

In the summer of 2018, before beginning my PhD studies, I fulfilled a long-standing dream by writing a crime/comedy novel titled, ‘The Runaround’. Shortly after this, the coursework and readings for the PhD program in Operations Management (OM) introduced me to product-related issues that I had never thought about before. I was fascinated by research related to optimal pricing and release-timing strategies as well as the effect of planograms and congestion levels in the stores on customer buying behavior for retail products. I wondered how these dynamics would play out for products of artistic nature. Unbeknownst to me, my summer hobby and the intellectual exploration in my PhD had sparked a new passion in me – to scientifically study the dynamics of production and consumption of art. Since then, I have worked on a research agenda that employs empirical methods to address exigent issues concerning the management of cultural markets using OM principles. As a researcher, I consider myself to be very fortunate in having the opportunity to combine my passion and skills in the pursuit of knowledge, making every step involved in this process – from idea generation to writing a manuscript for conveying my conjectures and findings – incredibly exciting for me.

The markets that produce, promote, and distribute art (such as the music, publishing, and museum sectors) not only shape the societal discourse, but they also have significant economic relevance. Such activities contributed to 4.2% of EU GDP and employed more than 29.5 million people across the world in 2019.¹ A responsible management of the cultural sector is central to the Sustainable Development Goals laid down by the UN. Despite this, these markets remain under-explored in the OM literature. One plausible explanation is that, previously, the cultural sector was difficult to study from operational and economic perspectives due to the lack of objective and granular data. However, the continuous innovation in content production and the rise of newer ways of experiencing these products in the form of content streaming (Spotify, TikTok, virtual exhibitions, etc.) has contributed towards digitization. Consequently, this hurdle has nearly disappeared with the newly available production- and consumption-related data across multiple cultural domains. In my research, I leverage these recent advancements to seek a holistic understanding of these markets.

My theoretical contributions involve establishing new connections between the substreams of service and people-centric operations, which are necessary to capture the creative aspects and subjective experiences inherent to the cultural sector. Methodologically, I utilize empirical models that employ retrospective and experimental data to establish causal relationships. To produce research with real-world implications and a wide external validity, so far, I have actively reached out to multiple industry leaders like the Van Gogh Museum (VGM), BMAT, and Deezer to initiate research collaborations. In complement, I have developed an expertise in state-of-the-art web-scraping techniques to acquire internet-based data. Altogether, my research can be divided into two major theoretical themes (each with multiple projects): (I) Product innovation and diffusion, and (II) Designing sequential experiences. In what follows, I provide a brief overview of these themes and the corresponding projects within followed by an outline of my future research agenda.

(I) Product innovation and diffusion: In the paper titled ‘**Come Together, Right Now? An Econometric Study of Collaborations within the Music Industry**,’ we advance the theory of collaboration in new product development (NPD) by explicitly capturing the specificities of cultural creativity. We choose the music industry as the paradigmatic context to uncover the effect of short-term collaborative projects on the career trajectories of music artists, and identify the factors that lift

¹Pasikowska-Schnass, M., 2019. Employment in the cultural and creative sectors.

an artist's profile in both the short and the long term. Specifically, we develop a theory of collaboration based on the notion of *transfer of capital* between the collaborating artists. Hence, we identify optimal complementarities which facilitate performance spillovers across time. To validate this theory, we use the Difference-in-Differences (DID) methodology on data compiled by combining a weekly log of radio plays of songs, across 25 European countries, between 2011 and 2018 (obtained with BMAT), a multi-attribute Spotify dataset of songs that allows us to numerically track the acoustic features, and the so-known Hofstede's cultural dimensions in relation to artist origins. We show that collaboration, in comparison to a solo release, provides a positive boost of 5% to an artist's career. This work has been accepted for publication in the journal *Management Science*.

