will become more relevant over the next few years.

This is not just a unilateral issue, in which there is one specific set of individuals or disciplines to point the finger at for the lack of progress thus far. I think it is the responsibility of experienced academics and practitioners to teach the new generations to truly use all the tools in the toolbox and not just one. I am hopeful that in 20 years’ time we are not talking about the same challenges herein discussed, and that we make true progress in advancing the practice of marketing science.

APPENDIX

Milestones in traditional marketing⁸

- 1450: Gutenberg’s metal movable type, leading eventually to mass-production of flyers and brochures
- 1730s: emergence of magazines (a future vector of niche marketing)
- 1836: first paid advertising in a newspaper (in France)
- 1839: posters on private property banned in London
- 1864: earliest recorded use of the telegraph for mass unsolicited_spam
- 1867: earliest recorded billboard rentals

- 1880s: early examples of trademarks as branding
- 1905: the University of Pennsylvania offered a course in 'The Marketing of Products'
- 1908: Harvard Business School opens
- 1922: radio advertising commences
- 1940s: electronic computers developed
- 1941: first recorded use of television advertising
- 1950s: systematisation of telemarketing
- 1970s: e-commerce invented — Advanced Research Project Agency Network (ARPANET) Stanford and MIT transaction
- 1980s: development of database marketing as a precursor to CRM
- 1980s: emergence of relationship marketing
- 1980s: emergence of computer-oriented spam
- 1984: introduction of guerrilla marketing
- 1985: desktop publishing democratises the production of print advertising
- 1991: integrated marketing communications gains academic status
- 1990s customer management (CRM) and integrated marketing communications (IMC) gain dominance in promotions and marketing planning
- 1995–2001: the dot-com bubble temporarily redefines the future of marketing
- 1996: identification of viral marketing
- 2000s: integrated marketing gains acceptance and in 2002 its first dedicated academic research centre
- 2010s: social networking becomes an underlying fabric of society. Mobile makes Facebook and Twitter much more accessible and use explodes. The internet of things and the evolution of living things (eugenics and cloning) magnify the Big Data opportunity

FURTHER READING

- Axelrod, R. and Cohen, M. D. (2001) 'Harnessing Complexity', Basic Books, New York.
- Bound, J. and Ehrenberg, A. (2000) 'Marketing research: State-of-the-art

perspectives'. Handbook of the American Marketing Association & Professional Marketing Research Society, American Marketing Association, Chicago, IL, pp. 23–46.

- Cilliers, P. (1998) 'Complexity and Postmodernism: Understanding Complex Systems', Routledge, London.
- Holland, J. H. (2006) 'Studying complex adaptive systems', *Journal of Systems Science and Complexity*, Vol. 19, No. 1, pp. 1–8.
- Leefflang, P. S. H, Wittink, D. R., Wedel, M. and Naert, P. A. (2000) 'Building models for marketing decisions', Kluwer Academic, Dordrecht/Boston, MA.
- Lilien, G. L. (1994) 'Marketing models: Past, present and future'. In: G. Laurent, G. Lilien and B. Pras (eds). *Research Traditions in Marketing*. Kluwer Academic, Dordrecht/Boston, MA, pp. 1–20.
- Naples, M. J. (1979) 'Effective Frequency: The Relationship Between Frequency and Advertising Effectiveness', Association of National Advertisers.
- Nordhaus, W. D. (1973) 'World dynamics: Measurement without data', *Economic Journal*, Vol. 83, pp. 1156–1183.
- Richins, M. (2000) 'President's column: The discipline of consumer research', *ACR News*, March, pp. 2–4.

References

1. Marketing science as defined by Roberts, J., Kayande, U. and Stremersch, S. (2014) 'From academic research to marketing practice: Exploring the marketing science value chain', *International Journal of Research in Marketing*, Vol. 31, No. 2, pp. 127–140: '... the development and use of quantifiable concepts and quantitative tools to understand marketplace behavior and the effect of marketing activity upon it'.
2. See Appendix: Milestones in traditional marketing.
3. Moore's law is the observation that, over the history of computing hardware, the number of transistors on integrated circuits doubles approximately every two years. His prediction has proved to be accurate, in part because the law is now used in the semiconductor industry to guide long-term planning and to set targets for research and development. Metcalfe's law

- states that the value of a telecommunications network is proportional to the square of the number of connected users of the system (n^2).
4. Guadagni, P. M. and Little, J. D. C. (1983) 'A Logit model of brand choice calibrated on scanner data', *Marketing Science*, Vol. 2, No. 3, pp. 203–238.
 5. Little, J. D. C., 1994. Modeling market response in large customer panels. In: Blattberg, R. C., Glazer, R., Little, J. D. C. Eds., *Ž. The Marketing Information Revolution*. Harvard Business School Press, Boston, MA, pp. 150–172.
 6. The digital ecosystem is paid, owned, earned and shared.
 7. Levitt, S. D. and Dubner, S. J. (2005) 'Freakonomics', Harper Collins, New York.
 8. Wikipedia, available at: http://en.wikipedia.org/wiki/History_of_marketing. (accessed 22nd October, 2014).