

## 6. The Distributive Forces and (Digital) Capitalism: What is New?

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Following Karl Polanyi's analysis of the transformation on the buying side of the production process, and Karl Marx's analysis of value generation in the production process and the related distributive forces (Chapter 4), we turned our attention to the always inevitably crisis-prone expansive dynamics of consumption and the market. Let us now take a closer look at the selling side, where crucial changes are also underway. The selling side is assuming a new economic significance, displaying its own transformative quality. While avoiding any underestimation of the explosive nature of the new form of buying and value generation enabled through digitalisation, I will therefore concentrate on the *new (both socially and economically) transformative quality of selling*,<sup>1</sup> for the rise in global productivity also increases the pressure to ensure value realisation as early as possible and, above all, before the competition. *I consider all those technological and organisational measures and activities linked to (the safeguarding of) the realisation of surplus value as distributive forces.*

That is to say, the distributive forces are geared towards value realisation—the successful sale—and the optimisation of the corresponding processes that are hoped to shorten the time between production and sales and minimise the risk to sales more generally. In this field, profound changes were underway long before the onset of digitalisation, including the expansion of consumer credit, franchise systems, leasing plans or system catering. The development of the distributive forces is linked to a host of market-related and political measures, both at the level of the individual company and beyond. We are familiar with many of these measures from our everyday lives, as we—as consumers—are increasingly and almost constantly the target of all these activities (sometimes quite noticeably and

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1 In a world in which the driving belt of consumption is blurring the boundaries between economic and social spheres (see Bauman 2007; Hellmann, Kai-Uwe 2013) and in which, given the phenomenon of prosumption, the boundaries between production and consumption have grown equally hazy (see Blättel-Mink/Hellmann 2010; Hellmann/Schrage 2005), the question is no longer whether this transforming force is affecting the economy or society—the transformation deserves its name precisely because its effects are not limited to just one sphere.

obviously so, yet mostly in an only intuitively perceived and concealed way). They include:

- measures towards the stimulation and maintenance of consumer motivation (planned obsolescence, marketing, advertising, nudging);
- measures towards the more accurate prediction of consumer needs/preferences and practices as well as changes thereof;
- measures towards the repeated obligation to purchase for use rather than for personal acquisition (Software as a Service, subscription models, streaming services);
- expansion of sales channels and opportunities for sales (in order to establish contact with consumers willing to buy more quickly, in greater numbers and on the greatest possible geographic scale);
- increase in efficiency and efficacy of individual sales processes;
- increase in the efficiency and efficacy of logistical processes on the selling side.

Much like the productive forces, the distributive forces are not limited to the business and market spheres, but contingent on certain social and national economic measures that entail specific consequences, such as:

- political measures for the promotion and maintenance of the capacity for consumption (despite stagnant real wages; e.g. via the subsidising of energy in order to reduce transport costs and, simultaneously, use of global wage differentials);
- political measures towards market expansion and safeguarding the preconditions for sales (free trade, non-regulation, the privatisation of public data);
- consumption as an increasingly relevant aspect of society and social practices;
- discursive equation of innovation with market success instead of social progress, and the positive reinterpretation of disruption;
- differentiation, specialisation, professionalisation and scientification of the professions and fields of knowledge geared towards value realisation;
- quantitative increase in the activities (e.g. search engine optimisation), professions (e.g. in marketing) and business models (e.g. services for the data-based tracking of the so-called customer experience across several websites) geared towards value realisation;
- increase in spending on science and research related to the distributive forces.

This initial cursory and invariably inexhaustive list shows that the distributive forces encompass *the totality of institutionalised processes of sales and sales promotion*, which are only conceivable in combination with a mode of production that

is dependent on realising the produced surplus value on the market at all costs (see Chapter 5): *alongside the competition between manufacturing companies for the most cost-effective production technique and the constant need for the maintenance or, better yet, increase of value generation, an intensified battle for the pole position on sales markets has ensued.*

At the heart of all these efforts is the actual sale. At the level of the national economy, this act increasingly becomes an economic necessity for capitalism and, at the same time, the inescapable prime objective of all business actions. As is the case with production, however, the investments that enable sales are not free of charge, let alone free of human labour. As his economic gaze does not stop at production nor at the factory gate (i.e. *inside* the factory walls), Karl Marx also sees this. He condenses all these costs in the concept of the circulation costs (on this, see also Chapter 7.1):

“All these costs are incurred not in producing the use value of commodities, but in realising their value. They are pure costs of circulation. They do not enter into the immediate process of production, but since they are part of the process of circulation they are also part of the total process of reproduction.” (Marx 1998: 288)

So, once sales become ever more important for each (over-)producing company, the costs for businesses to boost sales, or consumption, rise. Here, too, processes and methods are permanently improved and overhauled. These distributive forces can be distinguished at three different levels: firstly, *advertising and marketing* (Chapter 6.1)—i.e. all efforts and expenditures aimed directly at value realisation in terms of consumption and the market; secondly, *transport and warehousing* (Chapter 6.2)—i.e. all efforts and expenditures aimed at ensuring the physical access to markets and value realisation; and, thirdly, *control and prediction* (Chapter 6.3)—i.e. all efforts and expenditures aimed at documenting the processes of value generation (production) and value realisation (distribution), rendering them predictable, depicting them in exact figures and representing them as controllable and increasingly predictable in all circulation movements. This third level thus also captures the other two, linking up all three. All levels are closely connected, often develop in relation to one another—in the sense of technical and organisational collaborations and a division of labour—and, at any rate, in direct mutual interdependence. Seeing as they are indispensable for an understanding of what is new about digital capitalism, I will address them in separate analyses in the following. To begin, I will illustrate each level with regard to changes and dynamics that have taken place over the past decades, the ways in which they have, so to speak, paved the way for the development of the distributive forces, and thus—if you will—created the (economically, particularly promising) points of contact for what we currently refer to as digital capitalism (Chapter 6.4).

## 6.1 The distributive force ‘advertising and marketing’

Advertising and marketing emerged long before the Internet and were already becoming increasingly important years before the World Wide Web. Likewise, data have always been used, as a glance at recent history reveals. However, the historiography of marketing is fairly young and there is persisting disagreement on many issues. For example, there is controversy concerning how influential new technologies are, when exactly marketing was invented and by whom, and when the history of marketing began (with some tracing its origins back as far as the Middle Ages) (Berghoff et al. 2012: 2–3). What is undisputed, then, is that marketing became visible and successful from the 1890s onward. At the time, there were already lectures available on the topic and, from 1902, the first advanced trainings in marketing were being offered (see *ibid.*: 3).

It is probably no coincidence that the specific evolution of capitalism entailed the emergence of advertising and marketing. In the early days, however, it actually denoted far more than just pitching a product. A historical study of the development of marketing between the 1920s and the 1970s notes even for the beginning of this period that the market was increasingly abandoning the idea “of educating people on how to make use of new products”; Instead, the task at hand was more and more “to touch the consumer emotionally” and “to reach consumers at the level of their unconscious wishes.” (Logemann et al. 2019: 3). The common specialist term for this is *consumer engineering*. It appears hip and modern, but was in fact already coined by one of the pioneers of marketing, Earnest Elmo Calkins, as early as 1930—interestingly, and not unintentionally, during the Great Depression—and subsequently described and refined in a book by his agency’s staff (Sheldon/Arens 1976). The stated goal—and, simultaneously, advice to businesses on how to safely navigate the Great Depression—was ‘[to] engineer a supply of consumers’ (*ibid.*: 55). The authors already emphasise the importance of conducting systematic market research and applying scientific methods from the field of psychology, using the term ‘humaneering’ in this context (*ibid.*: 95–96). That is to say, the overabundance of goods is to be counteracted with a sufficient and, as far as possible, never-ending flow of willing consumers, which in turn has to be proactively created.

The concept of ‘paying’ with data has also been around for some time. Another historical investigation into marketing demonstrates that the dream of “tracking individual consumers and delivering perfectly tailored and timed promotional messages” (Lauer 2012: 145) existed long before Big Data or Machine Learning entered the stage. As early as the 1920s, this vision was encapsulated by the term ‘customer control’ (*ibid.*). Technologies geared towards this customer control were initially linked up rather coincidentally with the field of credit management, though this process was accelerated once the strategic use was recognised.