In line with the NPD theme, the second paper titled, '**Play it Again, Sam? Product Differentiation and Success in the Music Industry**,' examines how different dimensions of product differentiation influence audience opinion about newly released cultural products, consequently affecting their market performance. We postulate that due to the constant exposure to other cultural products available in the artistic space, audiences compare the focal product with: (a) the past profile of the focal producer, leading to *Within-artist differentiation*; (b) the products released by proximal peers of the focal producer, giving rise to *Proximal-peer differentiation*; and (c) the chart-topping products that have maximal reach, generating *Dominant-design differentiation*. We integrate these dynamics to develop a theory rooted in the classical behavioral constructs of reference-building and couple it with the two psychological preference structures of habit formation and variety seeking to predict the commercial and critical success of an NPD project by an artist. The aforementioned datasets on radio plays and song attributes, along with a log of professional critics' reviews from media outlets across the world are used in reduced-form empirical analyses. The results show varied responses of audiences to the three forms of product differentiation which can be utilized to inform the decisions of product design within the context of cultural markets. This work is under second round review at the journal *Management Science*.

Moving from the production decisions to strategies employed for product diffusion, in the project titled, '**Riding the Gravy Trend? Bandwagon Effect Vs. Conspicuous Adoption of Music in User Generated Content**,' we consider music adoption patterns on platforms like TikTok and NetEase. Here, user-generated content – in the form of embedded snippets of music in videos – serve a dual role, both as means of entertainment and as promotion vehicles for the music track and artists featured in them. We uncover the tendency of users to showcase *bandwagon effect* by conforming to the crowd opinion or, conversely, to *conspicuously deviate* from the trends in their music adoption preferences. This, as we show, is contingent on the platform's recommendations that lead to the formation of *echo chambers* and the user standing in the social hierarchy that organically emerges in the platform's network structure. To validate the theory, we use a detailed log of clickstream activity of users on NetEase Coud Village and employ Heckman 2-Stage and Instrumental Variable 2SLS estimation techniques to correct for self-selection and endogeneity issues. Our approach can be used by both the platform and record labels in making predictions about user engagement with their music. Along with winning the first prize in both **INFORMS 2020 RMP Data-Driven Research Challenge** and **2021 INFORMS Social Media Analytics Section's Student Paper Competition**, this work has been invited for second round review (major revision) in the journal *Manufacturing & Service Operations Management*.

(II) Sequential consumption of experiences: Presenting the aforementioned works at conferences helped me connect with Deezer, a major European music streaming platform. In collaboration with them, the paper titled, ‘**Keep It or Skip It? Sequential Consumption of Music with Reference Effects,**’ studies the sequential consumption of music on streaming platforms. We aim to develop a new generation of recommendation algorithms which are able to curate experiences/playlists tailored to the listeners’ dynamically evolving preferences for enhancing their engagement. We construct a utility-based theoretical framework that takes into account the past consumption of listeners to construct two types of references: (a) *Recall*-based, that are built on past sessions, and (b) *Locally*-based, resulting from the previous songs in the focal session. The heterogeneous responses of the listeners, rooted in the constructs of habit formation and variety seeking, help us understand their dynamic preferences in sequential consumption, which are further influenced by the memory decay effects. We combine the music streaming logs of 44,794 paid customers of Deezer across 2018-2019 with the song- and artist-attributes data from Spotify to carry out reduced-form econometric analyses. The counterfactual analyses and a lab controlled experiment show that our suggested algorithm can outperform the industry status-quo by up to 34% in engaging listeners. This work is under first round review at the journal *Management Science*.

While the aforementioned projects solely explore the music industry, the following ones pertain to other cultural markets. Namely, in my job market paper, ‘**Designing Layouts for Sequential Experiences: Application to Cultural Institutions,**’ with my advisor and Dr. Ali Aouad (LBS), we turn our attention to cultural institutions that are tasked with providing an experience to their visitors by displaying a collection of items for physical and digital interactions. After personally getting in touch with the data analytics department of the VGM in the Netherlands, we were able to develop a long-term research collaboration to explore this issue. Accordingly, we develop a data-driven analytics framework to inform layout-related operational decisions, taking into account visitors’ preferences. First, we propose a dynamic choice model, called *Pathway MNL* (P-MNL), that represents visitor activity as a sequence of conditional logit experiments influenced by the layout. We estimate this model on large-scale data logs of Multimedia guide (MMT) usage at the VGM. Using parametric specifications of the utility function, we uncover significant relationships between visitors’ choices and layout distances, artwork characteristics (uncovered through Convolutional Neural Networks), and other contextual dimensions. After validating our approach through a multitude of tests (prediction accuracy of 63%) and natural experiments, we formulate the *layout optimization problem* with the aim to assign artworks to different locations to maximize the expected visitor-path length. We establish a strong inapproximability result for this new optimization setting. We identify realistic interventions that can lift visitors’ engagement by 7% by improving the attractiveness and retention exercised by the layout. This paper is under first round review at the journal *Management Science*.

