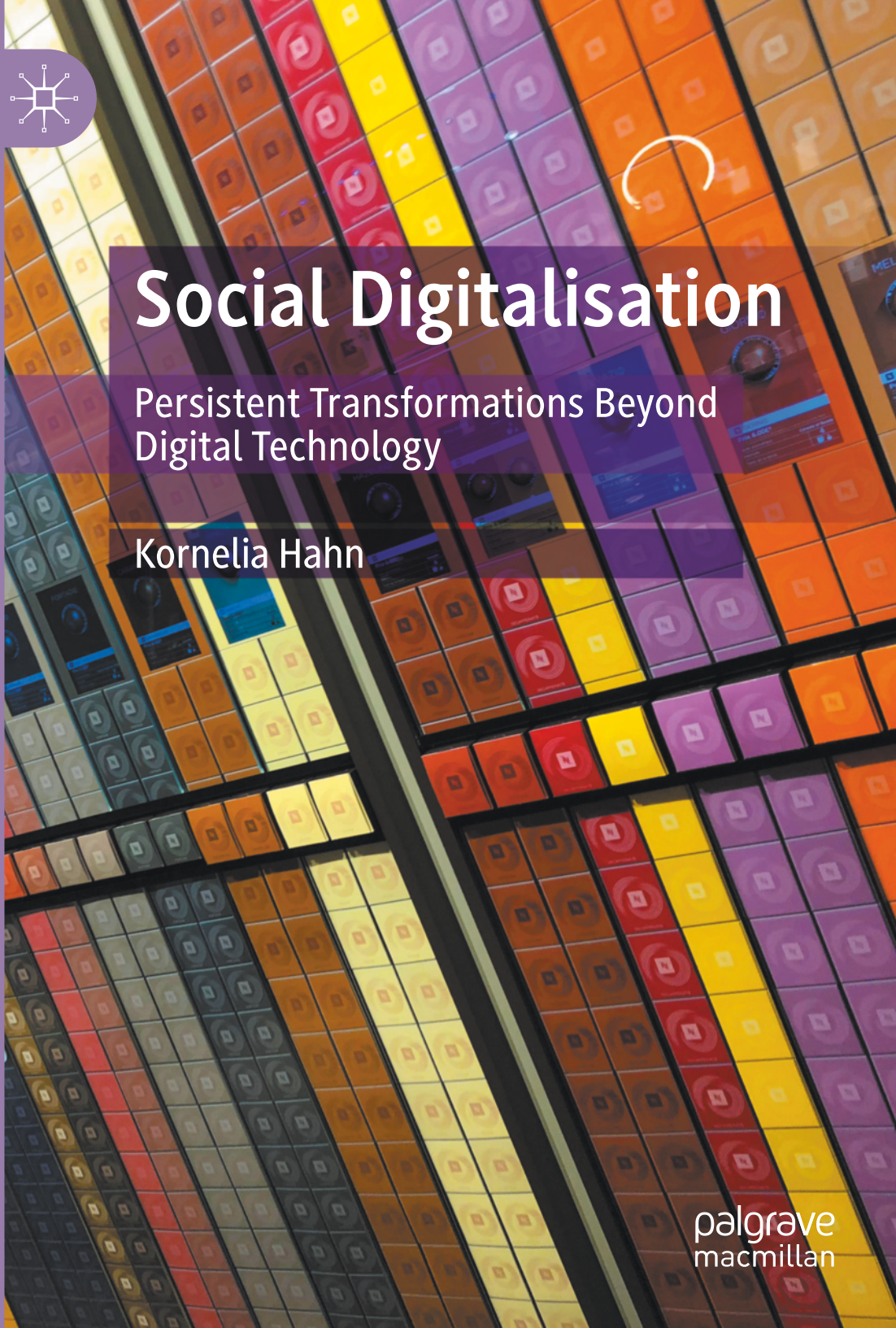
Social Digitalisation
Persistent Transformations Beyond Digital Technology
Kornelia Hahn
palgrave
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Social Digitalisation

"The focus on social digitalisation theory offers an original contribution to the field. I particularly liked the breadth and depth of historical examples that the book presents in an engaging and compelling demonstration of the social and historical processes underpinning 'transformation'."

—Kate Orton-Johnson, *Senior Lecturer in Sociology, University of Edinburgh, UK*

Kornelia Hahn

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To my son Tyrique

Preface

Writing this book in the year when COVID-19 first swept the globe has inevitably come with unforeseen effects, including on my own stance towards the phenomena explored in these pages. Like many academic instructors and authors, I had longed to have more time to work at home before the lockdown ruled out any other option. In spite of the privilege of being able to continue to work in these circumstances, it seemed at first that writing a book in the midst of a global cataclysm might be something of a sideshow.

However, the pandemic has also compelled me to speculate, like many others, not only on the scale and depth of changes likely to be accelerated and generated by this pandemic but also on the role that might be played in these changes by the very subject of this book, i.e. by transformative processes of social digitalisation.