Between 1880 and 1920, there was a sharp rise in the number of consumer loans in the United States. Access to such credits was increasingly tied to the disclosure and collection of numerous data about credit seekers that were then used for target marketing (see *ibid.*: 155–156). From the 1960s, marketing methods were able to harness information technology, while the 1970s, starting with the introduction of the barcode, marked the beginning of data mining (see Berghoff et al. 2012: 5).

Another historical study (Logemann 2019) focuses on the links between Europe and the US and the development of ‘consumer engineering’. At the heart of this investigation are people who emigrated from Europe to the US during the Nazi era and used their academic expertise in the subjects of psychology or arts and design to contribute to the professionalisation of marketing, only to bring these techniques back to Europe upon returning there after the end of the war. The study does not stop with these exciting biographies, but uses them as a starting point to analyse the development of consumer capitalism in the United States in the middle of the last century. While most investigations concerning this period are limited to Fordist phenomena and mass production as well as the complementary Keynesian policies geared towards consumer-driven growth, the study contends, the marketing side remains largely unstudied: “The equally important marketing side of this phenomenon, however, remains less explored, aside from a substantial historiography on the development of advertising.” (*ibid.*: 5) Yet the historian Jan Logemann traces the ways in which producers of consumer articles and retailers adjusted their strategies to this consumer capitalism and the role which market research, consumer psychology and commercial design played in the process.

This brief historical recap is intended to underscore three aspects: firstly, it is clear that the idea of mapping consumers and rendering their behaviour predictable and (better yet) manipulable and controllable is not simply the result of a coincidentally developed discipline or field of work that is somehow becoming increasingly professionalised. The significance and dynamics of marketing are rather closely tied to the development of capitalism and its structural framework conditions. Secondly, the historical analyses already indicate that the increasing importance of marketing on the distribution side is systematically linked to the realities on the production side (overproduction and crisis). And, thirdly, we have seen that ‘consumer engineering’ draws on the respectively available state of knowledge and technology, with data and the Immaterial always having assumed a central role—given that the task at hand, from the outset, has been the reductive quantification (and the prediction, as accurately as possible, of a purchase) of qualitative aspects (namely complex emotional and material reasons as well as biographical and lifeworldly conditions for the appropriation of use values). In his reflections titled “Capital goes to Market”, David Harvey also addresses the considerable advertising effort undertaken to secure potential markets: “An immense

amount of effort, including the formation of a vast advertising industry has been put into influencing and manipulating wants, needs and desires of human populations to ensure a potential market.” (Harvey 2011b: 106) Some 70 per cent of the US economy is based on consumption, according to Harvey (*ibid.*: 107). Furthermore, Harvey considers the constant creation of new needs to not only represent a crucial precondition for continuously growing capital accumulation, but as absolutely essential for capitalism’s survival (*ibid.*).

The fact that the willingness to invest in advertising has long remained remarkably high can be unequivocally and empirically verified: German businesses spent around €35 billion on advertising in 2019, which corresponds to just over one per cent of GDP. At first glance, this may appear negligibly small, but this figure stood at only 0.84 per cent in 2015. In other words, the GDP share of advertising rose by more than 20 per cent in just four years (see ZAW 2020), after it had declined by 23.5 per cent (from 0.85 per cent to 0.65 per cent) (ZAW 2018: 9) in the two preceding decades (1995 to 2014). Although this decline is not explained in any greater detail in a brief study by the Association of the German Advertising Industry (ZAW—*Zentralverband der Werbewirtschaft*), it is likely related to two events: the bursting of the dot-com bubble in 2000 and the financial crisis in 2008. The World Advertising Research Center (WARC) has noted a 12.7 per cent decline in global advertising spending for the period following the financial crisis, and, given the ongoing crisis caused by the pandemic, is predicting a renewed drop of 8.1 per cent (see WARC 2020).

With regard to Germany, the German Institute for Economic Research (DIW—*Deutsches Institut für Wirtschaftsforschung*) has investigated the micro- and macro-economic significance of advertising. According to its findings, a rise in advertising spending of one per cent of GDP elicits a growth impulse of about 0.02 per cent on average (see Horch et al. 2016: 61). Furthermore, the study’s authors state, a positive trend between advertising and product quality (see *ibid.*: 8–17) and between advertising and innovation (see *ibid.*: 17–28) can be confirmed.<sup>2</sup> Whether or not one concludes that such a causality exists, the numbers certainly indicate that companies are willing to make substantial and rising investments in advertising—including in conventional ads. And this is the case even though the effects of advertising on a given national economy can hardly be measured. This discrepancy between high and rising investments and a negligible Return on Investment

2 When, for example, the brand names of TVs, winter tyres or digital cameras are more intensely advertised, the respective products score higher in independent product reviews (Horch et al. 2016: 17). However, the evaluations of these two statements are purely descriptive and can therefore be drawn on neither with regard to the reliability of a supposed link nor to the direction of any possible causality. An OLS regression, moreover, shows that those industries with the highest expenditure on brand advertising (such as the pharmaceutical, electronics and automotive sectors) also exhibit the highest rate of innovation.

(RoI) can be justified at the individual company level with only two arguments: on the one hand, there is the (in some cases, certainly reasonable) hope that one's own advertising investments will be ultimately redeemed; on the other hand, there is the (simultaneous) pressure to act in order to realise on the market—at all costs—whatever has been overabundantly produced. So, we find a discrepancy and a pressure to act that are not decreasing in the digital variant of capitalism but doubling: while in the past businesses used advertising to *successfully compete for customers' attention*, today, in the context of digitalisation, the task at hand is to *successfully compete for access to the attention* of potential consumers. For example, the German 'Adtech' industry is complaining about the tendency of browsers such as Firefox or Chrome to no longer allow third-party cookies<sup>3</sup> and thus create so-called *walled gardens*, and about the login, i.e. black box strategies pursued by Facebook and Google (see Pilot 2020: 17–18). In order to counteract this 'data dominance', companies' own websites would have to register the relevant user numbers in order to compile their own datasets, reach more people and evaluate their data. The aim is, according to Pilot, to "to form a counterweight by becoming an identity service provider" (ibid.: 18; translation amended). In Germany, companies like

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3 It may seem difficult to imagine these days, but the Internet, which is today the enabler of gigantic world-spanning business models, was initially conceived as a decidedly non-commercial device (on this, see Chapter 2.1 and Schiller 2014: 73–82). In technical terms, the 'cookie' represents the crucial step into the era of the commercialised Internet as we know it today. After it was quietly integrated into the Netscape browser in 1994, Tim Jackson (1996) was probably among the first to recognise the potential of the cookie and only two years later, he addressed the dramatic impact a corresponding type of marketing could have on individual privacy. In the original specification of state and session cookies (Kristol/Montulli 1997), third-party cookies, interestingly, were still excluded, meaning they would, from today's perspective, comply with the requirements of General Data Protection Regulations (GDPR), as Thomas Baekdal (2019) has noted in a blog article on the history of the cookie, from which some of the references cited here have been taken. If we take a look at the specification given at the time, third-party cookies, as Baekdal's post may be interpreted, are not addressed explicitly. What is specified, by contrast, is a whole range of guidelines concerning the conditions hosts must meet in order to be permitted to exchange cookies between one another—and these guidelines effectively rule out any third-party use: "Note that domain-match is not a commutative operation: a.b.c.com domain matches c.com, but not the reverse." (Kristol/Montulli 1997: 1) Given that browser cookies, just like so-called browser fingerprinting (the identification of a computer through a specific configuration of hardware and software, installed scripts, etc.) can be circumvented by way of browser settings and add-ons, Google started using a unique installation ID as a third tracking method from version 54 of its Chrome browser. As was discovered in the source code more recently (see Magic Lasso Adblock 2020), this personal ID (in the header under 'x-client-data') is sent to Google each time a Google entity is used somewhere online—including when other websites have integrated Google services (such as captchas, texts, scripts). Seeing as this is the case with just about every website, Google thus has access to unprecedented exclusive data on individual online user behaviour through a system that is hardly consistent with GDPR standards (ibid.).

Allianz, Daimler, Springer, Deutsche Bank, the Federal Printing Office (*Bundesdruckerei*), Deutsche Telekom and Lufthansa (Verimi), or the RTL Germany Media Group, ProSiebenSat.1 Media and United Internet (netID) have formed such data alliances (see *ibid.*). Another example is the company Ad Alliance, a so-called cross platform that represents other major TV, print, online and mobile media partners, offering ‘special cross-platform campaigns’ and ‘performance and influencer marketing’ as well as data-based advertising. Taken together, the platforms marketed by Ad Alliance—as runs the self-promotion—reach some 99 per cent of the German population (see Ad Alliance 2020).

