

RSM Discovery 37

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Selecting the right assortment of products to carry is a perennial challenge for most retailers. Even for online retailers, distribution centre space and shoppers' mental bandwidth present constraints. Faced with too many choices, the consumer will shy away from buying anything at all.

Introduction



Ting Li

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Data analytics: the Rosetta stone of our age

We are in an age of profound digital transformation. Great strides in artificial intelligence, robotics, blockchain, the rapid evolution of the Internet of Things and Big Data, necessitates that organisations at all levels of society acquire new sets of skills and new ways of thinking if they are to create long-term value from the oceans of data that these technologies generate.

As Gerrit Schipper, Executive Director of the recently formed Erasmus Centre for Data Analytics (ECDA) observes in the article on p05: 'You cannot look at data analytics in isolation anymore. It is not just influencing technology, operation management, or marketing – it's influencing whole industries.'

And at the launch of the ECDA in July last year, Frans van Houten, CEO of Royal Philips, stated that: 'We all have to deal with the proper treatment and meaning of data. Data science and machine learning mean nothing in my world unless we do something meaningful with it.'

Thus, real value comes not from the complexity of the data itself, but from the strength and quality of the insights we gain from it. Put another way, data analytics is the Rosetta stone of our age.

However, value can only be attained through multidisciplinary collaborations – between organisations and academia – that translate data into real-world insights, with beneficial real-world applications.

It is very much in line with this thinking that I have approached this issue of *RSM Discovery* magazine as guest editor, a role in which I'm honoured to serve.

The value of multidisciplinary collaboration is exemplified by the impressive achievements of the ECDA and its partners, which are explored on p05. Such collaborations are reinforced in the article on p28, in which the development of a productive re-

lationship between RSM and e-retailer Coolblue has brought significant benefits to both parties.

Data analysis provides the backbone for the insights presented in Rodrigo Belo's article on churn management (p09), the implications of which will be useful for commercial entities operating subscription-based business models. On p12, Xi Chen explains how drawing on game theory has enabled him and his fellow researchers to develop a mathematical model that is more effective at measuring social influence than traditional techniques.

On p15, Jelle de Vries and Debjit Roy analyse a year's worth of customer data to understand how waiting to get a table at a restaurant affects customer experiences, and how managers might benefit.

It is the analysis of data sets that enables Phillip Cornelius (p19) to show that crowdfunding – typically seen as a means of raising capital – also offers great possibilities for market research and product development. Seeking insights into how power grids might be balanced, given that supply increasingly comes from less predictable sources such as wind and solar energy, has led Wolfgang Ketter and Jan van Dalen to show how electric vehicles can be used as virtual power plants that earn their owners money (p22).

On p25, Marcel van Rinsum's novel use of advanced eye-tracking technology highlights how focusing on processes rather than outcomes improves project funding decisions.

I am certain you will find these articles to be enlightening as you strive to not just embrace but also harness the power of the digital transformation era we are now in. And if we at RSM can provide assistance or guidance as you seek to do so, please do feel free to get in touch.

A big tent for big data

Interviews with **Ting Li and Gerrit Schipper**

Six months after launch, the Erasmus Centre for Data Analytics is already bringing together business executives, government leaders, and university scholars to meet the societal challenges of digital transformation.

Roughly every half-century, a technological advance occurs that disrupts everything. From steam to electricity to computers, such shifts have led inevitably to major changes in how the world works. Now, business, government, and society as a whole are undergoing another fundamental shift that some are calling the digital transformation – the rise of the hyper-connected, data-driven organisation.

Two years ago, Erasmus University Rotterdam (EUR) data scientists and friends of the university working in technology began discussing whether Rotterdam School of Management, Erasmus University (RSM) or the university generally had the right organisational structure in place to address the challenge of big data. Although EUR had world-class data scientists and strong IT scholars, they concluded that the answer was no – the expertise was too scattered around the university, and outsiders who wanted to consult faculty on data analytics questions had no single point of contact to direct them to the scholar with the most appropriate background.

To succeed in this new era of an ever-growing stream of data that needs interpretation, RSM needed a broader, more holistic response to the digital challenge, one that would tap

the full strength of the EUR community while building closer connections with enterprises that are working with data. As Rotterdam analytics entrepreneur Gerrit Schipper puts it: 'You cannot look at data analytics in isolation anymore. It is not just influencing technology, operation management, or marketing – it's influencing whole industries.'

The outcome of those discussions was the Erasmus Centre for Data Analytics (ECDA). A cross-disciplinary organisation launched just last summer, ECDA is already offering a number of companies easier access to university data experts, providing the university's data scientists with a stream of

interesting projects to work on, and giving students exposure to complex, real-life data problems. 'Faculty, students, alumni, and practitioners from in and around the university are being brought together by this centre,' explained Ting Li, Endowed Professor of Digital Business and Academic Director of the MSc Business Information Management at RSM, and founding member of ECDA.

The concept behind the centre is to align all data analysis research at EUR, help scientists, students, public and private organisations, to collaborate in a multidisciplinary fashion, and finally, to give full-time and continuing education to students looking for hands-on education of and training in data science, data visualisation, and data engineering.

Open for business

Although only launched in June 2019, ECDA is already serving as a big tent for all kinds of analytics-related re- ▶

"You cannot look at data analytics in isolation anymore. It is not just influencing technology, operation management, or marketing – it's influencing whole industries."

Gerrit Schipper, Executive Director, ECDA

A big tent for big data (continued)

Interviews with **Ting Li** and **Gerrit Schipper**

search and discussions, with a particular focus on the analytical issues raised by enterprise-wide digital transformation initiatives.

One of ECDA's early advocates, Gerrit Schipper, has signed on as its first executive director. A veteran technology executive and serial entrepreneur who serves on several tech company boards, Schipper has moved quickly to find more faculty members, corporate partners, and students interested in today's data challenges.

In addition to EUR, ECDA has the support of five founding corporate partners: Coolblue, a successful Dutch e-tailer; Siemens, an industrial giant; Quint, a tech consultancy; ING, a financial service corporation; and the City of Rotterdam. All partners signed up as lead sponsors for the next three years, making not only a financial commitment to the centre but also a commitment to participate in a research partnership that includes contributing data and sending executives to executive educational programmes.

In addition to the five founding partners and their generous financial support, a number of other companies – including VIVAT, ALLSAFE and FloraHolland – have been supportive of ECDA, even before its inception, with each organisation sponsoring multi-year PhD research.

According to Schipper, ECDA provides benefits for all its stakeholders. For companies, the partnership with ECDA gives them access to leading data analytics scholars and some of Europe's brightest young analytic talent. The ECDA-affiliated students include mas-

ter and PhD candidates currently studying at RSM who are working on projects that range from digital business, marketing and supply chain analytics, to auditing, accounting and control, fintech, and smart cities.

'Our faculty members have not only deep scientific knowledge but also acute business insights. Their research can help organisations understand more of their business and inspire innovations,' explained Schipper.

At the same time, ECDA's commercial partnerships will offer EUR scholars access to interesting intellectual challenges, he says. More important than the financial support is the partners' commitment 'to supplying interesting cases and data for faculty and students to work on, because it's not just about the money; it's about learning how it is all working in practice,' Schipper said.

'Data analytics research needs real quantitative data from real companies,' Li explained. 'Having data from different industries, in different forms, both structured and unstructured data, and complete and incomplete sets, creates challenges for us and good training for students,' she said.

Those ECDA-sponsored projects give students first-hand experience working on real cases, helping them learn to make the judgments that working analysts must constantly make about how to work with and interpret "dirty" data, according to Schipper.

All these aspects should offer students excellent opportunities to build their analytical skills, according to Li – and in the end, the ability to use those skills is the most valuable part of that education. As Li puts it: 'Analysing data is one thing, but asking the right questions, using the right methods to answer these questions, and presenting the findings to stakeholders are even more important.'

Mutual benefits

At the ECDA launch, Coolblue founder and CEO Pieter Zwart saw mutual benefits too. 'This won't only help us to become a little bit better with data every day, but it'll allow students to kick off their career by adding relevant analytical skills to their academic expertise,' explained Zwart.

Schipper said that he hopes this close contact with industry will make RSM graduates' transition to the working

"Faculty, students, alumni, and practitioners from in and around the university are being brought together by this centre."

Prof. Ting Li, Academic Director of Digital Business, ECDA



ECDA by the numbers

- 12 academic directors from five EUR faculties, including RSM, Erasmus School of Law, Erasmus School of Social and Behavioural Sciences, Erasmus Medical Centre, and Erasmus School of Philosophy.
- 50 faculty members
- 4,500 students, members of the Erasmus student organisations who have expressed support.
- 20 additional partners, all of which are currently in contractual negotiations with the university.

world of analytics easier. Reflecting on his own experience running an analytics business, he recalls, 'I often hired the best possible students from the university, but then it took six to nine months for them to make any money for my organisation, because they were excellently educated theoretically, but not in practice.'