Back in the classroom in March 2020, just as I was announcing the teaching schedule for the coming week, it was through my students' connections to the outside world via their digital devices that I first learnt there would be no more face-to-face classes for the foreseeable future. The university had just ordered an immediate lockdown—a state whose

significance most of us were still only beginning to grasp. Worldwide, across every sector of society and the economy, rapidly adjusting to this state has entailed harnessing the resources of material digital technologies on an unprecedented scale. Such technology has proved pivotal both in tackling the direct health impacts of the pandemic and in enabling many people to continue performing much the same work they were doing prior to the lockdown. In my own case, for example, the transition to teaching online proceeded quite smoothly over a matter of weeks—so smoothly, in fact, that it is hard to imagine there will ever be a complete return to pre-pandemic routines.

While the application of digital technology in relation to the pandemic raises many questions, and while we have witnessed many tragic failures to mitigate the virus, such technology has undeniably proved immensely helpful and even essential for people coping with lockdown conditions and other impacts of the pandemic. For better or worse, the outcome is that more and more areas and activities have swiftly become connected with and/or organised by digital processing.

With digital technology set to become ever more ubiquitous over the coming years, the hope that has helped drive me in writing this book is that our globally shared experiences of the pandemic will lead to more profound *assessments* of further digital transformation, including assessments from the perspective of *social theory* as set out in this book.

The social theory approach proposed and elucidated here is primarily concerned with long-term developments in digital processing, including those set in motion long before the advent of material digital technologies—in some cases prior to the so-called Age of Steam. From this perspective, the 'Digital Transformation' is thus understood as a trajectory rather than a sudden disruptive change. This approach is above all focused on the *re-organisation* through digital processing of social activities that were previously more or less contingent. Such re-organisation involves simultaneous and intertwined processes both of *discontinuance* through the digitisation of discrete units and of *continuance* through the application of streamlined programming, necessarily complemented by what I term 'co-programming' on the part of ourselves as interpreters.

What should be noted here already is that these intertwined processes can only be set in motion by strategic actions and deliberate decisions,

with such actions and decisions often taken in a highly non-transparent way. Once processes have been made digital, moreover, the *dynamics* of this transformation generally do not encourage or support any further assessment of its trajectory. Public and scholarly discourse about digital transformation has thus far mostly limited itself to a consideration of policies without shedding much light on the political decisions that have led to the implementation of overall digital processing. In this book, by contrast, I call for a critical analysis of the impacts of social digitalisation that goes beyond an assessment of implemented material digital technologies and the policies related to their use. Failing to undertake such an assessment of social digitalisation 'on the run' would itself constitute a political decision. An important aim of the approach I propose here, therefore, is to contribute to assessments of ongoing and future digital transformation and thus to facilitate more informed decisions and policies better designed to address the consequences of such re-organisations of social activities.

If this book has a message, then, it is a call for all of us to think about digital transformation as a form of social processing beyond technology. The intention here is not to set out a case against the implementation of digital technology per se but rather to emphasise the importance of understanding the social conditions in which digital technology is implemented and how its implementation is likely to change the trajectory of social processes. A key element of this approach is thus the need to consider the consequences of digitalisation from a *variety* of social perspectives.

The more extensively digital technology is implemented, the more urgent it becomes to base empirical studies and policies of this phenomenon on theoretically sound foundations. This work represents my own attempt to help strengthen the theoretical basis of research and ultimately of political decision-making regarding forms of social digitalisation.

A brief summary of the overall structure of the book here may help readers to navigate its contents more easily. Thus, readers can find an outline of social digitalisation as a long-term organisational logic of modern society in Chapter 1, while the final chapter provides a summary of the theory of social digitalisation. The five intervening chapters apply

this approach to the analysis of some key modern settings in order to garner evidence of and gain insights into the long-term dynamics of social digitalisation. These settings include the factory (Chapter 2), the bourgeois household (Chapter 3), the department store and other retail settings (Chapter 4), watching television at home (Chapter 5), and a contemporary luxury restaurant equipped with augmented reality technology (Chapter 6).

I hope that the breadth of the approach I have taken in analysing the re-organisation of these settings over the long term will also prove of interest to readers who may not be especially preoccupied with *digital* transformation itself. It should be noted, however, that social digitalisation theory approaches these settings not as distinct spheres but as *interlinked* in order to better capture the entangled and dynamic trajectory of digital transformation.

Finally, the epilogue to Chapter 7 offers a short version of the theory of social digitalisation and a small-scale practical example of its application to the contemporary phenomenon of encapsulated ground coffee (as depicted on the front cover of this book).

I wish to thank all those who have supported me in different ways in the process of writing this book. Working together with Sharla Plant and the editorial team and staff at Palgrave Macmillan was a pleasurable experience and I thank them all for their support and patience. Several anonymous reviewers engaged with the contents and aims of the book and their positive attitudes towards the project were a major encouragement, while their criticisms inspired me to push myself further. I am grateful to my teaching assistant, Filip Kulling, who supported the writing process, not least by discussing the ideas and arguments in the book and offering insights into how they might best be conveyed to readers. My colleague Alexander Schmidl read chapters of the book and offered highly constructive comments. As a non-native speaker of English, I am also deeply indebted to my proofreader, Matt Jones, for his close engagement with the drafts of this book and for his invaluable help in increasing the readability of the text.

I dedicate this book to my son Tyrique, who has good-humouredly endured and adapted not only to the restrictions imposed by the

pandemic but also the changes to our family life arising from my work on this book over an extensive period of time.