Advertising and marketing are thus no longer in the hands of local creative agencies and their small-scale business models, likeable web designers or nerdy, freelance search engine optimisers. Advertising and marketing have, above all and increasingly, become the business of major corporations and their business associations. They include, as the examples from Germany illustrate, not only the big names from Silicon Valley, but also the ‘familiar faces’. Yet there are also new advertising platforms that are fairly unknown outside the industry, such as the French company Criteo. With a workforce of just 2,700 and a 2.9 per cent market share of what is called (behavioural) retargeting<sup>4</sup>—albeit relying, in technical terms, entirely on the phase-out model of third-party cookies—the company ranks fourth behind Facebook Web Custom Audiences, Google Dynamic Remarketing and Google Remarketing (see Datanyze 2020).

Advertising and marketing are increasingly important to manufacturing companies. This applies all the more to digital advertising: in 2018, global spending for ad software amounted to \$16 billion (see Boehm et al. 2019: 4). What has proven to be a billion-dollar business for some companies can deal a real blow to others in terms of circulation costs. In order to avoid having to transfer these costs entirely to the price of the good that is to be sold (which would, in turn, diminish the chances of that sale), digital advertising must follow the same path as production before it (which the latter continues to pursue): automation, optimisation, rationalisation—the increase of the generated surplus value (per campaign or cost per mille). All of this is only possible if the productive forces are unleashed that are directed at this area of circulation—and which I refer to as distributive forces precisely for this reason. Once again, we are dealing with an economically substantiated dynamic resulting from the logic and development stage of capitalism, in which digitalisation is not the cause, but an accelerator at most, and above all a

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4 Retargeting or remarketing are employed, for example, when people have looked at certain products in an online shop or even placed them in their shopping cart but not yet made a purchase. Through this form of tracking, a web user's attention is repeatedly directed to precisely these products, even when accessing entirely different websites.



means of production (or, more precisely, a means of distribution) that has become more relevant.

In the process, the Digital acts as the very platform on which advertising and the correspondingly pursued purchase and sale take place; alongside computers, tablets and smart phones, this increasingly also includes smart language assistants such as Alexa from Amazon, Siri from Apple, Cortana from Microsoft, Bixby from Samsung and Google Assistant.

Yet the Digital also allows for the permanent optimisation and rationalisation of advertising and thus particularly for programmatic advertising, i.e. highly diverse forms of automated advertising. As a study by Deloitte shows, some 65 per cent of worldwide ad spending in 2019 was conducted in a 'programmatic' form. Furthermore, this study emphasises that such automated processes are increasingly replacing human expertise in the placing of ads (Boehm et al. 2019: 4). Here, too, human labour power is being displaced. However, that is not all that algorithms are used for. The advertisers themselves are coming under increasing pressure, too. Besides Amazon, Facebook and Google, who seek to sell their digital advertising expertise, there are hundreds of start-ups competing for the attention of manufacturing enterprises willing to spend on advertising. What used to be advertising sales for TV ads or daily newspapers can today be done by an algorithm. Buying and selling are automated; digital auctions are used to adjust advertising prices in a matter of seconds to reflect supply and demand at a given point in time. We will look at the related business models at a later point (Chapters 8.1 and 8.2).

## 6.2 The distributive force 'transport and warehousing'

In the Marxian sense, circulation costs are not only made up of spending on advertising and marketing, but also on warehousing, transport and packaging, shop fittings and sales floors, trade fair booths and distribution structures and so on and so forth. Usually, the costs of logistics denote, in the narrower sense, the spending on warehousing, transport, commissioning and handling. The latter's share of GDP amounts to less than 10 per cent in countries with sophisticated logistics capabilities: for example, in 2018, the United States recorded the lowest logistics costs as a share of GDP (8 per cent). At 8.8 per cent, Germany ranks ninth. By comparison, China is already trailing far behind at 14.5 per cent, but Indonesia has the highest share at 22 per cent (see DVZ 2019; databases used: Armstrong & Associates and World Economic Forum). If we consider data on the 50 listed countries in detail, we find that 27 of them (or 54 per cent) are ranked between the top value of 8 per cent and the 10 per cent that is still regarded as an indicator of reasonable logistical capability (among which, by the way, there are no South Ameri-

can or African countries). In Karl Marx's eyes, there may well be a real generation of value during transport if the relocation of the product is required in order for the use value to be brought to bear and if this relocation involves the performance of human labour:

"Quantities of products are not increased by transportation. Nor, with a few exceptions, is the possible alteration of their natural qualities, brought about by transportation, an intentional useful effect; it is rather an unavoidable evil. But the use value of things is realised only in their consumption, and their consumption may necessitate a change of location of these things, hence may require an additional process of production, in the transport industry. The productive capital invested in this industry imparts value to the transported products, partly by transferring value from the means of transportation, partly by adding value through the labour performed in transport. This last-named increment of value splits, as it does in all capitalist production, into a replacement of wages and into surplus value." (Marx 1997: 153–154)

In other words, there is a certain added value in its own right that arises during the transport to the place of consumption. Marx ultimately considers this process as production and an act of value generation. This step in the production process adds another value to the commodity's original value—and is, at the same time, indispensable for value realisation. Wherever surplus value is generated, it can be expected that efforts will be made to keep the costs of human labour as low as possible. One only needs to look to automated high-rack warehouses, perfected workflows in distribution centres operated by haulage companies or package delivery services, efforts to implement autonomous driving technology in commercial vehicles and vans or last-mile<sup>5</sup> delivery solutions using drones: all these activities follow the logic of cost reduction or, as Marx would have put it, surplus value increase. Yet technological developments are not the only factors affecting transport-related surplus value. Added to this are struggles over the applicability of distinct collective bargaining agreements at Amazon, for example, which is ultimately down to the classification of employees as retail versus logistics workers (and receiving wages that differ according to separate collective bargaining agreements, as is the case at Amazon in Germany), the lobbying efforts of transport companies when it comes to political decisions pertaining to the maximum

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5 Following the 'break-bulk point', at which large homogenous supply volumes are split up into smaller ones, the so-called last mile, i.e. the last segment of the transport route to the 'point of sale', is considered to be particularly cost-intensive (see Brabänder 2020). Generally, the depiction of this context in Christian Brabänder's book on logistics controlling is certainly helpful to get an idea of the complexity of the structures in the business.

legal number of driving hours per day, bans on night-time shipping, the permitted size of commercial vehicles or the subsidisation of jet fuel.

This diversity of measures may seem confusing as they concern an additive and not the actual product. Intuitively, one may assume that transport costs are for the most part smaller than the value of the product. Yet this has long changed given the global scale of capitalism. Let us take an example: a 20 foot (or 6.1 m) shipping container holds about 41,250 T-shirts<sup>6</sup>; the ocean freight charge from China to Germany varies between €550 and €1,000, depending on the website used to calculate shipping costs.<sup>7</sup> This translates into a maximum surcharge per T-shirt of €0.024 (although further warehousing and transport costs do accrue before and after ocean freight shipping). This sounds like a very small sum when assuming a sales price per T-shirt of €20–30. The whole equation is jumbled up, however, if the production costs even for a T-shirt produced in the US instead of China are only about \$3 (or €2.60) (Brunner 2015: 291; based on the example of American Apparel). The scale of transport-related circulation costs that are generated on the world's oceans each day becomes clear when taking into account that there are more than 6,000 cargo ships currently in operation—with over 23 billion containers (see Alphaliner 2020).<sup>8</sup> Such a vast fleet of cargo ships and such low shipping costs can, of course, only be maintained if the endless flow of goods continues reliably. It is the only way to avoid empty or below-capacity trips. And again, we find the need for a constant growth of the volume of goods. The development of the distributive forces, in its own intrinsic economic logic, thus acts as a driver of growth and overproduction, which in turn further propels general, inevitable capitalist overproduction. This is another reason to analytically engage with the development of the distributive forces as a dynamic in its own right.

Besides maritime shipping, air freight also plays a major role on global transport routes. And, of course, the numbers in this field are just as shockingly impressive as ecologically disconcerting: in 2017, some 62 million tons of cargo at a value of \$6 trillion (€5.01 trillion) were transported over a total distance of 255 billion kilometres by air. At the same time, air freight accounts for only 0.5 per cent of cargo shipping worldwide in terms of volume—but almost 35 per cent of

6 A standard ocean shipping container has a volume of 33 cubic metres. Assuming a T-shirt pack size of 20 x 20 x 2 centimetres, one cubic metre alone could be filled with as many as 25 (surface area) by 50 (height) T-shirts, i.e. a total of 1,250, which sums up to 41.250 T-shirts for one container.