Giving students the chance to work during the course of their education with corporations, with public organisations like municipalities, and to handle real data so that they could discover that data is not as clean as most of the

lecture books or textbooks are assuming – that's very important,' he said.

Tangible benefits for ECDA stakeholders didn't take long to accrue. The June launch event included not only a conference on data analytics but also a hackathon in which RSM students competed to solve a real-life problem for Coolblue. By the end of the contest, the e-retailer got its solution and the winning team walked away with a cash prize given to them by the keynote speaker, Frans van Houten, CEO of Royal Philips Electronics and EUR alumnus. ▶

Education and collaboration

Executive education features prominently in the activities of ECDA. For example, in September, twenty five participants began a four-month, two-day-a-month executive education programme called Leadership Challenges with Data Analytics, which is taught by faculty members from EUR and Delft University of Technology. In parallel, over those four months, the executives bring in their own challenges, their own case and data problems, and work with the faculty members to come up with proposals that they can take back to their boards at the next

quarter's meetings. 'So you see already, an application of the centre that is very fruitful for both faculty and students as well as organisations,' Schipper points out.

Looking ahead, Schipper says, the next item on the agenda is to build a dedicated, state-of-the-art data lab for ECDA, the Erasmus Data Collaboratory, which will make it easier for students and outside-industry representatives to get together to discuss common issues. The location of the physical space is still being worked out, but a number of companies have already expressed an interest in providing its virtual fur-

nishings, including HAL24K, SynerScope, Tableau, Celonis and Widget Brain.

As well as a range of educational programmes tailored to different audiences, and the development of a state-of-the-art lab, ECDA is organising industry-academic seminars, summer schools and workshops, and facilitating joint research activities and other collaborative ventures focused on knowledge creation and which help partners identify new business opportunities. ■

For more information about the Erasmus Centre for Data Analytics and its activities, visit [WEB www.rsm.nl/ecda/](http://www.rsm.nl/ecda/)

ECDA's educational offerings

ECDA's conferences and short-term executive educational offerings supplement a growing list of analytics-related post-graduate degrees at RSM, including:

Diploma Programme in Digital Transformation

Delivered by world-class faculty along with professional consultants from leading digital transformation consultancies, this executive education diploma programme consists of four three-day modules ranging from digital strategy, digital innovation, digital leadership, to digital analytics, and aims to support executives in winning business performance through digital transformation initiatives.

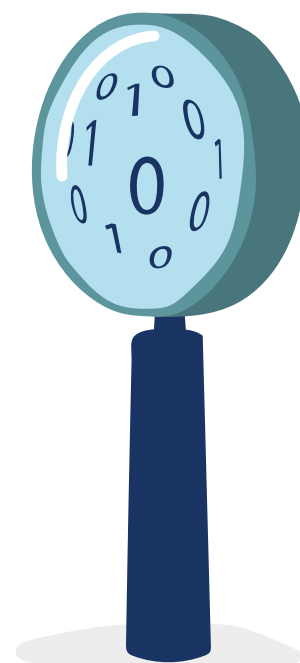
MSc in Business Analytics & Management

Beginning in September 2020, this one-year programme will teach recent bachelor graduates to understand, solve and communicate operational, tactical and strategic challenges from data in organisations.

MSc in Business Information Management

Consisting of two specialisations – digital business and data science – this RSM flagship MSc programme focuses on the management of information as a strategic resource for improving overall business performance.

[WEB www.rsm.nl/ecda/education/](http://www.rsm.nl/ecda/education/)



Proactive beats reactive in churn management

By **Rodrigo Belo**

It's an age-old business dilemma – how to prevent or reduce customer churn. Organisations broadly use one of two customer retention strategies: reactive and proactive. In a recent collaboration with a major telecoms provider, our research shows that taking a proactive approach really does reduce churn rates and increases client lifetime value.



Proactive churn management can help firms reduce a consumer's non-renewal to subscription telecoms services. But just what do I mean by proactive churn management and its advantages?

Proactive churn management is a practice in which firms aim at identifying people subscribing to their products or services on a contract basis that are likely to churn (or, in plain English, stop being clients) in the near future, and to then take action in order to prevent this taking place.

By contrast, reactive churn management, ie, the traditional way, is to wait for a call from a user stating that they want to leave, and stop receiving a supplier's products or services, and then react to that call. This is usually less effective, as many users will likely have already taken a decision to leave, and they might in fact have already signed a contract with a competing supplier.

"Financial discounts and vouchers are standard industry tools, but the importance of peer group influence should not be underestimated."

How important is it to business?

Identifying likely churners ahead of time can mean the difference between commercial success and commercial failure. In most fields of human endeavour, prevention is perceived as almost always being more effective and cheaper than a cure.

If people who have not yet made up their minds on a subscription renewal – might not have even thought that they would leave a supplier in the near future – might be persuaded to stay connected in return for a lower discount than if they had already decided to quit, company profits will reflect that, all other things being equal.

Key challenges

It is quite hard to clearly identify who is going to churn in the future, and there is a clear trade-off between (a) identifying the right people and (b) doing it ahead of time. If you try to identify likely churners for several months in advance you will almost inevitably make more mistakes. And any intervention that you make is probably not going to be as successful.

Key findings

There are two key findings from research I conducted with co-authors Miguel Godinho de Matos and Pedro Ferreira. Firstly, implementing a proactive churn retention strategy on top of a reactive one is cost-effective, even in the presence of a reactive churn management system. Secondly, the targeting of friends of likely churners (by offering them discounts and/or other incentives) further helps in the retaining of them (the likely churners) as subscribers, and it is still a cost-effective process. ▶

Proactive beats reactive in churn management (continued)

By **Rodrigo Belo**

When making a purchase, whether it be a car, a television or a phone, people will normally ask friends, family and others for advice. Occasionally, some might even listen to that advice. Financial discounts and vouchers are standard industry tools, but the importance of peer group influence should not be underestimated.

Lessons for managers

Many readers will look for reassurance that there are lessons to be learnt. In this case, proactive churn management, if done well, can make a difference. But it demands investment, of time, patience and other resources. You need to set up a process to periodically collect data from the relevant sources. You need to train models that predict who is going to

ing costs involved in setting up a new connection with a router, TV box and fixed phone are high, and also inconvenient to users. So you can retain them by finding them early enough and offering them a relatively good deal.

Experimentation and theory

The information gathered from a practical experiment is inherently more valuable than pure theory. Theory does not inform you, for example, how sensitive customers are to different offers, or whether you would be able to identify likely churners with enough precision.

In this case the role of theory is limited. You need to go into the field and experiment. And you need to be sure you are measuring the effects correctly,



"The first dimension is to check whether it is possible to predict who is going to churn in the near future..."

churn. You need to have an operations team that will act upon this information in order to retain those customers.

In this specific case, we studied churn in the telecommunications sector, which no one will need reminding is a very competitive market, and users are constantly bombarded by the competition to switch.

Usually, churn in this market means that customer switch providers (and not that they stop being subscribers of a telecom product). However, the switch-

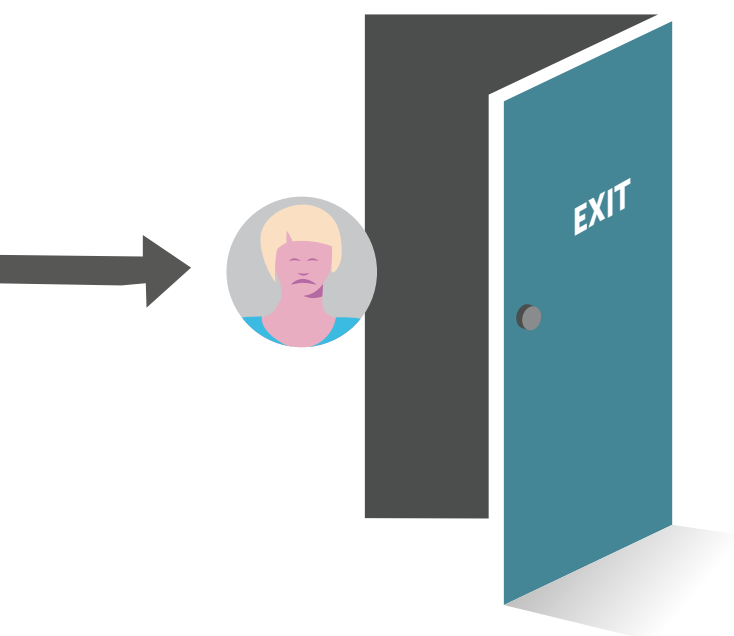
which is why you need to implement randomised control trials, as in the spirit of this year's Nobel Prize winners.