Salzburg, Austria Kornelia Hahn
July 2021

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Introducing Social Digitalisation

Preliminary definition: 'social digitalisation' refers to the dynamics entailed in the organisation of social life through the persistent implementation of digital logic over time. Digital logic is defined as a combination of digitisation*, i.e. the rendering of things and processes into abstract discrete units that engenders discontinuances in social procedures and activities, and* programming*, i.e. the formal* composition of *these units in such a way as to produce continuance. As a vital component of this process, such re-organisation requires the simultaneous co-evolution of our capacities to interpret and make sense of such digitalised processing—capacities I refer to most generally as 'digital literacy'. In contrast to prevailing conceptualisations of the 'digital transformation', this approach does not consider digitalisation as the outcome of any material digital technology introduced in recent decades but rather as a long-term trajectory in modern society and culture.*

SOS, the alphabetic equivalent of the Morse code distress signal, seems a good example of what this book is about, namely the evolution of modern digital transformation prior to the advent of material digital technology. There are many examples of such transformations in everyday life, including the well-known *Maggi* bouillon cube or the shelves of orderly stacked boxes of encapsulated ground coffee depicted

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on the cover of this book. Digital organisation and transformation have been underway for a long time, arguably long before the SOS distress signal was first used for ship rescue in 1905.[1] As a consequence of this long evolution, today's material digital technology has necessarily had to be fitted into a pre-existing 'digital culture'. Throughout the following chapters I present evidence for this argument to show how the holistic approach I propose can lead to a better understanding and evaluation of contemporary *social digitalisation*.

The example of the SOS signal affords a first illustration of the overall argument set out in this book, including in its application of digital logic, people's interpretation of this innovation, and in the fact that Morse code itself was the culmination of numerous attempts made before the nineteenth century to develop a code system by which to convey messages through telegraphy—a word whose literal meaning is 'writing at a distance'. Prior to the use of electronically transmitted sounds, for example, various code systems had been developed using flags and lights. When Samuel Morse came up with the first version of a single-wire code system in 1837, however, this system proved so highly efficient and economical that it ultimately became the basis of the International Morse Code. This system was itself based on the earlier code system of the alphabet, which the Morse code converts and further encodes. Morse is a binary code consisting of two symbols, i.e. the 'dots' and 'dashes' in the visual version that symbolise the duration of the signal units in the audio version. For obvious reasons, the code of a distress signal should be as brief and clear as possible, prompting the choice of two of Morse's simpler codes, i.e. those for the letters 'S' (dot code: · · ·) and 'O' (dash code: ———), combining these to form SOS (· · · ——— · · ·). The codes of the letters S and O are not only simple codes compared to the other letters but also the most distinct from each other (Headrick, 2000, p. 204). The coding of this distress signal was thus designed on the basis of and in relation to the formal traits of the code units, which are arbitrary and without reference to any literal meaning. Since it was first introduced, however, the sequence of the SOS code has been interpreted

[1] For a comprehensive history of the telegraph and the Morse code with reference to the Internet, see Tom Standage's (1998) book, *The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century's On-Line Pioneers*. New York: Bloomsbury Publishing.

far less technically. In order to better memorise the sequence, people have ascribed to the code the more comprehensible and also somehow culturally indicative phrase 'Save Our Souls'. After all, unless one knows the real origins of the signal it seems intuitively plausible that the letters SOS might be an acronym of 'save our souls' as a means of indicating distress.

This example can help advance our analysis of digitalisation in several important ways. For one, the binary system of the Morse code reminds us that the digital code system so crucial to computers is a technology that was already well-established before the invention of the computer—in the alphabet and in sheet music, for example, and indeed in any numerical grading system. A yet more important insight to be gained from this example is that the Morse code system was used most effectively and efficiently only *after* it had been implemented within an existing social context. Transmitted by a wireless telegraph apparatus, messages converted into Morse code initially made most sense in contexts where it was not possible to communicate by any other means and where it was desirable to communicate instantly, especially in a distressing situation—as in the case of its initial use by crews aboard the new steam vessels of the time. Once the hardware and software of the telegraph had been 'inserted' into this particular setting, however, the SOS code became associated with this context to such an extent that the reference between this code and the specific communication of an emergency situation has now become part of global culture. In other words, even though SOS is a technical code that was first conceived within a technical and not a social context, there is an inextricable link between the technical code and the socio-cultural context of its use. So much so is this the case, indeed, that from today's vantage point it is rather astonishing to learn that the globally recognised emergency call 'Save Our Souls!' is not actually literally encoded in the SOS signal. And while the SOS code is obviously limited as an example of social digitalisation, it does hint at the complexity of the historical trajectory of digital organisation and what would later become known as 'digital culture'.