7 Based on my own research conducted in September 2020, among others, on freightfinders.com or worldfreightrates.com. The prices indicated on the websites, which are obviously also intended as a teaser and a way of collecting contact data, can therefore not be compared to a real quotation, but still provide a rough idea of the price range.

8 By comparison, there are 426 ocean cruise ships—which have come under (certainly legitimate) criticism for their ecological footprint—in operation worldwide (Oppermann/Oppermann 2020; as of June 2020).

transported values are shipped by air (see ATAG 2018: 8). The Air Transport Action Group (ATAG) is cautiously optimistic about the future, but somewhat sceptical as to whether the trend towards a doubling of air traffic (including passenger traffic) every 15 years will continue in the future (see *ibid.*: 76).

As we can see, the distribution-related industries engender their own overproduction, and, indeed, must do so, regardless of whether viewed from a Marxian analytical viewpoint or simply attributed to shareholder interests. Companies do not simply react to the actually accruing transport volumes of other companies (be this B2B, e.g. in the case of just-in-time deliveries or to a given point of sale, or B2C in the case of courier or express delivery services along the last mile to the end customer), but act, as any other company, on the production side: they overproduce, reduce costs, replace human labour wherever possible, they create incentives for buying, or rather, in this case, for transport and try to assert themselves vis-à-vis the competition. This means they also have a rebound effect inside the manufacturing industries: when transport costs decrease, the desire to produce and/or sell on other markets increases. Overproduction in this sector, of course, cannot be gauged by piece rates, but by unused freight volume. For example, in air freight, only 49 per cent—less than half—of the available ton-kilometres are used (see IATA 2019: 17).

On a regional, or non-global scale, too, freight volumes and the competition for freight goods are increasing. In Germany, for example, road-bound freight is by far the most used (comprising 71 per cent of transported goods), followed by rail cargo (19 per cent) and inland navigation (7 per cent) (see Allianz pro Schiene 2020). In total, Germany's goods transport amounted to around 707 billion ton-kilometres in 2018, the bulk of which was carried out by commercial vehicles on roads (510 billion ton-kilometres). In the same year, the logistics industry, with its 605,730 strong workforce, saw a turnover of €112 billion. Furthermore, the turnover and employment curves have been moving steadily upward since 2003 (with the exception of a dip during the financial crisis). According to the German National Association of Transport and Logistics (DSLVL—Bundesverband Spedition und Logistik), the umbrella organisation of the seven German logistics associations, there was unusual growth in the size of the labour forces of almost 5 per cent between 2017 and 2018 (see DSLVL 2019: 4–5). A more in-depth look at the numbers contained in the annual report of the DSLVL reveals that transport is either unable to keep pace with the overproduction of goods, or falls prey to the miniaturisation of products, or—and this is the most likely explanation—the global division of labour leads to much of the generated transport revenue appearing on the books of other countries. While German exports grew by 3 per cent and imports by almost 6 per cent between 2017 and 2018, setting a new record value for foreign trade, the industry seems to have benefited only rather modestly: during that same period, overall

goods traffic grew by 1.2 per cent, and the turnover of the transport and logistics industry by just under 4 per cent (see *ibid.*).

Wherever goods are being transported, warehousing capacity is needed, and storage spaces and warehousing have long become a business model in their own right. From the classic real estate business—i.e. the brokering, sale or letting of spaces—to full-service providers ranging from location scouting via ready-to-use high-rack warehouses equipped with sorting technology and loading docks, etc., to leasing and operator models. While the battle for ever decreasing space for industrial estates, warehouses and residential areas is intensifying in densely developed urban environments and any further sealing of the soil surface ought to be avoided for ecological reasons,<sup>9</sup> the need for warehousing space is growing unrelentingly and has further increased due to the needs of e-commerce and platform-based delivery services. And it is certainly not enough to consider only Amazon, even though the company has recently leased millions of square metres of warehousing space in New York. However, the industry estimates a total increase in demand of 93 million square metres of warehouse capacity in the United States by 2025, plus another 9.5 million square metres solely for facilities with cooling systems (see GTAI 2020). By comparison, Germany's warehousing capacity amounted to 6.9 million square metres in 2019, up from only 1.9 million square metres in 2003 (see Statista/BNP Paribas Real Estate 2020).

This brief overview in numbers provides only a vague indication of the extent to which the distributive force transport and warehousing has developed and becomes the indispensable enabler of global value chains and networks and of the interlinkage of production sites and consumer locations. Furthermore, over past decades an increasing differentiation, specialisation and technological optimisation has taken place, relating to hardware (e.g. faster cargo ships, the standardisation of shipping containers or elaborate loading techniques), and, from the 1970s onward, also in terms of space or surface area. The basis for all these processes and their global pace was computerisation. The fact that this system was already in place is the only reason that the more recent digital business models—from e-commerce and the precarious, self-employed delivery driver to data-driven utilisation rate prediction and blockchain-controlled supply chains—are able to link up so smoothly with existing structures (or at least promise their venture capital investors to be able to do so; see also Chapter 8).

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9 However, the sealing of the soil surface continues: in Germany, the total settlement and traffic area (STA) grew by 13.4 per cent between 2000 and 2018, amounting to some 5,880 square kilometres; as a category of land use, it ranks third after agricultural and forest areas, accounting for 14.3 per cent. However, the STA also includes recreational spaces and cemeteries—i.e. not only sealed surface areas—alongside residential, public, commercial and traffic areas.

We will return to the more recent developments later. At this point, we can establish one important aspect worth remembering that is related to the distributive force transport and warehousing, too: what is a business model to some, constitutes—albeit essential—circulation costs to others. Marx distinguishes between two types of costs:

“The express company owner, the railway director, and the shipowner, are not ‘merchants’. The costs which we consider here are those of buying and selling. We have already remarked earlier that these resolve themselves into accounting, book-keeping, marketing, correspondence, etc. The constant capital required for this purpose consists of offices, paper, postage, etc. The other costs break up into variable capital advanced for the employment of mercantile wage workers. (Expressage, transport costs, advances for customs duties, etc., may partly be considered as being advanced by the merchant in purchasing commodities and thus enter the purchase price as far as he is concerned.)” (Marx 1998: 287–288)

Here, we already encounter an initial link to the distributive force control and prediction considered next (Chapter 6.3). Yet before we turn away from the express company owner and transport costs and move to the merchant’s core toolkit—mathematics and accounting—a glance at the *hidden circulation costs* in the context of transport and warehousing seems worthwhile. After all, the global or the national economic perspective on transport and warehousing between businesses and the market are one thing, the circulation costs for an individual company are certainly another. The logistics companies necessarily require an IT-based representation of these highly complex processes—not only in order to control them and maintain their frictionless operation despite all kinds of disruptions that may occur (as a result of trade conflicts, weather conditions, strikes, technical problems or damaged goods), but also in order to optimise processes, minimise buffers and maximise capacity utilisation, while constantly being on the lookout for any potential for further optimisation and cost reduction. All these activities can also be found—albeit on a smaller scale—within companies that do not belong to the logistics industry, but whose two ‘ends’, namely procurement and distribution, are tied to the value chain nonetheless. They cannot help but physically move their internal logistics based on numbers. The question of where logistics ends and production starts, where the one stops and intra-logistics begins, is ultimately often a matter of arbitrary or evolved decisions determined by the job description or assigned department. The processes themselves, however—and that is the goal of any optimisation—are, effectively, closely and inextricably interwoven.

As a result, then, the analytical separation becomes more difficult. For example, expenditures for procurement (e.g. for the evaluation of suppliers) facilitates circulation, firstly, and, secondly, they are functionally necessary for a system

of mass production with differentiated supply chains, organised as networks of just-in-time production, thus becoming indispensable for a frictionless value generation in production. Beyond this, there are numerous hidden circulation costs. Just trying to imagine the range of in-house and cross-company processes that ultimately represent costs of circulation rather than production is dizzying. Often enough, one cannot even be separated from the other, which, in the context of advancing digitalisation, applies especially with regard to the specific functional distinction.