For the benefit of readers who might not have followed the process closely, this year's Nobel Prize in Economics was awarded to Abhijit Banerjee, Esther Duflo and Michael Kremer 'for their experimental approach to alleviating global poverty.' This year's Nobel Prize is therefore, in a way, recognition of the methods – the experimental approach

and the use of randomised control trials – that many researchers have been using for some time.

Practical implications

As alluded to earlier, the research has practical implications for managers and businesses. I would say that it is important for any commercial enterprise operating a subscription business model to experiment, and to try out different strategies.



Dealing with data

Certain key elements of our research and the way in which we conducted it must remain confidential, so there are limits to how freely I might discuss the primary gathering of data and then the data analytics involved that played a central role in determining the findings of the researchers.

We can say that we worked closely with a European telecoms operating company with a triple play model (that is, they provide telephone, television and internet services), and that the data and resources they put at our disposal allowed us to run the necessary randomised control trials to assess the effectiveness of proactive churn management.

Moreover, this context allowed us to run our experiment in a networked environment, which in turn allowed us to find that targeting friends of likely churners made the process even more effective. ■

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The paper *Target the Ego or Target the Group: Evidence from a Randomized Experiment in Proactive Churn Management*, written by Miguel Godinho de Matos, Pedro Ferreira and Rodrigo Belo, appears in *Marketing Science*, Vol. 37, No. 5, September–October 2018, pp. 793–811. DOI: <https://doi.org/10.1287/mksc.2018.1099>

The first dimension is to check whether it is possible to predict who is going to churn in the near future; the answer to this question is highly dependent on the context and on the available data.

The second dimension is to decide on which interventions should be applied in order to prevent churners from doing so; there are many alternatives at the outset and only after trying them out do we know whether they work.

Many businesses are still struggling with setting up an initial proactive churn management system. I would say that setting up such a system can pay for itself in a couple of months (depending on the sector), but managers need to build the right team. This team must include data managers, data scientists, and someone who can translate the resulting models into everyday practice.

Understanding the power of social influence marketing

By Xi Chen

Traditional marketing communication tools like digital advertising and promotions are still useful for making people aware of products, but do not effectively persuade them to make a purchase. This is because consumers are much more informed and take a longer period of time to make a purchase decision than before.

Ten years ago, if you wanted to buy a laptop, you would pop into a Dell store. Today you are more likely to read online reviews, or watch a product demonstration on YouTube, before eventually choosing which make or model to buy.

The challenge for consumers is knowing which source of information to trust. Each review will communicate different things, and sometimes offer conflicting opinions. This makes each purchase decision more complex and lengthier. Consumers thus turn to heuristics, such as personal recommendations from their networks. We are all social animals, after all. If my friend tells me they liked a laptop they bought, I'll likely trust his words more than that of an unknown technology product blogger, and certainly more so than an advert.

This is where the power of social influence marketing comes in. This is a relatively new form of digital marketing that leverages the social influence of individuals on social networks to influence consumer behaviour, often celebrities with massive followings on the likes of Instagram, who are known as influencers. So a marketer might send an influencer a free product to review and post about. The hope is this social

media star's trusted and valued opinion will motivate others to purchase the product.

Understanding influence

Companies often purchase massive data sets from social media firms with millions or billions of users, such as Twitter and Facebook, to work out which influencers to use for marketing campaigns. This data will shed light on things like how many followers they have, or how often they post about certain products online and the reach of those posts.

The problem is, marketers have little sense of how influential these people really are, despite their cult stardom online. This is because, when surveyed, consumers themselves find it hard to remember and quantify how much impact someone has had on their purchase decision. That's because it takes people a long time to make a purchase and much could have happened in that time that might have influenced their choice. It's almost impossible for them to accurately quantify the impact of social influence on their purchase decision.

It's also difficult to work out how much social media users influence each other based on the secondary data that

companies buy from the social media giants. Often, marketing managers assume that if people have a similar purchase history, they are likely to be able to influence each other. But correlation does not necessarily mean causation. People are often friends because they have similar interests already, rather than each friend driving the interests of the other. Environmental factors also come into play. People who live in the same area probably consume the same advertisements, leading them to purchase the same products.

Social influence

Fellow researchers Ralf van der Lans, Michael Trusov and I have developed a mathematical model that is much more effective at measuring social influence than traditional techniques; one that, potentially, has big implications for companies' marketing efforts.

The idea comes from game theory – a theoretical framework for conceiving social situations among competing players that was pioneered by famous mathematicians John von Neumann and John Nash. So, in other words, the outcome of the decision an individual makes is dependent on the decision that all the players of a game make.

Take, for example, a poker game, where people are playing without knowledge of their opponents' cards and make decisions based on what they think their opponents will do. If they could see all their opponents' cards, they could work out the best decision to make using maths. Each time they play the hand they would have played if they could see everyone's cards, the better they perform,



and vice-versa. This is known as an incomplete information game.

To build our mathematical model, we gathered data on the login decisions of more than 25,000 users of an online social game over 30 days. Tasks in the game require team efforts, making social influence an important consideration for users' login decisions. We examined whether the users logged in, or not.

We also assumed that people's perceptions of their friends' login decisions would affect their own login decisions, positively and negatively. For example, we assumed that, if people thought that a large proportion of their friends were online, they would react in one of two ways: be more motivated to log in and socialise, or the opposite.

We also assumed that if people were more motivated to log in, this effect would be multiplied across their friendship group, with the behaviour of one person influencing their friend, and then that friend's friend, and so on. In game theory, this is known as fictitious play.

But it's not always the case, we supposed. And indeed, social repulsion, a desire to be unsociable, is gaining ground, with Facebook allowing people to hide their behaviours from their friends, for instance.

To determine the influence of users playing our online game, we used a counterfactual scenario: what impact does removing one person from the game have on the total number of login decisions of all the remaining players? If the number of login decisions went down, that indicated the removed player had social influence: people wanted to play with them and followed the trend they set. Using this framework, we ranked users based on their influence, with the most influential players the best targets for influencer marketing.

We used a community detection algorithm to create control variables to partial out spurious correlation and cleanly quantify social influence. If not controlled, these spurious correlations, due to people facing similar environments, would be attributed to social influence. The community detection algorithm is also efficient and scalable to a network of millions of consumers.

We dubbed our model the optimal approach to social influencer marketing, and compared it to two other, commonly-used approaches: the responder approach, whereby people who ▶

"This is a relatively new form of digital marketing that leverages the social influence of individuals on social networks to influence consumer behaviour..."

“We also found that the performance of targeting influential users not only depends on their network position, but also on the time that consumers were hit with advertising.”

frequently purchase products are targeted; and the hub approach, in which people with large social media followings are assumed to have influence over them.

The results showed that our model vastly outperformed both the hub and responder method, by 22.25 per cent and 27.49 per cent, respectively. This is because people are often connected with those who are similar to themselves, so they likely already buy the same products. This is called assortative mixing. And not only will they not buy the products, they might tell other people not to as well. This might be because they are already attached to a brand's product, and might not want to purchase newer versions.

Our model's outperformance, then, can also be attributed, in part, to the fact that it considered the heterogeneity of consumers, who have both a positive and negative influence on their online networks.

We also found that the performance of targeting influential users not only depends on their network position, but

also on the time that consumers were hit with advertising. In the online game, there were times of engagement that were more preferable to some users but less popular among others. How users respond to their friends might also depend on the time of the day.

When targeting individuals, we assume a gaming company faces a decision of choosing one of four quarters of the day (12am-6am, 6am-12pm, 12pm-6pm, and 6pm-12am). In a uniform targeting approach, the company selects an optimal quarter to stimulate all of the targeted individuals. In the second scenario, called personalised timing, each targeted user is stimulated at a personalised optimal quarter, which depends on its responsiveness as well as the responsiveness of its peers.

Benchmarked with an approach that does not consider timing, the timed approach improves the targeting performance by 27.43 per cent. Moreover, using a personalised promotion schedule further improves the targeting performance by 15.13 per cent.

Practical implications

There are numerous practical implications for the research, including the finding that predicting consumer behaviour is far different from searching for the effects of influence.

Our research also shows that usage patterns are less effective for social influence marketing. Instead, marketers should leverage what is known as the social multiplier effect, or targeting a small group of members who are proven to be influential through how they respond to social influence over a long period of time.