1.1 Digitalisation Beyond Technology: 'Digital Fruits' and Other Examples of Digitalisation in Food Production, Retail and Marketing

The trajectory of digitalisation can further be illustrated by 'digital fruits' as an example from contemporary everyday life. 'Digital Fruits in the Supermarket' was the headline of an article in an Austrian newspaper in 2018 (Wienerroither, 2018). This article was informed by an interview with a representative of a local company providing technology for the so-called digital fruits—a product that was actually no more than a packet of dried fruits wrapped in a newly designed material that enabled consumers to obtain additional information about the product via Augmented Reality (AR) technology. By scanning the product's packaging in the supermarket with a smartphone, potential customers are linked via an app to videos, promotional lotteries, recipes and nutritional facts about the product, as well as the possibility of learning more about the ecological and social conditions of the product's cultivation, harvesting and distribution. The article further informed readers that the AR technology allows for 'interaction' with potential customers, connecting the company's software with users who in turn provide the company with data, albeit mostly inadvertently. As indicated in the headline, 'digital fruits' are presented in this article as part of contemporary digital culture and/or material digital technology, even though the product itself can easily be imagined in a traditional and even premodern marketplace not embedded in any digitalised setting at all. This observation suggests it is worth reflecting on what exactly it is about these dried fruits that makes them 'digital'.

Starting from the immediate context, the first thing to note is that the product is offered within a contemporary supermarket setting. This is important because tracing back the organisation of this setting in line with the social digitalisation approach I propose can help us to understand how today's 'digital fruits' have emerged within and are dependent upon an already long-established and far-reaching trajectory of digital organisation. Thus, since we may fairly assume that dried fruits could

still be sold and consumed even in today's 'digital culture' without the need for any digital organisation, it is clear that 'digital fruits' must also now serve as sign vehicles in addition to their use and exchange value. For example, while the promotion of the product obviously appeals to motives for buying fruits beyond mere consumption, it is also clearly beneficial for sellers to obtain information about customers beyond the customers' interest in buying dried fruits. For customers, the AR technology embedded in the product packaging might make the selection process in the supermarket more meaningful than merely grabbing a random product from the shelves *without* AR technology. Furthermore, some customers may prefer to obtain any information they seek about the product by interacting with the AR packaging rather than with a copresent human seller. What is important to note here, however, is that the meaning ascribed to this purchasing process does not depend on the AR technology itself; rather this meaning is influenced by the signifying practices of the interpreters, i.e. in this case the purchase-related signifying practices of potential customers for digital fruits. These practices in turn are embedded in and draw upon semiotic resources that have been shaped by our accumulated experiences of the extensive organisation of digitalised settings over time, including the now seemingly 'ordinary' contemporary self-service supermarket. A key argument advanced in this book is thus exemplified here in that potential customer must first have developed some degree of digital literacy before they can make sense of products promoted in supermarkets as 'digital fruits'. In other words, it is this evolved digital literacy that enables customers to 'read' the significance of a technologically augmented food product offered within an already highly digitalised setting. This is not to say that the 'significance' of this product is necessarily unambiguous; indeed, the ambiguity of a product and thus its openness to multiple interpretations can often be an intentional strategy to widen its potential appeal.

There have in fact been many precursors of 'digital' food throughout modernity. In the food retail industry in particular, as a sector that has for some time accounted for a substantial proportion of global GDP, there has been quite a long history of digital processing. For example, a study by Kinsey and Ashman (2000, p. 83) of the use of information technology in the food retail industry provides evidence of how attempts

to increase productivity in the grocery business have always relied on the adoption of new technologies. As the most recent example of such adoption at the time they conducted the study in 2000, Kinsley and Ashman cited the use of digital technology for testing the quality of fruits, including the visual screening of their surfaces and the digital measurement of their firmness and levels of ripeness. Interestingly, although this method of quality testing is performed automatically with the aim of ensuring faster processing, it nevertheless involves testing every single fruit, thus constituting a form of digital processing based on the smallest unit—in this sense comparable to a 'bit' or binary digit.

Further examples of digitalisation in the food industry include the introduction of the *Food Categorization Code* to identify products in the global food processing industry more clearly and precisely than is possible through our linguistic coding of food. The category code for 'dried fruits, nuts and seeds', for example, is 04.1.2.2.[2] Another code system that has been around in the food industry since 1990 is the price look-up code (PLU), introduced as a way to identify bulk produce in order to streamline checkout and inventory control processes in supermarkets, i.e. to make these processes easier, faster and more accurate.[3] The PLU code is administered by the *International Federation for Produce Standards* and assigns either four or five random digits that are printed onto stickers for labelling conventionally and organically grown products respectively. These methods of organisation have changed the retailing process in a specific way, with bulk produce now digitised in *discrete units* in order to enable each item to be handled individually. Such itemisation is clearly beneficial for commercial purposes; in addition, however, this numerical identification system transcodes our more ambiguous linguistic codes.[4] Customers in supermarkets can certainly still talk to

[2] According to information at: https://foodlicensing.fssai.gov.in/PDF/Food_Categorization_Code.pdf. Accessed 25 February 2021.

[3] According to information at: https://www.ifpsglobal.com/PLU-Codes. Accessed 25 February 2021.

[4] By chance I had a telling personal experience of this ambiguity in January 2019 when I happily grabbed a savoy cabbage from a very limited stock in a corner of the lowest shelf of the vegetable section in my local supermarket. It was only when I reached the checkout that I realised my savoy cabbage was neither wrapped nor labelled and had no PLU code, much to the irritation of the very busy person in charge that Saturday morning. "What is this?" the shop

clerks and sales assistants or to each other when shopping, of course, but communications based on the linguistic code of talking literally do not 'count' in this digitalised communicative system of economic transactions.