If, for instance—and this example is a much-cited scenario in the Industry 4.0 discourse—production-related processes are optimised to the point at which it becomes possible to respond to market requirements in the most flexible way possible (batch size 1), as quickly as possible (on demand)<sup>10</sup> and as specifically tailored to customer preferences as possible (personalised), this then has an impact on the tasks and processes in production and is economically classified (both at the individual company and the national level) as production costs. Upon closer examination, however, a major part of this (except for, at least in part, the personalised use value) turns out to be circulation costs; this reorganisation on the inside primarily pursues one goal: to realise the value on the outside—i.e. the market—and to do so faster and more accurately than the competition. Besides digitalisation, there are also other strategies to deal with these kinds of hidden circulation costs emerging within or in combination with production, which are applied both at the national economy and company level.

At the *level of the national economy*, the hidden impact of circulation costs is, for the most part, completely underestimated. This is evidenced, for example, by economies that do not wish to simply emulate the production-based industrialisation of the advanced capitalist countries, but rather seek to skip this stage and invest in the development of IT-based service industries: a study that investigates India, the Philippines and Kenya finds that the economic impulses in these countries aim primarily at value generation rather than value realisation (Kleibert/Mann 2020). Conversely, it becomes clear that only combined circulation and production strategies offer any real long-term prospects. The reason is that those countries that have tended to pursue the economic path of providing routine tasks

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10 I am intentionally trying to avoid the term 'real time', a technical term that is often so naïvely adopted by social science, yet which would not only be factually inaccurate in this context, but also is often misunderstood to be synonymous with 'extremely fast' (say, in the area of milli- or nanoseconds). According to the corresponding German technical standard (DIN 44300), however, it only means that a certain period is stipulated which, depending on the specific case of application and technical setting, can be very short, but may also take several hours, and for which a certain reaction, besides the time interval, is just as relevant as the extent of 'hardness' or 'softness' of the stipulation, that is to say, which tolerance of deviation is permitted without any disruption occurring (Filler 2019: 24–25).



are prevented from any meaningful technological upgrading that would allow them to reduce production costs and develop independent strategies towards value realisation. Instead of this strategy, which Jana Kleibert and Laura Mann refer to as “indigenous coupling” (ibid.: 1065), the newly created job opportunities are immediately threatened once again by IT-guided measures towards efficiency increases such as Robotic Process Automation (RPA) or Business Process as a Software (BPaaS) (see ibid.).

At the *level of the individual company*, there seems to be an inclination to follow the strategy of hiding circulation costs, for example, by increasing the number of variants through a sophisticated modularised product design. Although this adds to the costs of development and production, these are still lower than in the case of a broad range of variants without modularisation. Given that this measure ensures that even the most unique designs can be realised if the customer so wishes, we are dealing with a share of circulation costs that can hardly be deducted from production costs in economic terms. This can have a significant impact on value realisation, if, for instance, a customer's desire for pale-yellow coating is combined with a preference for purple leather seats and unique preferences can be catered to, and—better yet—if competing companies are unable to produce this specific variant. The scaling of such variety made possible by modularisation can be immense. Based on the available derivatives and equipment variations, a car manufacturer may well produce more than 1,000 different variants of a vehicle in just one year (see Tripp 2019, p. 38). Of course, production scheduling and intra-logistics can cope with such a material differentiation only if these variants (and their operational documentation and coordination) can also be registered and controlled via IT systems. At the same time, it seems likely that customers who have such an exotic request for pale yellow and purple will find it more difficult in future to acquire such special products: based on these data and aided by Machine Learning, the system will calculate that this request is so rare that keeping pale yellow lacquer and purple leather in stock represents avoidable operational costs (or costs that can be outsourced, in the sense of a business risk, to suppliers).

This is just one of many examples in which the need for surplus value realisation and for reducing circulation costs come into conflict with one another, which is not only interesting analytically, but something businesses have to deal with in specific ways. This is another reason why they require ever-more sophisticated digital solutions (which, again, produce additional costs) in order to balance the two extremes as far as possible based on scenario planning and model calculations. We have also seen just how closely the different distributive forces are actually interwoven in the real world and, in particular, how transport and warehousing as well as advertising and marketing are characterised by an increasingly tight-knit coupling (see Chapter 6.1). Their interplay must not only be physically orchestrated in real, tangible terms, but indeed proactively managed, and their



smooth continuous operation has to be ensured to the greatest possible extent. Only this way can the cycle of commodity production and value generation on the one hand, and commodity consumption and value realisation on the other be guaranteed. And yet, this is the very precondition of economic circulation, which turns commodities into capital. The interplay of circulation and the coordination of the distributive forces we have considered here, necessitates a third level of distributive forces: control and prediction. Over the course of capitalism's development, this has also become a distributive force in its own right—or, in other words, a facet of the productive forces whose inherent logic and dynamic justify a separate analytical investigation. The origin of their circulation costs, which are becoming increasingly visible, lies in the obsession with representing all actual processes in numbers—be it with regard to real input/output relations between two economic sectors at the level of the national economy, or concerning the exact production numbers pertaining to ‘plastic frame X’ within a given company.

### 6.3 The distributive force ‘control and prediction’

What is today captured by statistics used by national account systems (NAS), or in no less complex corporate controlling systems, has its roots in accounting and initially emerged not to control or even predict production and commodity flows, but to illustrate the results thereof. Historically, it was more a matter of catering to the economic interests of third parties (e.g. the tax requests of a monarch) or to detect such interests (e.g. the creative ideas of trade intermediaries who were stealing goods). Early forms of accounting relied on personal trust and could thus only work in small structures: simple bookkeeping “kept firms small. Basically, a tiny group you could trust.” Larger structures and transactions, by contrast, “were open to large-scale fraud.” (Walshaw 2019: 4) That is why double entry bookkeeping was invented: the earliest evidence of its use can be traced to a Florentine bank in the year 1211, although similar approaches had already existed before then in the Arabian world and India (see *ibid.*). Jane Gleeson-White also dates the beginning of double entry accounting to around the year 1300, when it was employed by the banks of late-medieval Florence (see 2013: 20), and contends that its precursors can be found as early as 7000 BC. She refers to accounting as our very first communication technology and essentially an anthropological constant: “Our urge to account—to measure and record our wealth—is one of the oldest human impulses.” (*ibid.*: 11–12)<sup>11</sup>

11 However, double entry accounting is mostly attributed to the mathematician Luca Pacioli, who, alongside texts and books on other mathematical topics, wrote a treatment on accounting in

Gleeson-White offers an impressive historical account of how the Venetian iteration of double entry accounting went ‘viral’ (see *ibid.*: 115–132), but explains that it widely asserted itself only with the onset of industrial capitalism, indeed leading to a dedicated profession in its own right (see *ibid.* pp. 132–160). The question of what came first, double entry accounting or capitalism, is impossible to answer (see *ibid.*: 161). Others see double entry bookkeeping as less ideologically suspicious and, in that sense, purely as a method that is used in other economic systems as well: according to Henning, double entry bookkeeping “primarily represents accounting for business enterprises. The method can be used irrespective of the given economic order (free-market capitalism or a planned economy, or hybrids thereof) [...]” (Hennig 1962: 10; translation amended)

One of the professions implied here is, of course, business administration, which emerged much later, and which “has been systematically taught at universities only since the 1920s”, having set out to “provide answers to three central economic questions of the time: how can monetary fluctuations be eliminated from accounting? What are the factors influencing production costs? How can we deal with the uncertainty of decisions related to sales strategy?” (Brockhoff 2002: 3; translation amended)<sup>12</sup>

To put it differently, and in Marxian terms, the task was to identify or devise measures to maximise surplus value in production and minimise the risk to value realisation on the market. In the almost century-old history of the discipline, its departments related to pursuing these two objectives have widely branched out and today also include the areas of corporate leadership, organisational studies, international management and corporate ethics alongside the more directly bookkeeping-related areas of financial management, accounting and controlling (see Gaugler/Köhler 2002).

In the English-speaking world, business schools have probably exerted a considerable influence on corporate practices far longer than they have in Germany: ever since the 1970s, they have promoted the doctrine of ‘investor capitalism’ and the image of a CEO whose interest is just about identical with that of shareholders

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1494 (1997)—for more detail on this, see Gleeson-White (2013: 91–114) and Walshaw (2019: 27–29).