Indeed, we found that the 1,000 most connected users have significantly lower average responsiveness than the least connected 1,000 users. The influencer approach, which considers both direct responsiveness and connectedness of users, significantly outperforms all other approaches.

The best targets for social influencer marketing, then, are those most likely to react to marketing and who have the largest online social networks, made up of people who are likely to respond to the target's own action. ■

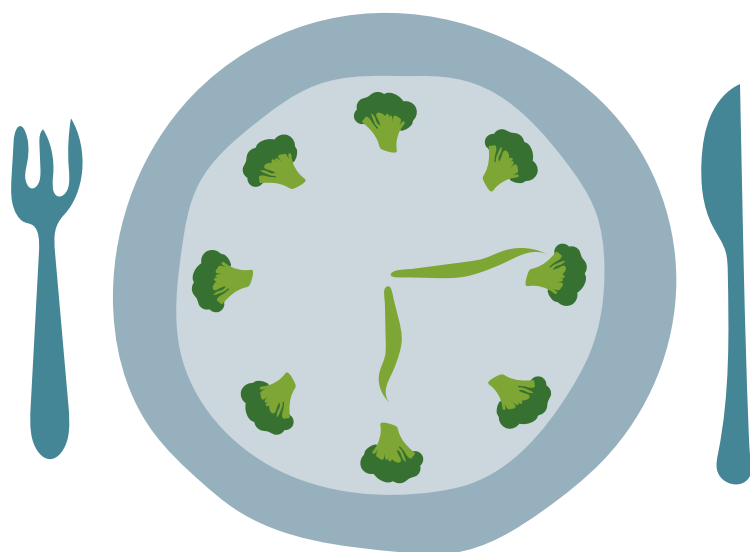
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The working paper *Efficient Estimation of Network Games of Incomplete Information: Application to Large Online Social Networks*, is written by Xi Chen, Ralf van der Lans and Michael Trusov.

Customer loyalty and queuing: was it worth the wait?

By **Jelle De Vries and Debjit Roy**

The deferment of gratification can be an admirable trait in those of a religious disposition. It is probably not, however, what most of us want to practise when going out for dinner on a Saturday evening with friends and family. But how does waiting time affect customers, and can restaurant owners turn queuing to their advantage?



“For the provider of the service, the ability to generate additional revenue from the people waiting shows there can be a positive in making them wait...”

Waiting time has come in for a degree of academic and other study down the decades, but probably deserves further in-depth investigation. The research to date focuses mostly on two very clear perspectives. One, that of the service provider. Two, that of the consumer.

From the provider’s point of view, the emphasis is usually on the quantitative. How many tables does the restaurant have? How might they be configured? For one diner? For two? Three, four, five, six, seven, eight or even more?

How many customers are waiting? How many staff are on duty to meet their needs? What will happen if the equation is changed so that there are more staff and/or fewer customers?

From the customer’s point of view, the emphasis is usually on the qualitative. People see waiting as a core element of the experience, which, if handled correctly by the service provider, can even enhance the experience. A classic example almost inevitably arises in conversation with people who have visited one of the globally known Disney resorts as part of a holiday of a lifetime.

They will almost always say they had to queue for hours, only managed to experience a few of the rides they had hoped to and spent a fortune. But they almost always say they had a great time. For the consumer, the length of the wait and the overall enjoyment are all part of the experience, suggesting that, as the traditional proverb puts it, it can be better to travel than to arrive.

Waiting can be profitable

For the provider of the service, the ability to generate additional revenue from the people waiting shows there can be a positive in making them wait, if only to persuade them to part with additional cash premium for the fairground equivalent of speedy boarding. And recent research of queuing to buy cupcakes indicates that the longer people queued, the more cupcakes they eventually went on to buy. It seems that people want to justify to themselves that they waited, and will consume more in response.

It might be ill advised, however, to even attempt to replicate the experience

Customer loyalty and queuing: was it worth the wait? (continued)

By **Jelle De Vries and Debjit Roy**

with a call centre queue, where the people joining the queue will most likely be angry and/or upset at the time of joining. By the time they speak to a human being, the most likely result of their lengthy wait will be a loss of temper and a bout of angry shouting, rather than an outbreak of high fives and laughter.

Few restaurants might be able to match the Disney organisation in delivering that quality of enjoyment, but those who make the slightest effort and offer quick delivery of a drink or two to those waiting for a table, or offer a free basket of bread and chilli oil to those sitting at a table waiting to have their order taken and prepared, will deliver a degree of satisfaction that goes beyond the financial cost. This can transform waiting from a chore that must be

endured into an enjoyable part of the overall experience.

A working knowledge of Einstein's theory of relativity might come in useful here, enabling an informed opinion on the differences between experienced time in the queue and actual lapsed time.

The propensity to queue

Sticking with restaurants, and the propensity to queue, anecdotal evidence points to the existence of what we all probably think of as "empty restaurant syndrome". This inclines us to look for a restaurant with customers already at table, as we instinctively follow our herd mentality.

However, a diner who knows about the quality of a restaurant will probably not mind entering it when it is empty.

A diner who does not know about the quality, might use the queue as a signal of quality. In other words, a diner might assume that there are "informed" customers in the queue who are waiting because the restaurant offers good quality.

Even if a proposed alternative restaurant is full, if one or two members of a group have eaten there previously, they are in a position to recommend to their companions that it is "worth the wait" – especially if they can have a drink or a nibble or two while waiting.

This opens up a whole new area for discussion, on whether queuing customers should be encouraged to pre-order to reduce the eventual time spent at table. This could, however, test the kitchen staff to capacity as it leads to even higher peaks in kitchen work-

"By the time they speak to a human being, the most likely result of their lengthy wait will be a loss of temper and a bout of angry shouting."



load, as the demand for kitchen output is no longer capped by the number of seats.

Diners-in-waiting might not even realise that watching the serving of tasty dishes while waiting for a table can function as an appetiser, and wallet opener, triggering the ordering of and paying for more food than planned when eventually seated.

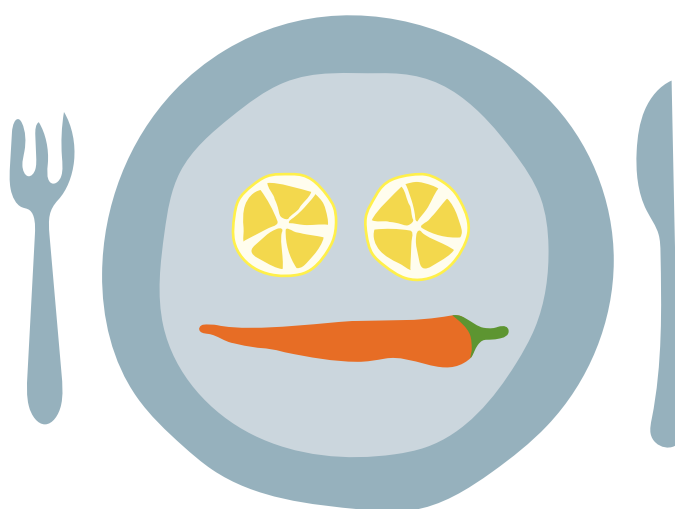
Restaurateurs must beware, though, that we all have different trigger points. Some people might wait an hour or two at a favourite restaurant, reassuring themselves that it will be "worth the wait". Some might leave within five minutes, even at a favourite restaurant, if they sense that something is amiss with service. Some might go and find a different restaurant altogether.

The evolution of dining

It could be argued that the evolution of dining for the masses from the simple consumption of necessary fuel is one of the defining characteristics of the modern era.

Dining as a leisure activity has long been a staple of life for the wealthy. Dinner for the rich has seldom, if ever, been simply a starting point for the evening, but the evening itself.

As such self-indulgent behaviour has trickled down the socio-economic ladder, so it has become more important not only to serve palatable food, but also to make diners feel more comfortable (but not too comfortable, as rapid turnover of tables is a key element of the business model in the fast-food and casual dining restaurant segments).



"Restaurateurs must beware, though, that we all have different trigger points."

In today's competitive environment, a restaurant might get away with serving poor food but not with providing a poor experience.

Research and data

Returning from the digression and the anecdotal, and looking to the lessons learnt from traditional studies, research undertaken in 1992 and replicated in 2008 demonstrated the impact that background noise can have on consumer behaviour. Raising the volume of music by a few decibels, for instance, encourages men to buy more beer; possibly it is then much easier to drink than to hold a conversation.