Starting from the mid-1970s in the United States, supermarket checkout-scanners transformed the management of stock-keeping because the same data collected by scanners could also be used for easily re-ordering any products missing on the shelves. The computerised internal organisation of stock was later further enhanced by the added option of connecting the purchase of one item to all other items presented at the checkout by individual customers. The collection of such data helped to inform more effective marketing and other strategies to increase sales (Kinsey & Ashman, 2000, p. 86). With the advent of electronic data interchange (EDI) systems in 1999 and the direct transmittal of scanner sales data to manufacturers and suppliers, moreover, shelves could now be automatically replenished, thereby "developing a continuous and coordinated flow of product" (Kinsey & Ashman, 2000, p. 88). The generation and use of scanner data made it possible not only to determine which products to order and when but also to calculate the optimum product assortment. This in turn has facilitated the development of 'category management', leading somewhat paradoxically to a *reduction* in the variety of products and services available to customers at the same time as enabling a "continuous replenishment of products" (Kinsey & Ashman, 2000, pp. 88–89). Such category management digitises (bulk) food by assigning abstract numerical codes according to the discrete units of a specific category system, thereby supporting sales strategies that are shaped primarily by the aim of ensuring a continuity of sales rather than, say, the aim of providing customers with a wider range of higher quality products.

assistant asked. "It's a savoy cabbage," I answered. "But is it a lettuce or a cabbage?" she asked, glaring. "It's a savoy cabbage", I repeated. (I should add the German word for 'savoy cabbage' is phonetically completely distinct from the words for either 'lettuce' or 'cabbage' and so I was referring to a third type of product.) Apparently concluding that any further conversation with me would be futile, the shop assistant then referred to a list before entering some numbers into the cash register and proceeding with the sale. On leaving the shop, I learnt from my receipt that she had decided to record my purchase as 'cabbage'.

As we have already seen in the case of 'digital fruits', food wrapping and the substantial role played by packaging in retail is a topic that well merits exploration in relation to social digitalisation, not least because some form of wrapping is essential and now even legally compulsory for most foods offered as products on the market. The evolution and role of food wrapping can best be demonstrated in the case of food that is more highly processed—or 'transcoded'—than dried fruits. Industrially produced meat and bread products, for instance, first developed and distributed at the beginning of the twentieth century, provide especially good examples of the historical development of packaging and digital processing. The history of these products has been described in two excellent studies by Roger Horowitz (2006) on the US meat industry and Aaron Bobrow-Strain (2012) on the social history of store-bought bread, as explored below in relation to social digitalisation.

As Horowitz notes, the modern marketing of meat products in supermarkets contrasts with the marketing of many other products, including dried fruits for example, since meat is now mostly offered 'fresh' rather than preserved or dried as was often the case in the past. Horowitz (2006, p. 130) describes the meat industry's "struggle to tame nature" by "overcoming the process of decay", explaining how the mass marketing of fresh meat entailed tackling not only the problem of meat's perishable nature but also "the dilemma of organizing mass production around an item that came in irregular sizes" (Horowitz, 2006, p. xii). The solution eventually adopted to overcome these obstacles and thus enable the profitable sale of fresh meat in supermarkets was to slow down the process of physical decay and to standardise the shape of meat (Horowitz, 2006, p. 2). This was accomplished by applying a new technology that preserved the perishable product as 'fresh', namely the technology of cellophane packaging that was introduced into meat retailing in the United States in the 1920s.

Cellophane packaging material serves at least two purposes. First, it attenuates the natural process of decay by interposing a film between the meat and the external environment, thereby creating "artificial conditions" or an "artificial environment" that "allowed for manipulation of [meat's] appearance" (Horowitz, 2006, p. 137). Second, cellophane was

the first transparent packaging material available for consumer products and significantly altered the way customers encountered meat. Different cuts of meat could now be customised for different market segments while less popular products such as internal organs could be presented more appealingly, especially as cellophane wrapping influences both the colour and smell of meat (Horowitz, 2006, p. 137). The slogans used for marketing cellophane as food wrapping—including "'Shows What It Protects! Protects What It Shows!'" (Horowitz, 2006, p. 139)—emphasised the enhanced visibility of products for customers prior to purchase. Together with claims as to the increased safety and hygiene of the new wrapping technology, this factor of enhanced visibility became an important sales aspect. The transparency of cellophane serves as a screen through which an inspecting customer can gather certain hints, at least subjectively, about the quality of the product. Horowitz (2006, p. 139) quotes advertisements promising that "cases filled with cellophane-wrapped meat would 'Make shopping quicker, easier'" and "permit selection of 'the weight or size you want,' and 'provide menu ideas'". Moreover, the new packaging "carried a distinctive logo […] and minimal text to maximize the meat visible through the cellophane" (Horowitz, 2006, p. 139). Here, Horowitz is referring to the star logo of *Armour and Company*, one of the leading meatpacking firms in the United States. As emphasised in the advertising, customers in the new self-service supermarkets, first introduced in Memphis, Tennessee, in 1916,[5] were no longer reliant upon a preselection made for them by sellers/clerks. This latter traditional process was now critically exposed by comparison with self-service, moreover, especially compared to pre-selected products wrapped in non-transparent material and offered on the recommendation of a seller/clerk rather than by a formal and 'official'-looking quality label.