12 The approach in distribution economics of taking into account the “acquisition from the user” (Sundhoff 1990: 3)—i.e. marketing for the purpose of consumption—alongside manufacturer sales and trade turnover was pursued for a long time especially at Cologne Business School; according to Köhler, this approach did not prevail in the discipline due to the dominance of US concepts, while, moreover, the “(acquisitional and physical) distribution [is] mostly an integral component of the marketing mix” (Köhler 2002: 360). The fundamental, strategic considerations concerning sales targets and channels can still be found under the heading “Distribution Policy” in most marketing textbooks (see, for example, Fröhlich et al. 2018: 142–49; all translation amended in this footnote).

(Khurana 2010: 3 and 364). Although the idea of social responsibility, as Khurana contends, was never fully abandoned (see *ibid.*: 296), the Ford Foundation<sup>13</sup> popularised, among other things, the idea that management entailed making purely rational decisions, and that the corresponding methods were entirely independent of the particularities of specific companies or even entire industries (see *ibid.*: 295). The idea of business schools seeing themselves as institutions providing general education, even going so far as to suggest a social sciences focus, as was long true for the London School of Economics (see Dahrendorf 1995), seems to be largely a thing of the past. Rather interestingly, a strand of critical accounting research that is based to a large extent on Foucault has developed in British business schools of all places. The focus here is on methods that translate into 'governing by numbers' and calculatory practices—or what is often referred to as *calculative* by researchers—i.e. practices in which numbers take precedence and appear as the sole guideline for action (see Miller 2001; Vollmer 2003) and which are partly interpreted as a one-directional and very smooth process. Besides this criticism, voiced by accounting researchers, of the role of accounting within business enterprises, there has also been increasingly vocal criticism of the business schools' training programmes: at times, this has taken a more academically persuasive tone (see Miles 2019), and at others been more polemicist and political (see Locke/Spender 2011; Parker 2018)—but always with arguments that are certainly convincing, albeit so far without any noticeable effects on the criticised institutions or their curricula. Gleeson-White (2020), by contrast, in her current, forward-looking book, *Six Capitals Updated Edition: Capitalism, climate change and the accounting revolution that can save the planet*, pins all her hopes precisely on this profession when it comes to the fight against the climate crisis. According to her, it was accounting that enabled countries' gross national products to be calculated with no consideration for factors such as environmental degradation and ecological damage. But it is also the accountants who are able to include externalities that have been left unconsidered as costs in the equation.

Accounting and its related professions<sup>14</sup>—and not just the pure method, but an ideological perspective on the economy, economic objectives and the tech-

13 The Ford Foundation, which currently (and by its own admission) is dedicated primarily to the fight against poverty and social inequality, is by far one of the most financially powerful foundations in the US. As a study originally published in the 1950s shows, there has been 'an incredible amount of confusion' regarding its intentions, ranging from it being surprisingly classified as 'dangerous communists' to the story about it being a front for US espionage operations in the countries of the former Eastern Bloc (see MacDonald 2017: 5–6).

14 Please forgive me for this reductionist contradistinction. The accountancy profession, of course, recruits its members not only from among business administration graduates or from business schools, but also, particularly in Germany, from vocational training institutions/schemes. Correspondingly, the Federal Institute for Vocational Training (BIBB) lists around 30 skilled com-

niques to pursue them—are themselves an expression of the circulation costs that Karl Marx already concerned himself with. This brings us to another, important dimension of the development of the distributive forces:

“Bookkeeping, as the control and ideal synthesis of the process [i.e. the process of commodity production], becomes the more necessary the more the process assumes a social scale and loses its purely individual character. It is therefore more necessary in capitalist production than in the scattered production of handicraft and peasant economy, more necessary in collective production than in capitalist production. But the costs of bookkeeping drop as production becomes concentrated and bookkeeping becomes social.” (Marx 1997: 138–139; comment in square brackets added by author)

Thanks to digitalisation, the opposite appears to be the case nowadays: while production sites, even those within a single corporation, are usually dispersed around the globe, accounting was initially standardised, to then be centralised and ultimately outsourced. One essential and IT-based factor in standardisation processes are *Enterprise Resource Planning* (ERP) systems, the most well-known and widely used being SAP. This software combines the most diverse modules (e.g. for Supply Chain Management (SCM) or Customer Relationship Management (CRM), Human Resources (HR), Controlling, administrative accounting and warehouse management) and simultaneously provides industry-specific solutions (not only for businesses, but also and increasingly for public administrative bodies, universities, etc.). Individual and additional units and departments can also be integrated using software supplied by other producers via interfaces.

ERP systems are usually structured as a top-down hierarchy of different planning levels (see Osterhage 2014: 16–19): from the constant “annual target to current performance comparison” via general and detailed planning to the coordination

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mercial professions in its job search engine (2020). Alongside more general professions, such as industrial management assistant or office manager, there are numerous classic specialisations, such as wholesale and foreign trade, hospitality, banking, logistics, tourism and retail, as well as more recent specialisms such as IT system management, digitalisation management or e-commerce. In addition, the job search also lists more than 30 advanced commercial training qualifications (business administration or management in a wide range of areas). In other contexts it would constitute a grave mistake to leave this unconsidered—but here I will limit myself to business administration because, firstly, it poses a threat to vocational training via the integrated degree programme (Duales Studium) at BA level (Euler/Severing 2017) and, secondly, because it is increasingly influencing the curricula of vocational training courses: economic control along with business and HR management take centre stage in daily practice, managerial control and governance are regarded as core skills to be acquired in commercial training, and administrative terminology related to accounting is not only jargon, but also structures commercial thinking (see Brötz/Kaiser 2015).

and control of everyday routine tasks and processes. Planning may occur based on deterministic or probabilistic methods, while also often being coupled, at the level of detailed planning and control, with project management systems (e.g. in development) or with systems for Operating Data Logging (ODL) and PLC Data Logging or with Production Planning and Control (PPC) systems. Communication systems such as Slack, which resemble social media platforms, are integrated into ERP systems in order to be used, for example, for warning signals and messages sent by that ERP system (see *ibid.*). The idea is to horizontally integrate all of a business's functional operational segments along the value chain and vertically integrate all the planning and control mechanisms (Hecht 2014: 10).

In many companies, the terms ERP and SAP have been used almost synonymously for decades—SAP is (and remains) by far the most successful provider of ERP systems.<sup>15</sup> The best-known software version, SAP R/3, which was released at the beginning of the 1990s, is still used by many companies today. Currently, SAP is marketing its solution for SMEs called *Business One* and the cloud-based version S/4 HANA. Founded in the early 1970s and ranked as the third-biggest software company worldwide (and the largest in Germany),<sup>16</sup> SAP's stated goal is to integrate all of a company's operationally relevant processes into a single system and organise and represent them according to the 'one best way' principle. Due to their restrictive top-down architecture, ERP systems have an immense impact on organisation and everyday work life and are very difficult to evade or work around (see Hohlmann 2007; Pfeiffer 2004: 201–215). After all, organisation is usually adapted to these normative specifications (and not the other way around, i.e. software is *not* adapted to existing processes), which takes place during the so-called customising process (i.e. the process of implementation). Correspondingly, not

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15 Given its market share, I am referring only to the ERP systems of the company SAP. There are, of course, countless other providers of similar systems, ultimately based on a similar logic and, above all, a comparable performance promise. For example, Microsoft (2020) is advertising its Dynamics 365 Supply Chain Management by emphasising its resilience through agile value chains ("Build resilience with an agile supply chain"), including, among others, accelerated market introduction, more planning flexibility, more accurate demand prediction, real-time planning of supply and production, and optimisation and automation along the entire supply chain logistics. Likewise, the firm Oracle (2020) is advertising its cloud-based ERP JD Edwards based on innovation, growth and reliability. Somewhat more modest and factual are the ads by the company Sage (2020), another major provider: "Anything your company needs in the management of accounting and finances, operational processes, staff, salary accounting and payments." (*ibid.*; translation amended)

16 SAP states that it is currently serving 444,000 business customers worldwide, increasing the distributed dividends by more than threefold from €594 million to €1.8 billion between 2008 and 2019 (see Klein 2020). The company's global market share in ERP systems stands at about 23 per cent (Statista 2019). We will take a closer and more detailed look at Microsoft and SAP's business figures in Chapter 8.1.