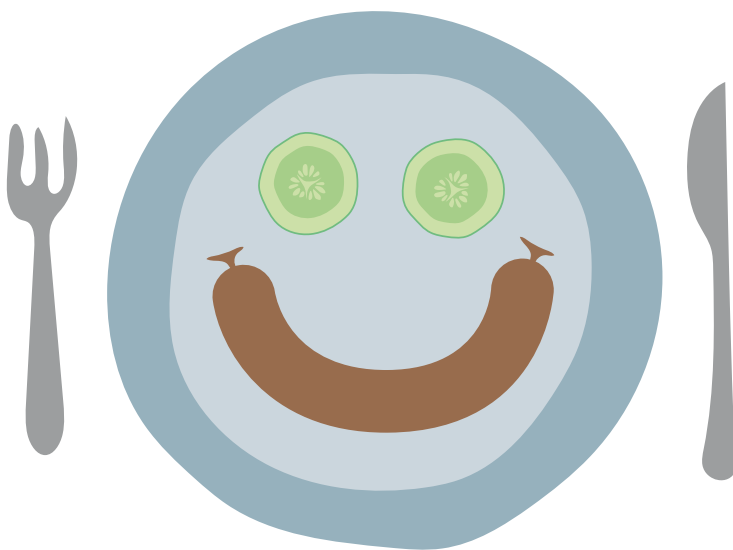
The issue of data is a key detail in the successful telling of this queuing story. While call centres routinely collect masses of data in the course of their daily routine, there have until now been few data-based studies of the restaurant sector.

The general view is that people come, wait or don't wait, and go. In our study, based on a targeted restaurant in Bangalore in India, we used a special app, a sophisticated digital restaurant reservation and table-management platform, which required customers to log in in order to join its queue, and tracked exactly when customers were assigned to a table, and when they left the restaurant. ▶

This enabled the collection of a year's worth of real-life customer data relating to 95,000 groups of two or three customers on average, which we then used to estimate several statistical models. The outcomes of these models served as input for a comprehensive simulation model, which was used to run a series of "What if?" scenarios.

Lessons to learn

What lessons did we learn that others might benefit from? Based on the data, rather than relying on gut instinct, we can point to a number of key immediate findings. A long wait relates to: one, a shorter dinner; two, a higher level of customer abandonment; three, a longer period of time elapsing until a disappointed customer returns.



"Our what-if scenarios suggest that the restaurant in the experiment could boost revenue by 14.5 per cent if waiting times were completely eliminated."

Looking to the longer term, for restaurants it is not so clear what the net effect of their queues is, and consequently, whether they should strive for longer or shorter queues. Depending on the specific context and type of restaurant, managers will have to determine which consequence is the most influential in their situation. For example, do they just care about high table turnover, or do they prefer more loyal customers who return often?

This can have implications for current and future revenue. Our what-if scenarios suggest that the restaurant in the experiment could boost revenue by 14.5 per cent if waiting times were completely eliminated. Only its management can decide whether the trade-offs involved are worth that additional income. ■

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The paper, *Worth the wait? How restaurant waiting time influences customer behavior and revenue*, written by Jelle De Vries, Debjit Roy and René de Koster, is published in the *Journal of Operations Management*, 63 (2018) 59–78. DOI: <https://doi.org/10.1016/j.jom.2018.05.001>

How customer investors can aid crowdfunding success

By **Philipp Cornelius**

The role of crowdfunding has long been thought of as merely a method of raising capital; opening up access to the capital markets for entrepreneurs who borrow from a large number of individual retail investors. Yet crowdfunding is far more than this: it's a tool for market research and product development.

Entrepreneurs can use crowdfunding campaigns on websites like Kickstarter and Indiegogo to talk to customers, receive feedback on their product, and even get in touch with potential retailers. All these benefits and more are laid out in a research paper titled *The Role of Customer Investor Involvement in Crowdfunding Success*, which I co-authored with fellow researcher, Bilal Gokpinar.

In the study, we collected data from October 2012 to June 2013 on about 22,000 crowdfunding projects on the popular website Kickstarter.com. The study involved looking at whether changes that entrepreneurs made to a project after they had received a comment from a funder had an impact on the likelihood of the success of the crowdfunding campaign.

Data analytics was an important part of the research. For example, we used instruments and fixed-effects models whereby we were able to rule out whether the assumed positive impact of funders' comments was actually driven by something we did not observe in the data, such as product quality or the ability of the entrepreneur. We rooted out these potential unknown impacts by looking at within-project variations over time and using exogenous instru-

ments, which allowed us to mathematically remove confounding factors from the estimation equation.

Increasing success

We found that comments from funders improved the likelihood of success and contributed to an increase in funding received by the entrepreneurs from the crowdfunding campaign. One comment increased funding by, on average, US\$65, though the variation between the value of comments was wide; some comments had a large effect, increasing funding by thousands of dollars, while others had a smaller impact.

It's easy to spot an unhelpful comment that offers no criticism, constructive or otherwise. So what makes a specific comment valuable? Usually, it's information about the product – a recommendation for a new design, say, or how it is priced. Based on an additional in-depth study of 25 random crowdfunding projects, their comments, and the interaction between the backers and the creators, we also found that funders often use their social networks to help, such as connecting entrepreneurs to potential suppliers.

Another common piece of advice passed from funder to creator was around the features of a product, with recommendations for additions to the product that would improve its functionality. For example, the NEEO smart home remote added API support after backer feedback on Kickstarter.

This suggests that crowdfunding can be far more effective than market research, because customers have skin in ▶



How customer investors can aid crowdfunding success (continued)

By **Philipp Cornelius**

the game. In traditional market research, customers can say whatever they want about a product, even if it is not helpful or indeed true. Crowdfunding solves this problem, because all the comments come from people who are genuinely interested in the success of the product. It is a similar commitment that venture capitalists have to their portfolio companies, since they too, depend on the success of the venture in which they have invested.

currently can. Instead, we believe VCs and crowdfunding are complementary, with each offering something the other cannot. For VCs, it is hands-on operational support and for crowdfunding it is through customer feedback.

Crowdfunding is traditionally associated with start-ups, but big companies can use it to improve their internal innovation processes too. Many companies, from AT&T to Xerox, use innovation labs in which they attempt to

"...crowdfunding can be far more effective than market research, because customers have skin in the game."

Disruption potential

There has been quite a bit of debate about the impact crowdfunding could have on the venture capital industry, with some warning that crowdfunding could disrupt traditional start-up investors. My research shows that crowdfunding can substitute some of the value-added aspects of having a VC backer.

VCs do not just provide business founders with money: they provide advice as well – at times even placing managers at the portfolio company to help steer its growth. Crowdfunding cannot mimic that entirely, but it can offer valuable advice on product development, human resources, and even supply chains.

VCs are not doomed, though, as they still provide more profound and long-term support than crowdfunding

create new products or services with a view to integrating them into the wider business should they grow and succeed. Crowdfunding works for big companies in similar ways, as they get access to a big pool of ideas that they could not necessarily come up with themselves. It is like outsourcing innovation. Or spotting what in economics is called the unknown unknowns: you do not know what problem you are looking for because you are not aware of it.

Netflix, for instance, used crowdsourcing to improve its movie rating prediction engine. Over three years it received some 44,000 submissions for ideas to improve the algorithm for movie rating prediction as part of a US\$1m "Netflix Prize" competition that

ultimately improved the algorithm by 10 per cent.

Diversity of thought

Big companies like Netflix might also be attracted to crowdfunding because of its diverse pool of investors. It is generally accepted in business that diversity of thought is a commercial benefit. This being the case, crowdfunding could be especially helpful for the technology industry, where there have been a host of high profile product failures that commentators argue could have been avoided if a more diverse team worked on the product's development. Consider, for example, the bathroom soap dispenser that automatically ekes out soap by





detecting a hand beneath it. A YouTube video showed a flaw in its design: it did not work on black skin and the developers did not spot this problem because they were white and tested the product on white consumers.

Seeking this diversity of thought, several large multinational companies have used crowdfunding for market research. One example is Coca-Cola, which used Indiegogo to test the waters in America

for Valser, its premium mineral water brand that was first launched successfully in Europe. The drinks company vastly exceeded its targets for its one-month crowdfunding campaign, proving that corporations can successfully utilise the wisdom of the crowd.

However, managers should be warned that there is a risk of reputational damage and consumer backlash if funders feel like they are being used

as guinea pigs. Funders on crowdfunding sites are often emotionally invested in a project and want to be involved in the product as it develops. This is not always the case with big brands, and consumers may not want to back a product if they know the money is simply going into a corporation's already deep pockets.