The presence of a brand logo conveys information to customers who might otherwise feel uninformed about the cultivation and processing of a product. Such branding transcodes information about the production process only in an abstract and symbolic way, however, while the

[5] The introduction of the self-service supermarket will be addressed more comprehensively in Chapter 4.

actual meat production process itself has obviously become less and less visible to customers ever since. With the introduction of visual and later written communications about products on meat packaging, customers could also choose to skip any conversations over the butcher's counter. On the one hand, therefore, the 'reality' of the traditional retail setting was reduced by presenting cuts of meat through preservative and labelled cellophane wrapping, thereby decreasing contingencies with regard to the quality of the product. On the other hand, adding a distinctive logo and text to cellophane wrapping in some way 'augmented' the retail environment.[6] Although the companies' options for conveying information about the product through the use of cellophane, labels and text were far more limited than the options available today through the use of AR technology, these developments in packaging altered the organisation of retailing in crucial ways.

The industrial production and cellophane wrapping of another staple food can be traced back to as early as the 1910s. As Aaron Bobrow-Strain (2012) has shown in his investigation of store-bought bread, the entire production process of bread was transformed, along with its supply chains and retailing environments, once bread became an industrial product sold in supermarkets. In the case of bread, we can see even more clearly the impact of the semiotic resources that accompanied and were drawn upon in bringing about this transformation. For while the introduction of logos and text on packaged meat products informed customers about the production process in a very specific way, literally *screening* the product, the introduction of industrially produced and packaged bread also involved the adoption of a cultural narrative related to the social context of its emergence. As Bobrow-Strain has shown in reference to the new industrial product of 'white bread', this transformed production process was narrated and framed in terms of allegedly increased levels of hygiene. This marketing strategy centred on the claim that industrial bread, unlike the handmade bread sold in the corner-store bakeries common in the United States at that time, was produced "untouched by human hands" of "dirty people", with the new bread

[6] The phenomenon of simultaneous symbolic reduction and augmentation is addressed in greater depth in Chapter 6.

factories introduced as "sanitary bakeries" in pointed contrast to their competitors whom the new producers reviled by publishing "reprinted news reports on the 'shocking state of cellar bakeries'" (Bobrow-Strain, 2012, pp. 37–40). Importantly, as Bobrow-Strain (2012, p. 44) points out, while commercials for white bread stressed the relevance of knowing where food came from, the paradoxical consequence of this emphasis was that customers were thereby actually further distanced from actual food production processes. Indeed it could be argued that such marketing was just as much if not more about knowing where food was *not* coming from.

Historically, bread had always been produced predominantly at home and it was only in the late eighteenth century that immigrants to the United States started opening 'cellar bakeries' to make a modest living, i.e. the same bakeries that were later to be denigrated for the purpose of marketing the new 'white' bread. When industrially produced bread first appeared in the early twentieth century, the attribute of 'whiteness' was promoted not only on account of the use of white flour instead of the wholegrain flour used by the corner bakeries but also with reference to the overall 'purity' of the production process, since the new 'sanitary bakeries' were owned by 'white' long-term US citizens and introduced large laboratory-like factory settings in which the raw material was processed exclusively by machines and the final product was mechanically wrapped and sealed. From the 1920s onwards, machine-processed bread was further 'optimized' by a new design, the streamlined loaf—a perfectly rectangular loaf completely even in consistency and neatly sliced before being packaged (Bobrow-Strain, 2012, pp. 57–61).

As a result of these processes, both bread and meat, while extremely different in their original raw 'material', were now encountered in the supermarket in the very same way, i.e. as processed, evenly cut or sliced products transparently wrapped and labelled in rectangular packages. Over the next hundred years these packages became the standard format for the ever-expanding production of industrial food and the organisation of food retailing. Transforming food supply chains into operations that create and proceed exclusively with rectangular, preservative and labelled packages affords multiples advantages to enterprises. Above all, such discrete packaging shapes abstract and formalised units that are

'discontinuous' in relation to the original shape of the product or raw material. The processing of such units contributes enormously to the *continuous flow* of production and retail that is so commercially desirable in terms of profit and market expansion. Further progress in digitalisation is attained once an industrial product has been made as universally composable as possible with other products by way of abstraction, i.e. by reducing the specificity of the product in terms of its use and connotations. The more abstract these entities, the more easily such products can be fitted into culturally diverse contexts, thereby greatly increasing their sales potential—ideally to the level of universal appeal. Indeed, it is the very fact that customers can ascribe a wider range of meanings to more abstract and thus ambiguous products that enables these products to attain the ultimate exchange value, again contributing to the ideally continuous flow of sales.

A good example of a product approximating to this perfect retail unit is the well-known *Maggi* bouillon or stock cube. This product was first introduced in 1908 and has since made its way into supermarkets and grocery stores all around the world. Although Horowitz does not refer specifically to the *Maggi* cube, he does point out two aspects of food production and consumption that seem of importance to the trajectory of digitalisation highlighted here. The first point is that food production became subject to frequent scientific and technological experimentation from the beginning of the twentieth century onwards, while the second is that the cooking of meat requires "considerable skill and knowledge for dishes at the lower economic level as well as for elite repasts" (Horowitz, 2006, pp. 6, 130). The invention of the industrially produced instant bouillon cube at once reflected these scientific developments and eliminated the need for such skill and knowledge. Moreover, the stock cube further overcame the problem that fresh meat products were only rarely affordable for poor families at that time.