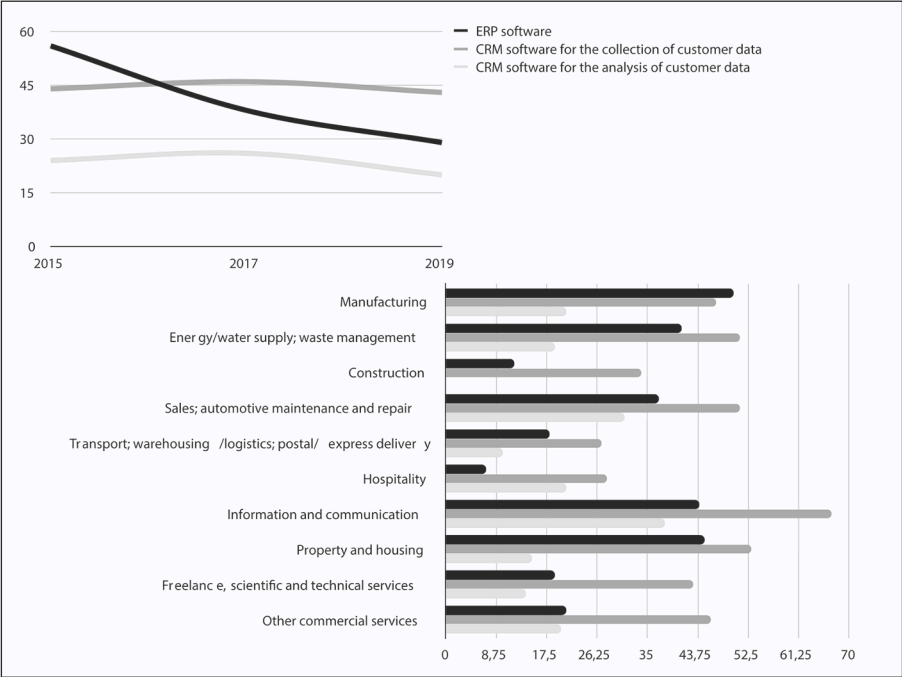
only organisational processes and workers and their tasks are adjusted to accommodate the system's requirements, but it also becomes difficult, or even impossible, to act 'against' the system when it comes to decision-making. Ultimately, even the "management subject" that has been "technicised" by ERP systems is proving "increasingly inflexible and technocratic" (Conrad 2017: 190; translation amended). This might be one of the reasons why many companies do indeed regard their ERP system as a 'central information hub' but have their reservations about turning this system into the crucial technological "backbone of the software landscape" (Sontow et al. 2020: 15; translation amended).

The extent to which ERP systems affect the actions and tasks of workers and management is not simply determined by technology. It is less a question of the impact of digitally predefined processes and actions so much as the strategies that are digitally conveyed as a result. For these strategies serve the integration of the economic logic (regardless of whether we refer to it as operational or as the capitalist logic of valorisation) into all organisational processes via numbers, thus being made the 'guiding star' of all action and decision-making—at times also leading to obstinate, obstructive or subversive behaviour. We can ascertain three such strategies empirically in fields as distinct as high-skill and project-based development work organisation (see Pfeiffer et al. 2019, 2016b) and low- to semi-skilled production and assembly work (Pfeiffer 2016a, see 2018a, 2018b): first, the strategies of the *performance and permanence* of the number (operational numbers are ubiquitous, always visible and unavoidable, the comparison between targets specified from above and the team-based actual performance is transparent at all times); secondly, there is an additional *compulsion to a (sensuous) appropriation* of the numbers via active elements such as data administration or the detailed verification and certification of individual production steps and, thirdly, a *self-controlled (self-)rationalisation* via particular management techniques such as *Objective Key Results* (OKR). It is not the commanding boss or the superior with a control fetish who enforce ever more efficient conduct, but workers themselves (both personally and within their teams). Yet (as empirically reconstructed in the cited studies), my aim here is not to depict the effects on work life in the sense of asking, say, at what point the system requests which input? In what instances does the system's representation contradict the processes in reality and demand a balancing act from workers? What is far more decisive for our objective here is how strongly the economic logic of circulation and the corresponding distributive force ERP system feed back into all processes and actors in a manufacturing enterprise. That is to say, feed back not only to affect the accountant whose daily business it is anyway, but also to the team leader on the assembly shop floor who signs off the end of a certain step in the assembly process; not only to the social media marketing specialist of a company, but also to the project manager in development who is bracing themselves for a presentation to management that will hopefully let her

off the hook regarding the discrepancy between the target costs and actual costs of her project; not only to the head of logistics, but also to the quality manager in finishing, who is forced to reluctantly resort to random sampling inspections because the truck is waiting outside the factory gate and the deadline for just-in-time production has already passed (which is displayed in large LED letters on screens hanging from warehouse and workshop ceilings).

The distributive force control and prediction, moreover, continues to be geared towards cost reduction. However, the mere ‘avoidance of waste’, as was a common theme in the so-called lean discussion, is no longer sufficient; the new target orientation is zero, or the “Big Zero” (see Timmermans et al. 2019). This refers to a management strategy in which all of a company’s costs are endlessly reviewed and checked for their potential to be reduced to zero. This approach also includes, e.g. value targeting (“quantifying the cost and revenue optimization potential of going zero-based”; *ibid.*: 63) and the idea of “near-real-time profitability reporting” (see *ibid.*: 113–124) which, needless to say, is only possible as a result of increasing digitalisation and the use of Artificial Intelligence. This underscores the efficacy of ERP systems as a distributive force, indispensable for circulation and in part linked to shockingly high circulation costs. The providers of this distributive force constantly have to come up with something new, or rather, with new and expanded service promises. For even ERP systems walk into the trap of overproduction—or, to use a more business-like term: market saturation. Considering the ICT indicators surveyed by Germany’s Federal Statistical Office, there is indeed a clear downward trend: only 56 per cent of German businesses indicated in 2015 that they were still using ERP software, and by 2019 this number had declined to only 29 per cent (see top chart in Fig. 3). Likewise, the collection and analysis of customer data using CRM software also declined between 2015 and 2019, albeit while slightly peaking in 2017. Whether or not this constitutes a lasting trend remains to be seen.

Fig. 3: Use of ERP and CRM by economic sector<sup>17</sup>



Data basis: Figures from the German Federal Statistical Office (Destatis 2020).

A comparison of the percentage use by economic sector in 2019 (WZ2008; as far as available for economic sector (ES) and use of ICT) indicates that CRM systems have consistently been used more often than ERP systems (except for in the manufacturing sector), albeit rather for the collection than the analysis of customer data (see Fig. 3). Here, control seems to take precedence over prediction for most companies.

The receding use of ERP systems can partially be explained by the fact that the use of cloud services is also included for the years 2016 and 2018. However, the use of such services in finance and accounting increased only moderately from 26 to 28 per cent (CRM: 28 to 19 per cent) (see top chart in Fig. 4). Just how strongly the use of digital means of distribution is oriented towards the market becomes impressively apparent in the comparison of Big Data analyses: while the use of

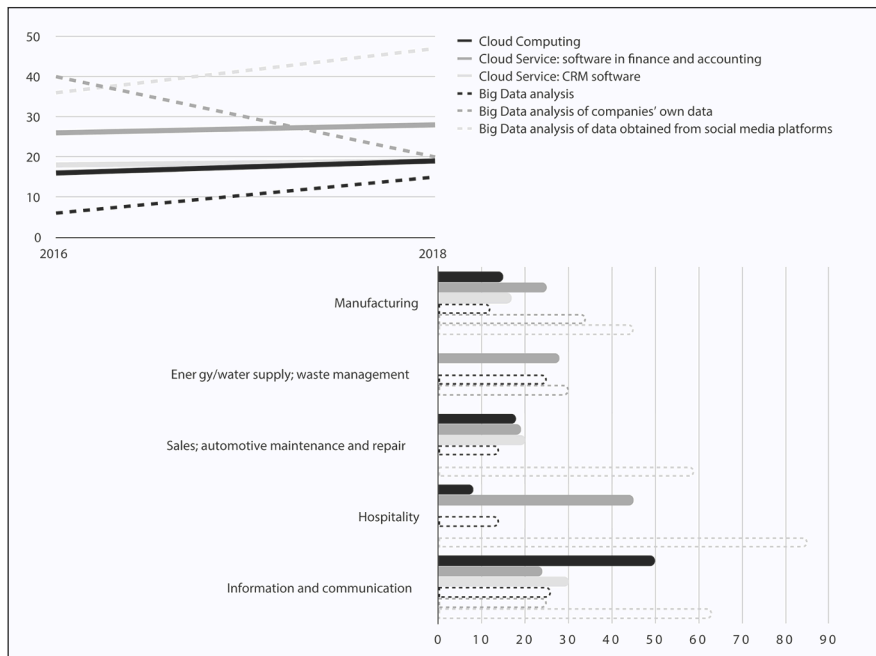
17 Figures taken from the German Federal Statistical Office (Destatis 2020): excerpt and own representation. Economic sectors (ES) according to WZ2008, use indicated as a percentage. The Federal Statistical Office does not provide any data for the ES 'provision of financial and insurance services' for 2019, while indicating only CRM-collected data for the ES 'repair of data processing and telecommunication devices'; these two industries are therefore not included in the chart.