These findings created an impression on the personnel at the VGM who were curious to try out our recommendations. Since the visitor experience is a combination of the physical and digital navigation, we took this opportunity to run real-world experiments on more than 65,000 visitors between May and July 2022 at the VGM by modifying the composition of recommended tours on the MMT display. Hence, in the project titled, ‘**Cultural Institutions: The Effect of Physical and Digital Layouts on Visitor Experience,**’ we introduce several interventions of changes in the digital layout stemming from our theoretical conjectures about visitor preferences in relation to the exhibits and the contextual

factors like congestion. We intend to utilize DID and our P-MNL models to measure the effect of these interventions on visitor (i) engagement, (ii) satisfaction, and (iii) learnings from a visit. We hope to causally establish certain theoretical hypotheses and show that optimized digital recommendations can enhance the overall visitor experience. This work is ongoing and we target a submission to the journal *Management Science*.

Finally, in the ongoing project titled, ‘**Scheduling Experiences: The Effects of Affect Infusion and Adaptation**,’ we work with Prof. Guillaume Roels (INSEAD) to study how affect percolates across time such that the consumption of an experience influences the evaluation of future ones. We develop a model that encompasses both *positive (affect infusion) and negative (adaptation) spillover effects*, by separating, for each experience consumed by a particular customer, its consensual quality from the focal customer’s individual perception of quality. For a wider external validity, we test our model with retrospective data acquired through extensive web-scraping in four experiential contexts, namely: books, movies, touristic attractions, and restaurants. We consistently find the presence of both positive and negative spillovers, with higher salience when experiences are more similar to each other and when the time elapsed between their consumption is shorter. This implies that to maximize customer satisfaction, it may be optimal to schedule the best activity in the middle of an experience, in contrast with the standard peak-end rule. Furthermore, under uncertainty, it may be valuable to save the best activity as a wild card to recover from bad experiences. This project is also in the final writing stage and will be submitted to the journal *Management Science*.

Future work: As an aspiring junior academic, working on intellectually stimulating topics that I feel extremely passionate about and seeing a real-world impact on practice spurs me on to pursue a similar line of research. I truly believe that working in close contact with the cultural industry, which, in general, is only just rising to the data-driven norms of today’s world, promises to be a very fertile domain for data-driven OM-based research that aims at providing both descriptive and prescriptive contributions. Accordingly, in the coming years, I expect to be working on publishing the aforementioned works, and to continue our collaboration with the VGM, BMAT, and Deezer. Specifically, we are working with our VGM contact persons to set up a project that will focus on their merchandizing strategies, which is a key source of the museum’s revenues. We intend to study how the visitor movement trajectories within the museum affect their buying behavior in the museum shops to inform product innovation- and design-related planning. Next, Deezer plans on extending the portfolio of their offerings by introducing podcasts and live streams of music concerts in the coming years. I will be assisting in their decision making process by designing focused Randomized Control Trials on a wide set of listeners across the world to measure the economic impact of such additions.

We are also working on connecting with other content streaming platforms and museums around the world for research collaborations. I believe that my portfolio of research projects and the already established connections will be advantageous in gaining further access to other key entities in these markets. In the long run, I aim at widening the scope of my research by exploring the TV series and book publishing sectors with one specific idea concerning the optimal product release strategies in each context.

With work that bridges the gap between art and science, I hope to nudge academics and managers alike to actively seek to manage and optimize the operations of cultural markets.