The atmosphere in online communities can turn sour quickly, as we have seen on Twitter and Facebook. This has happened in crowdfunding, too, although to a lesser extent. For instance, when Warner Bros launched a crowdfunding campaign for the Veronica Mars movie it was criticised because the money went straight to the corporation's coffers. And General Electric drew criticism for failing to keep funders updated after they had committed money to its US\$150,000 campaign to fund an ice maker built by one of its subsidiary companies.

The key to crowdfunding success, then, is respecting and learning from those offering you money. ■

The paper *The Role of Customer Investor Involvement in Crowdfunding Success*, written by Philipp B. Cornelius and Bilal Gokpinar, is published in *Management Science* 66(1):452-472. DOI: <https://doi.org/10.1287/mnsc.2018.3211>

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"...we believe VCs and crowdfunding are complementary, with each offering something the other cannot."

Balancing power grids with electric vehicles

By **Wolfgang Ketter and Jan van Dalen**

In the days when most of our electricity needs were covered by centralised fossil fuel power stations, output and demand could relatively easily be predicted and balanced. But with an ever greater supply now coming from less predictable and controllable sources such as wind and solar energy, grid balancing has become more difficult. Using the battery capacity of electric vehicles as a source for virtual power plants could be a solution. It can also make money for a vehicle's owner.

With the trend today moving away from top-down vertically integrated fossil fuel generation towards decentralised electricity sources, certain factors are no longer within a power plant operator's control. The operator cannot predict with any high degree of accuracy how hard the wind will blow or how

EVs to the rescue?

Our research (*Electric Vehicle Virtual Power Plant Dilemma: Grid Balancing Versus Customer Mobility*) shows that using electric vehicles (EVs) as virtual power plants (VPPs) can play a crucial role in balancing smart electricity grids, thereby addressing these key issues.

"Our research shows that using electric vehicles as virtual power plants can play a crucial role in balancing smart electricity grids..."

long the sun will shine, and there could be large fluctuations in generating capacity. In times when renewable output is low, back-up fossil fuel plants have to be brought into use to make up the shortfall. At other times when output is high, wind farms might have to be taken offline to avoid overloading the grid, which is both wasteful and inefficient.

While individual drivers can make a difference, the impact will be much greater at scale. For this reason we focused our study on the management of EV fleets organised as VPPs, and analysed the potential of parked vehicles to absorb excess electricity from the grid when energy supply is high and demand elsewhere low, and to feed electricity

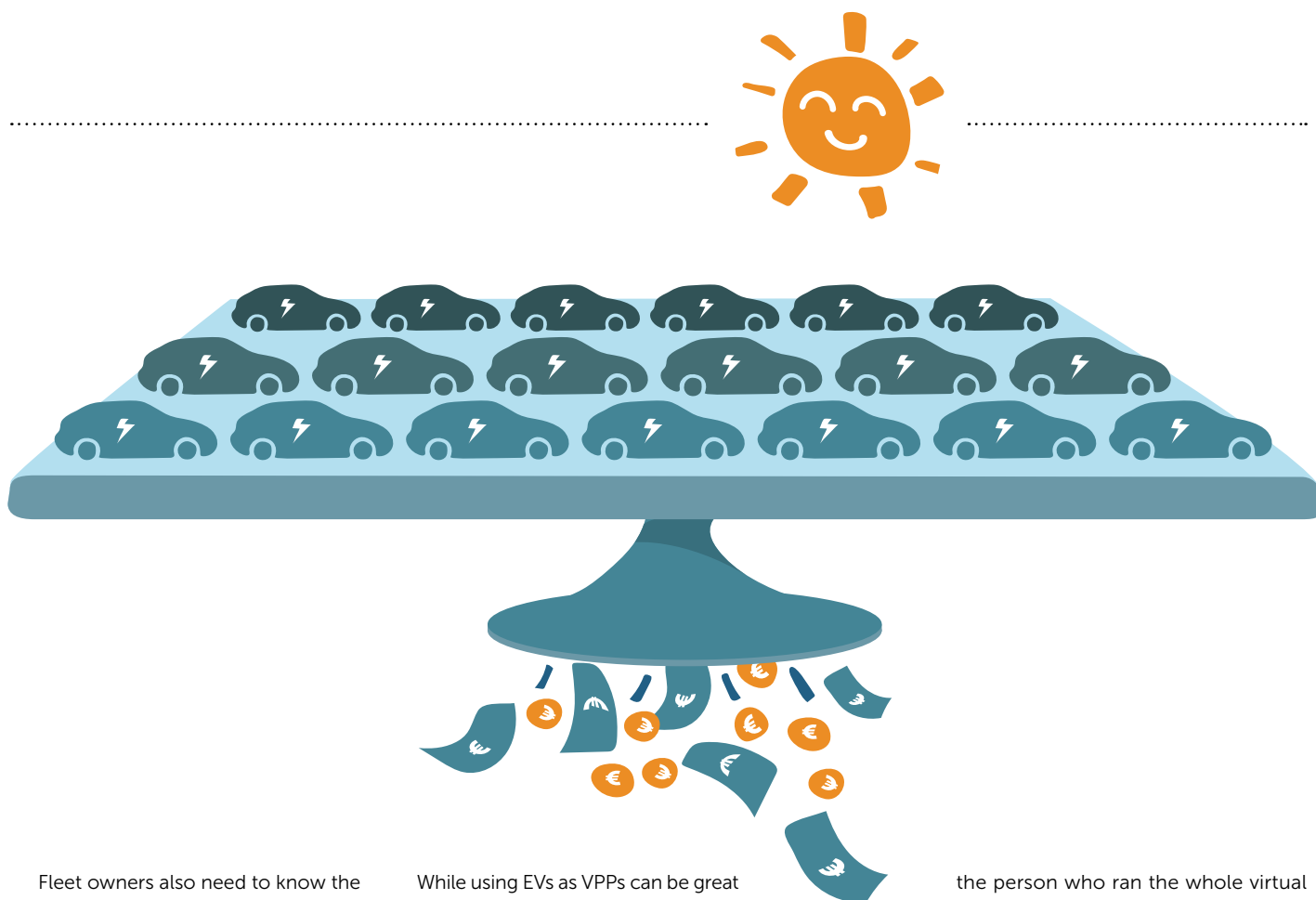
back into the grid by discharging when supply is low and demand high.

What we found was that such VPPs can be both ecologically advantageous, through reductions in wind power curtailment, and beneficial to consumers by reducing energy expenses. Crucially, however, they can also be profitable for fleet owners, by charging cars when low demand drives spot electricity prices down, and selling the same power back to the grid at times when high demand drives prices up.

Challenges ahead

But while this may sound like a licence to print money, there are a number of specific challenges that must be addressed if we are to make the best use of electric vehicles in this way. One big issue is infrastructure. We need charging stations to be located where there is highest demand for EVs, as these stations form a critical element of the whole virtual power plant. The location might be city dependent, environment dependent, or even seasonally dependent, but it requires careful planning. And of course, the charging points need to be bidirectional so that they can not only charge but also discharge a battery.

Then there is a large-scale prediction problem. In order to make the most of the situation an EV fleet owner would ideally need to know when the sun will shine or when the wind will blow the most, to take the best advantage of spot price fluctuations in the market. In other words, they need to be able to plan intelligently.



Fleet owners also need to know the spot market. But they could get around this by going to an external trading company. This might cut the profit margin down as they would have to pay a commission to the third party, but they still make money.

The mobility of people is perhaps the most important issue that must be factored in. After all, the first part of the business case for any EV fleet, whether it is for rental to individuals or use by a single company, is to move people around. We should not inconvenience them simply to provide a power source. A fleet owner therefore needs to know when and where there will be high demand for cars so that they can make those cars available.

While using EVs as VPPs can be great business, we have to remember that for the fleet manager it is only a side business. Nevertheless, a well-managed fleet can become something we call "doing well by doing good". The fleet owner is doing good by providing a service to society: changing high volatility in the grid to a high level of energy independence to create balancing capacity. But at the same time, they are doing well for their company's pocket by creating a second business model with an alternative income stream.

Behavioural change

In the cases we studied, the fleet owner (Car2Go in San Diego, Amsterdam, Copenhagen and Stuttgart) was also

the person who ran the whole virtual power plant infrastructure including the charging stations, but that doesn't have to be the case. It can vary in different environments. The important thing is that the two halves come together at the right times.

This means an element of behavioural change is required on the part of the EV user. In the cases we studied there was no incentive for the drivers to park the cars after use near to one of the charging stations. To benefit fully, that behavioural aspect needs to be in place – you want to have the cars available for usage, but also for discharging. They need to be parked and connected to the grid at the right time; otherwise they cannot take advantage of energy trading. ▶



One unique property of this mixed usage trading strategy is therefore that decisions have to be made between making an EV available for use, where the location within the city matters – drivers want cars to be near their place of departure or arrival – and discharging it to the grid. In the latter case location matters less, as vehicles can discharge from any capable charging point, wherever it is. It is a balancing act in which incentives may help, such as providing free driving minutes to encourage drivers quite literally to go the extra mile to seek out charging points.