The original *Maggi* cube was developed in 1886 by Julius Maggi in his family-owned factory in Switzerland.[7] Its development reflected the new industrialised factory-style preparation of food that had previously

[7] All information about the history of the Maggi company is retrieved from the company's website: https://www.maggi.de/ueber-maggi/historie/. Accessed 27 November 2019.

been prepared in private households and restaurants. As in other industries, the production of the cube and other industrialised foods involved experiments with different chemical procedures that had not previously been part of food preparation. Second, when Julius Maggi first started to invent soups prepared from powdered protein-rich legumes at the end of the nineteenth century, the Maggi company insisted on its charitable intentions. According to this narrative, the new powdered soups, which only had to be dissolved in hot water like the bouillon cube, were meant to improve the nutrition of working-class people who had neither the financial means nor the time to prepare the elaborate dishes consumed by bourgeois households at that time, most of which relied on the availability of live-in cooking staff.

The original cube was developed as an industrially produced substance that substituted meat flavours previously only derived from the extract of elaborately prepared meat. As described in a consumer study of stock cubes by Kim et al., (2017, p. 1), stock cubes thereby solve the problem that preparing meat broth "is important for palatable dishes of various cuisines [but] time consuming and difficult for people who do not have professional knowledge of cooking". The new industrialised cube production process followed a newly patented formula composed of ingredients specified in precise amounts to be mixed and processed in an automated procedure. Some of these ingredients are already highly processed before mixing, as in the case of monosodium glutamate, usually referred to as 'flavour enhancer'. In this procedure, as Kim et al. (2017) further describe, the mixture is then compressed into a square mould by a cubing machine, with each unit having a precise weight ranging from four to ten grammes. The units are then wrapped and arranged in rectangular boxes of various sizes. The resulting product is not flavoursome if eaten in its raw state but can be dissolved quickly in any hot liquid.

Interestingly, the professional manufacture of bouillon cubes actually dates back much further than the industrial production of *Maggi* cubes, as described in Rebecca Spang's (2001) historical analysis of the invention of the restaurant in Paris. While the *cube* was not central to this invention, *bouillon* itself was crucial, with the stock cube only later emerging as a spin-off. As Spang (2001, p. 2) informs us, the name

'restaurant' has its origins in an abbreviation of *restaurateurs*, which was the term used for public rooms in Paris where traveling merchants were served *restorative* bouillon: "In its initial form, then, the restaurant was specifically a place one went *not* to eat, but to sit and to sip one's *restaurant*." Produced by cooking meat into a liquid state to condense the meat flavour and break down its proteins and carbohydrates for easier digestion, the new commodity of salutary bouillon was marketed as a quick means of reinvigorating merchants before they continued with their exhausting business operations, thereby further contributing to the overall flow of sales in this early form of restaurant. However, the production and consumption of bouillon in this way was initially subject to criticism. For example, this form of meat preparation was regarded as inappropriately 'augmenting' the eating experience on the grounds that bouillon served to "overstimulate the senses and provoke pernicious eating without appetite, much like pornography" (Spang, 2001, p. 82). As has happened in the case of other 'augmentations' throughout modernity, however, and as is the case with AR technology today, people eventually got used to the experience of sipping bouillon and those who could afford it now wanted to enjoy it on a regular basis. Demand for bouillon grew to such an extent that "an aristocratic family obliged to travel long distances" would go to great lengths to ensure they could have it without relying on the products of any unknown chefs they might encounter on their journey, for example by sending "their kitchen staff ahead in a post-chaise loaded with bottles of broths" (Spang, 2001, p. 29). This practice ushered in the advent of "meat-extract bouillon tablets" in the early 1760s, heralded as easy-to-carry and non-spoiling products that guaranteed safe and healthy voyages on land and sea (Spang, 2001, p. 29).

What is of particular interest here is not only that the bouillon cube can be traced back 250 years to the beginnings of industrialisation but also that the changing technologies applied in producing bouillon cubes over time have all been deeply connected with the changing socio-cultural contexts in which this product has evolved. Furthermore, while describing the technical production of the stock cube captures its digitised aspects, including its usability in many dishes independent of regional varieties of cooking styles and cuisines, the *meaning* of

the bouillon cube has changed significantly over time, further differing according to each 'receiving' culinary culture in which it has been marketed.