Geography matters

Local factors are also important, and have a direct impact on the EV fleet's potential use as VPPs. Physical properties and culture both play a big role, as

the different cases that we explored. The results were dependent not only on the country, but also on the individual city. In Germany there is a high penetration of sustainable resources. In Stuttgart we saw a high uptake of EVs and you can also make good profit there. All cities we looked at show an annual profit increase, but Amsterdam appears to benefit the most.

Huge potential

This geographical diversity, both in terms of the ability to generate renewable power and the cultural acceptance of the concept, means there is no easy one-size-fits-all solution. But to make the scenario of using electric vehicles as grid-balancing virtual power plants attractive, providing economic benefit without unnecessary inconvenience

power plants during idle periods could have a massive impact both on society and the bottom line. And with some predictions suggesting there could be one billion EVs on our roads by 2050, as falling battery costs make them cheaper to produce and improved performance makes them more attractive to owners, the potential rewards are vast. ■

To see the potential benefits of electric vehicles as virtual power plants yourself, visit our Power TAC website (www.powertac.org). This is the world's largest free, open-source smart grid platform, which you can use to test this and a range of other sustainability scenarios.

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“If the fleet owner can provide a service for society while still making a profit, it will be a win-win situation...”

the success of a VPP depends on what percentage of sustainable resources a location has in its energy mix, and on the rate of energy taxes. It is also dependent on the willingness of people to share vehicles – this is much higher in Europe generally than it is in the United States.

What we discovered was that there was very different usage of cars between

is the main selling point. If the fleet owner can provide a service for society while still making a profit, it will be a win-win situation in keeping with the UN's Sustainable Development Goals: generating income and providing green power when needed.

As the vast bulk of most cars' time is spent parked, turning them into virtual

The paper *Electric Vehicle Virtual Power Plant Dilemma: Grid Balancing Versus Customer Mobility* written by Micha T. Kahlen, Wolfgang Ketter and Jan van Dalen, is published in *Production and Operations Management*, Vol. 27, No. 11, November 2018, pp. 2054–2070. DOI: <https://doi.org/10.1111/poms.12876>

How to improve project funding decisions

By **Marcel van Rinsum**

Companies tend to over-focus on outcomes when evaluating the performance of their managers. For best results with your company's next big decision, focus on the process used to reach it. We verified our insights by an innovative use of eye-tracking technology.

Most organisations place high emphasis on achieving good results. Not surprisingly, this often leads to an excessive focus on "objective" outcomes in performance evaluations. Similarly, "transparency" in performance measurement is often over-emphasised, because a simple way of keeping score is more easily understood and seems fairer.

These kinds of results-focused evaluations are popular with managers, but can have negative side effects, because they may add to executive stress levels and blind them to creative opportunities to achieve positive outcomes that lie outside the predefined parameters of success.

Fortunately, there is an alternative that can help improve decisions: to

hold the decision-makers accountable not for the outcome of the decision, but for the process underlying their decision-making. Process accountability can help managers take better decisions, by encouraging them to look for more decision-relevant information in a more systematic way before they make their decision and to weigh their choices more critically, knowing that they will have to justify their decision later.

Accounting studies have already shown that process accountability can reduce auditors' information-processing biases and improve their judgment accuracy and consistency, increase their effort, and enhance their professional scepticism. But this mode has its own potential downside: it can lead to in-

formation overload, driving the decision-maker to focus too much on unimportant details. There might also be other problems lurking that we do not yet know about, as there has not been much research yet on the effects of process accountability on managers' decision-making in a more complex financial context.

To understand more about the differential effects of these types of accountability, my co-authors and I set up a decision-making study that used eye-tracking technology. Although, as expected, a process focus does lead to higher decision quality and generates best results more frequently than an outcome focus, an alternative solution turns out to be almost as good: providing managers with a "strategy map" or "casual chain" that they can refer to before making their decision (see Fig 1). ▶

"...we found that including such a cause-and-effect chain that connects strategic performance dimensions in a linear fashion can strongly improve decision quality."



Fig 1. Part of a causal chain.

How to improve project funding decisions (continued)

By **Marcel van Rinsum**

In our study, we found that including such a cause-and-effect chain that connects strategic performance dimensions in a linear fashion can strongly improve decision quality. Surprisingly, this holds even when the true effects of decisions on performance are actually non-linear, which shows that the chain does not have to accurately reflect all possible effects to still be helpful.

Process or outcome?

To understand more about the cognitive paths that people follow under each methodology, we asked the 83 student participants in our experiment to assume the role of a manager in a retail clothing company, for which they were given performance data laid out in the popular balanced scorecard format.

Participants were asked to make a follow-up project-funding decision based on the pilot test data. They needed to indicate how much they would like to invest; they could choose any amount from €0 to €100,000. If analysed properly, the performance data revealed that the optimal project investment amount was €52,000. Over that amount, the company would begin to lose money.

We formed two participant groups. Outcome-accountable participants received instructions specifying that their evaluation would be based only on how closely their invested amount came to the optimal amount. Process-accountable participants, on the other hand, were asked to provide a written justification for their decision, and were informed that the quality of

other half basically had to make their decision with only the balanced scorecard data given to all the participants.

We found that, on average, process accountability led to better decisions. Additionally, although having the causal chain diagram handy did not further improve decision quality for participants in the process-accountable group, it did spur dramatic improvement in the performance of those who were held accountable for outcomes.

The eyes have it

To better understand exactly how people worked under these different conditions, we monitored our subjects' work on their assigned tasks using eye-tracking technology. This gave us very detailed insights regarding the processes that underlay their decision-making.

Eye tracking enabled us to gather verifiable, quantifiable data about how the participants consulted each piece of information, and how they worked their way through the decision problem. We recorded how long they looked at the data and the causal chain, and how often they moved their eyes from one piece of information to the other.

The results confirmed our expectation that process accountability enhances decision quality because it motivates a more thorough information search. Additionally, the study revealed that causal chain diagrams are helpful because they reduce cognitive complexity, focusing attention on the information cues most relevant to the decision at hand. Being able to refer to a causal chain diagram enabled

"...process accountability and a reporting format with a causal chain are both likely to lead to better project investment decisions..."

The case dealt with a for-profit company that had introduced a strategic initiative involving the extension of their shops' opening hours. The goal of this one-year pilot test project was to improve customer satisfaction.

their reasoning would be the basis for their evaluation.

Each of these two groups was further subdivided in two more groups: half of the participants within each group were given causal chain diagrams, while the

subjects to quickly focus on the most relevant parts of the data, reducing the overall effort they needed to put into searching for information while still making it likely that they would find the right answer.

Bring a map!

Our study suggests that process accountability and a reporting format with a causal chain are both likely to lead to

better project investment decisions than accountability for outcomes. In fact, our study showed that only five per cent of subjects made the optimal decision when they knew they would be assessed only on the outcome, compared to about 30 per cent of those who would be assessed on the outcome but could refer to a causal chain, and on average 33 per cent of those who would be assessed based on process accountability.

These differences in decision quality are startling and have important implications for company practice. They show that objectivity and transparency in performance measurement and evaluation are frequently not the best way to achieve desired results. Ironically, the way to achieve the best results turns out to be to focus not on the outcomes but the decision-making process. Or, to use a strategy map! ■

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This article is drawn from *How accountability type influences information search processes and decision quality*, by Nicola Dalla Via and Marcel van Rinsum, both of RSM, and Paolo Perego of the Free University of Bozen-Bolzano, and published in *Accounting, Organizations and Society*, Volume 75, May 2019, Pages 79-91. DOI: <https://doi.org/10.1016/j.aos.2018.10.001>



"Eye tracking enabled us to gather verifiable, quantifiable data about how the participants consulted each piece of information"

Omnichannel retailing: making smarter choices

Interviews with **Robert Rooderkerk and Marijn van Weele**

Selecting the right assortment of products to carry is a perennial challenge for most retailers. Even for online retailers, distribution centre space and shoppers' mental bandwidth present constraints. Faced with too many choices, the consumer will shy away from buying anything at all.

Until a few years ago, Coolblue, the fast-growing omnichannel retailer based in Rotterdam, had dealt with the issue of assortment the way most retailers always have: by making decisions about what to carry based on supplier discussions and managers' gut feelings.