Soon after its introduction, the *Maggi* bouillon cube became a globally successful product of industrialised food preparation. As Maren Jütz (2013) has shown, the cube has proven extremely popular even in places where its time-saving properties do not apply. In West African countries, for example, the cube has enjoyed massive sales in spite of playing no role in reducing the time needed to prepare food, since it has never replaced the practice of cooking elaborate dishes in the cuisines of this region. In these markets the cube has instead been successfully marketed and widely interpreted as a means of 'modernizing' traditional cooking styles and optimising dishes through the use of a new material technology. *Maggi* advertisements in these countries depict cooking as an exclusively female task and emphasise that the female 'user' of the cube will be instantly rewarded by the use of stock cubes. A commercial from Mali and Senegal, for example, declares "Avec Maggi chaque femme est une étoile!" (With Maggi every woman is a star!) (Jütz, 2013, p. 357). By referring to the cube technology as *Corrige-Madame*, or 'Madam Corrector' (Grossrieder, 2017), *Maggi's* marketing even suggests a certain guarantee for the quality of the dish regardless of the competence of the cook—a promise somewhat similar to some claims made in current discussions about autonomous driving technology. Interestingly, Jütz also observes from her fieldwork that a number of NGOs in West African countries have been advocating for the cube to be abandoned in favour of a return to seasoning methods with "natural" ingredients (Jütz, 2013, p. 360). This criticism of the *Maggi* cube has some parallels with contemporary rejections of material digital technology. For example, when holiday resorts promote *digital detox* stays in exclusively offline environments where the use of all personal digital devices is forbidden, this offer is often marketed as an opportunity to reclaim a seemingly 'natural' or 'sensual' experience in welcome contrast to our 'toxic' frequent use of material digital technology in everyday life.

A study by Madhudaya Sinha from 2016, neatly entitled 'Oodles of Noodles: Nestlé India and the Maggi Consumer Nightmare', focuses on some interesting alternative cultural narratives surrounding *Maggi*

instant products in India. Her study first draws attention to the very high numbers of *Maggi* products purchased in India and seeks to account for this popularity by examining the ways in which the company's marketing strategies simultaneously draw on traditions of Indian food preparation and address concerns about contemporary social changes that compromise traditional food preparation. As in the case of *Maggi* marketing in West African countries, the marketing of these products in India is based on the expectation that it is predominantly women who prepare food regularly for the whole family, typically preparing these family meals from scratch according to elaborate recipes. At the same time, however, women in India are increasingly willing or compelled to seek employment and thus ever more likely to be subject to work schedules that interfere with their cooking chores at home. Inexpensive instant food is accordingly marketed as a way of solving this problem by saving women both time and money. Despite these perceived advantages of instant food in relation to modern lifestyles, Sinha thus argues that the factor of convenience is not sufficient of itself to explain the high sales of instant foods in India. What makes this product attractive to consumers in India, she concludes, is actually its evocations of traditional lifestyles conveyed by a marketing strategy based on narratives of Indian *traditions*. Drawing on previous studies, and in particular a study by Tulasi Srinivas (2006), Sinha assigns a number of labels to these narratives, including "'narratives of subterfuge' where the packaged food is wrapped in a home cooked authenticity" (Sinha, 2016, p. 24), and narratives of "'affiliative desire'[…] referring to food which could possibly recreate caste, regional and other social identity groupings for the cosmopolitan Indian family" (Sinha, 2016, p. 20). Such narratives must also contend with critical counter-narratives lamenting the fact that global food chains now dominate the Indian food market and questioning the nutritional value of instant food. Sinha's findings further suggest that, unlike in West African countries, the narratives employed to prompt consumers in India to use instant food do not refer to modernisation but appeal instead to tradition. Thus, while dissolving a *Maggi* cube in a West African dish connotes the use of an advanced food technology that instantly 'modernises' an otherwise traditional dish, dissolving the cube in an Indian dish means instantly adding some desirable traditional element

at a time when traditional cooking procedures are increasingly having to be abandoned in practice. As I will further demonstrate throughout this book, such narratives are an essential compliment to digitalisation, since we necessarily draw on multiple narratives of this kind in making sense of our experiences of digitalised settings and processes.

For example, the multinational *Nestlé* corporation that first acquired the *Maggi* company in 1947 has recently revived a *charitable* narrative with which to sell its instant food products.[8] As Klassen-Wigger et al. (2018, p. 363) relate the matter: "Nestlé's corporate ambition is to be the food industry leader in nutrition, health, and wellness" in line with a business model that "has been anchored on consumer nutrition and health since its foundation near 150 years ago [and] has added micronutrients to numerous foods and beverages since they became available as food and beverage ingredients early last century." The introduction of micronutrient fortification of condiments was piloted in India in 2009, Klassen-Wigger et al. (2018, p. 364) recount, "with the launch of a new seasoning powder enriched with iodine, iron, and vitamin A." These products were intended to pave the way for a "large-scale food fortification program" in response to findings from studies conducted in twelve sub-Saharan countries that no less than "79% to 99% of women reported consumption of bouillon cubes in the past 7 days" (Klassen-Wigger et al., 2018, p. 364). This evidence of the mass consumption of instant food at a time when NGOs are advocating against cubes on health grounds probably led the company to conclude "that it must help people improve their nutrition, health, and wellness as well as to deliver superior shareholder value" (Klassen-Wigger et al., p. 363). This strategy is presented by the company as a form of corporate social responsibility called 'Creating Shared Value'. While successfully sustaining sales of stock cubes and other instant products certainly contributes to the company's profits, however, it is not quite clear how the 'fortification' of an already controversial food additive serves to promote health and wellness among consumers more effectively than the alternative of gaining such nutrients from food that is not industrially processed. In any case,

[8] The multinational company Nestlé still sells bouillon cubes under the brand name *Maggi* since acquiring the rights. See: https://www.nestle.com/brands/allbrands/maggi. Accessed 4 January 2020.