But as the business grew, this traditional approach had become unsustainable. In certain departments, shoppers were being inundated with options – nearly 200 kinds of power banks, for example. 'We were basically confusing the customers with a lot of options that for them are very similar. This is not really a good way to help our customers, so we started asking, how can we make smarter choices?' recalled Marijn van Weele, Head of Margin Optimization (Assortment, Pricing, Forecasting, Bid Management).

This sounds like an easy question to answer, but it isn't. In fact, Coolblue faced a dilemma retailers often face: it's easy to cut stock keeping units (SKUs), but what if some of those choices satisfied very particular needs? How could van Weele be sure that the effort to cut complexity wouldn't actually reduce sales?

An introduction

As he wrestled with this issue, a colleague invited van Weele to an evening seminar on assortment planning led by Robert Rooderkerk, Associate Professor in the Department of Technology and Operations Management at RSM.

After the seminar, the two continued to speak about 'our shared passion for assortment related challenges,' Rooderkerk remembers. This introduction began an ongoing dialogue, in meetings both at RSM's campus and at Coolblue's offices. Those meetings 'first focused on Marijn sharing challenges and me discussing state-of-the-art research on assortments,' Rooderkerk said.

Rooderkerk also told van Weele about an analytics tool for assortment optimisation he had developed while working on a methodology to optimise the composition of grocery store assortments. The analytics he developed on that project made it possible to evaluate the precise degree of overlap in the attributes of any two products in a given assortment – for instance, whether two kinds of laundry detergent did more or less the same thing, or had different benefits.

Rooderkerk believed that his tool could be adapted to handle a much larger number of products and a larger number of attributes than those he had programmed it to handle. In theory, Rooderkerk thought, it should work as well for consumer electronics at an online store as for consumer package goods in a grocery store. If he could prove that it worked on power banks as well as it did on potato soup, he could help many companies shrink their overall number of SKUs without reducing customers' meaningful choices.

But he needed real retail data to validate and refine his algorithm – and he realised that Coolblue might be the perfect candidate.

Improvements every day

Their collaboration started small. 'Coolblue has a good motto, which is to try to make a small improvement or at least some improvement every day. And so that's how we started,' Rooderkerk said.

The first tangible product of their collaboration was a joint lecture at RSM on the theory and practice of assortment planning. Rooderkerk also sent a master's student to work at Coolblue on assortment issues, jointly supervised by him and van Weele.

Since then, the two have moved on to more complex and ambitious projects. For example, understanding how to make his tool work for sorting decisions in a complex category, such as laptops, which have more than 200 features.

The tool has made a dramatic difference to Coolblue. 'Overall, we have reduced our assortment substantially,'

said spokeswoman Ottelien van Pelt, 'both by reducing product types in the assortment and the number of products within a product type.'

In certain categories, such as power banks, van Weele's team has reduced the assortment dramatically. 'However,' van Pelt said, 'there are also product types where we did the opposite and expanded the assortment.'

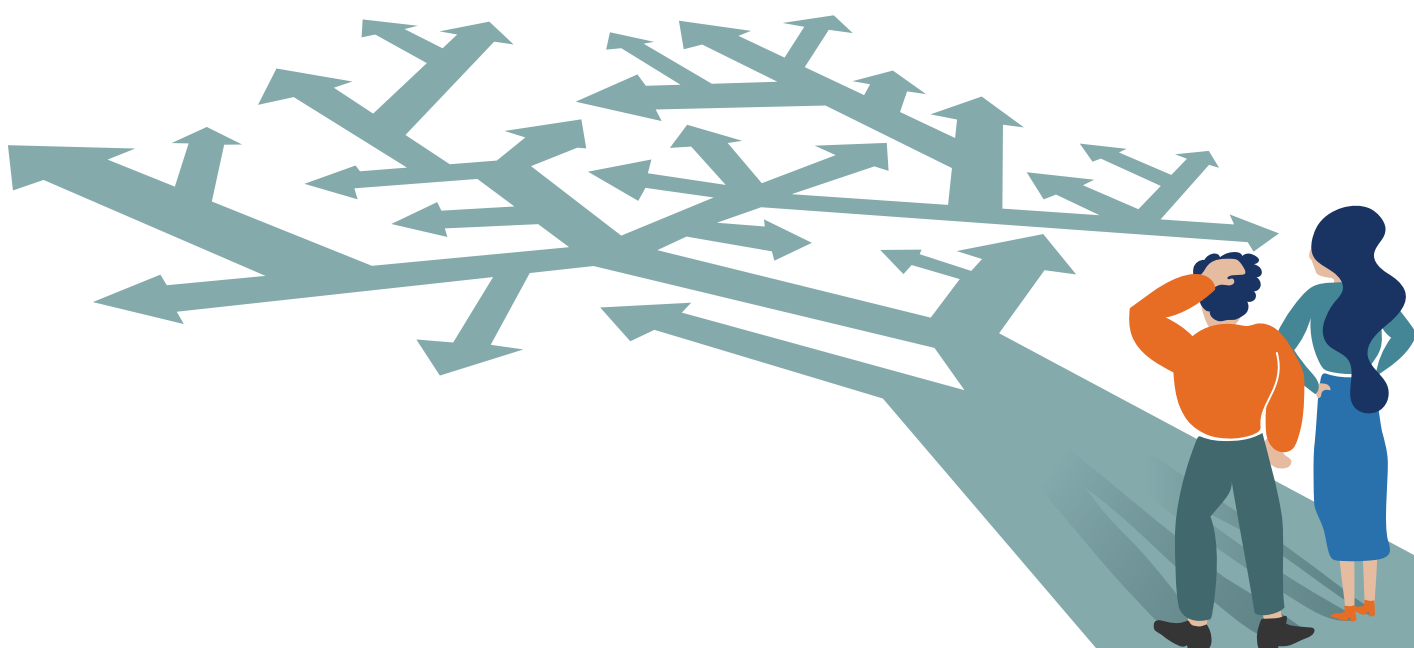
In laptops, for example, the data revealed that customers were searching for laptops with specifications that suppliers had not satisfied, such as a very high-end MacBook with highly enhanced capabilities. Now, since advising their suppliers about the spots they were missing, they have new hit products that sell out very quickly, said van Pelt.

In addition to helping Coolblue improve its efficiency, the Coolblue-RSM collaboration has enabled Rooderkerk to not only validate and extend the capabilities of his assortment tool but to begin working on new assortment tools as well. 'We have looked at other dimensions of assortment structure that, together with assortment size, affect the number of website visitors and conversion,' he said. So far, their research has shown that both the structure of a category's assortment and the number of choices offered matter.

The collaboration has yielded practical benefits to both partners: more sophisticated assortment processes for Coolblue, and several pa-

"We were basically confusing the customers with a lot of options that for them are very similar."

Marijn van Weele, Head of Margin Optimization, Coolblue



Omnichannel retailing: making smarter choices *(continued)*

Interviews with **Robert Rooderkerk and Marijn van Weele**

pers for Rooderkerk – two published, and one under review, on omnichannel assortment planning, marketing-operations challenges in omnichannel retail settings, and finally, the path of new product development in an omnichannel world.

In addition, Rooderkerk, who is also Academic Director of RSM's new MSc in Business Analytics & Management, said he has gained a better sense of the skills that he wants the students in the programme to develop. 'Besides soft skills,'

he said, 'they need an agile mindset capable of rapid prototyping, a good understanding of the interdependencies between different firm functions, particularly marketing and operations and different applications, especially assortment and pricing.'

Assorted answers

Today, Rooderkerk and van Weele continue to work on the problem of assortment for an omnichannel retailer, and have just begun a project

using Coolblue's data. Their collaboration is also becoming more central to Rooderkerk's research. Now, he says, he is working directly on the Coolblue research with his colleagues, and not delegating it to his graduate students.

The executive and the academic are thus working together now to try to answer a variety of questions that are important to Coolblue specifically and next-generation retail generally. For example, are the assortment dynamics the same for Coolblue's 11 physical stores as for its online store, or should Coolblue have a different assortment strategy in its physical stores? How does blurring the line between online and bricks and mortar stores affect assortment? What products should Coolblue display in the store, given that space is limited and taking into account the fact that consumers might inspect a product in store but then buy online?

As for the Coolblue-RSM collaboration, the assortment seems optimal: Coolblue has less inventory to manage, Coolblue's customers have fewer but better choices to make, and RSM has new insights into the challenges of assortment and an advanced set of analytics tools that can benefit retailers everywhere. ■

"Coolblue has a good motto, which is to try to make a small improvement or at least some improvement every day. And so that's how we started."

Robert Rooderkerk, Associate Professor, Department of Technology and Operations Management, RSM

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