(independently collected) company-owned data dramatically halved (dropping from 40 to 20 per cent), the analysis of social media data grew from 36 to 47 per cent over the two-year period considered.

The set of economic sectors for which reliable data are available illustrates two aspects (see bottom chart in Fig. 4): except for the IT industry itself, fewer companies entrust external cloud servers with their ERP data, but rather use the cloud for other purposes. Besides this, all the sectors considered are (in part, clearly) more interested in analysing social media data with the aid of Big Data than their company-owned data. It appears that manufacturing enterprises in particular regard their internal data as something that should not be handed to a third party. Besides, the willingness to invest is much higher when it comes to those means of distribution geared directly towards the prediction of surplus value realisation.

Fig. 4: *The use of Cloud and Big Data by economic sector*<sup>18</sup>



Data basis: Figures from the German Federal Statistical Office (Destatis 2020).

18 Figures taken from the German Federal Statistical Office (Destatis 2020), own representation. Data concerning the items Cloud and Big Data are available only for the years 2016 and 2018; likewise, data by economic sector are not or only very partially available for 2018 (such as in the case of financial and insurance services); the values represented in the bottom chart therefore cover only those economic sectors for which data pertaining to Cloud and Big Data were available.

So, while market expansion has currently come to a standstill for ERP systems, SAP is delighted to have increased the “share of more predictable revenue [...] by five percentage points year-over-year to 73% in the second quarter.” (SAP 2020: 2) despite the Covid-19 crisis. It would be difficult to express the *objective of all efforts towards the development of the distributive forces* any more clearly: generating *reliably predictable revenue*. So, what SAP condenses into a formula both to define its own business model and, more importantly, to send a message to its shareholders, is ultimately the same thing they promise their customers through their products: *to generate more revenue while reducing circulation costs, all at the lowest possible risk*.

Whether or not the software delivers on its promises is irrelevant.<sup>19</sup> After all, every business enterprise, every board member and every manager knows that revenue will never be high enough, and there will always remain an element of risk: maximum revenue (i.e. the sale of *all* overproduced goods) in combination with minimal market risks and minimal costs is impossible. It may occur temporarily, but certainly cannot be sustained in the long run. Nevertheless—or, perhaps precisely as a result thereof—any conceivable IT-based tool (regardless of its license fees or costs of implementation) that promises to bring this ultimately unattainable goal just a little bit closer (or at least allow a company to make relevant strides more quickly than the competition) will be pursued.

Ultimately—as is obvious in logical terms—the competing market participants taken as a whole are unable—or are hardly or only temporarily able, and only in isolated cases—to minimise the fundamental underlying problem if they all introduce the (more or less) same ERP system at the (more or less) same cost and at the (more or less) same point in time. Indeed, although this ought to be clear to every person in a decision-making position, there is no escaping this logic at the level of the individual company, even if one wanted to. Whoever fails to introduce the most recent generation of ERP systems, or does so at a later point than the competition, is almost doomed to fall by the wayside.

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19 Despite considerable investment-related circulation costs, this is particularly severe when the introduction of such systems fails. Usually, only the most spectacular such cases become publicly known. For example, in 2018, only a few months after the introduction of HANA, Haribo suffered a dramatic drop in sales: seeing as the new inventory control system and logistics were not yet properly working, the correct order volumes could not be delivered, as a result of which supermarket shelves often remained empty for days on end (see Kroker 2018). And this is not an isolated case. The German weekly *Wirtschaftswoche* reports of six additional ‘mega flops of major SAP projects’ (2019); what is noticeable is that this list consists exclusively of retailers or service providers (Otto, Deutsche Bank, Deutsche Post, Lidl, Edeka and DocMorris), but contains not a single manufacturing enterprise. In all of these cases, six-digit figures were invested (around €350 million) in long-term projects lasting between four and seven years, at times with hundreds of staff and consultants involved. These examples impressively show the volume of investment costs businesses are willing to raise when it comes to advancing their digital distributive forces.

To the ERP provider, ERP users are, in turn, no more than customers, serving the goal of maximum surplus value realisation. This is evidenced by the antitrust complaint against SAP which the Federal Association of IT Users *VOICE* has been pursuing since 2018 (see Voice 2020). The issue at the centre of these legal proceedings is the question of how to accommodate intellectual property rights and licensing in cases of indirect use (such as when a link is created with other systems by supplier or customer companies); so far, SAP is refusing to take the interests of the users' association into consideration (see *ibid.*).

What is more, a veritable host of consulting firms has emerged in the close vicinity of SAP, providing assistance services to user companies in the complex process of implementation and customisation. For even *Business One*—the 'all in one' ERP system for small and microenterprises—entails no less than 17 implementation steps, as one of these consulting firms explains (Versino 2020), ranging from demand analysis, key user trainings and the development of two prototypes to end user trainings, final data transfer (from previous systems) and, finally, support during launch (i.e. when the system is actually activated). The consulting agency compares the costs incurred based on the example of a company with five users: on-premise solutions (i.e. relying on the company's own servers) cost around €16,470 annually (not including overheads related to the maintenance of these in-house servers), whereas the SAP cloud service Cloudiax, a Software as a Service (SaaS) solution, commands a price of only €9,130 per year. In other words, storing one's data on an independently controlled device comes at a cost. Another interesting aspect is how obviously SAP is now exaggerating the costs of the formerly celebrated business model of licensing in favour of its own cloud-based solutions. Besides the fact that a 17-step implementation process at a company with only five users would most likely already constitute a rather staggering investment, the running costs for microenterprises are considerable in both models. After all, we are talking about annually incurred costs, and not about a machine that has been tax-efficiently written off after x number of years and henceforth famously appears in the company books as only €1. Rather, it is a model geared towards permanence, effectively guaranteeing the dependence of the user (when would this user find the time or want to and/or be able to afford another 17 implementation steps when moving to another provider?) and, therefore, permanently repeated surplus value realisation on the part of the provider. This variant of the development of the distributive forces is only possible, and is indeed becoming increasingly important, because of today's specific manifestations of digitalisation, as will be explained later on (see Chapter 8.2).

## 6.4 How the distributive forces combine with digitalisation

Advertising and marketing, transport and warehousing as well as control and prediction: we are familiar with all of this both *empirically and from our own everyday lived experience*. As employees in a company, or as consumers or buyers, we are all affected, implicated, involved and part of these distributive forces, not only as ‘victims’, but as active participants and shapers at the microlevel. We sense and experience the distributive forces at the micro-economic and micro-sociological levels as such dominant factors that we hardly even notice them. Incidentally, these processes already drove forward the technical development of the Digital long before today’s digitalisation.

If there is a place at which all this palpably converges, then, at least until fairly recently, it was the department store or, with a similar impact, pedestrian shopping zones with their retail stores, and, later, large shopping malls. The department store embodied the initial impetus for a new culture in the middle of the 19<sup>th</sup> century,<sup>20</sup> and today it is the location most threatened by current developments.<sup>21</sup> All the above is already discernible in these “early forms and institutions of modern mass consumer culture [...] [and] incorporations of modern civilisation”: overproduction and advertising as well as the need to achieve sales, “the accumulation

20 Arcades, which allowed for all-weather shopping, had emerged before that, including Paris’s *Galleries de Bois* in 1786 or London’s Burlington Arcade in 1818 (Holleran 2011: 19).

21 At least for Europe, this statement is still valid. However, there is much reason to believe that the few retail shops in the pedestrianised centres of small and medium-sized towns—which have survived the opening of local department stores and major brand outlets in shopping streets, inner-city shopping malls or superstores in local industrial parks on city outskirts—may well be unable this time to fend off the eCommerce boom, which constitutes merely the most recent attack on their existence. Providing little comfort is the fact that efforts to create platforms for locally based retailers have turned out to depend on rather challenging preconditions (see Küffmann 2020). In the United States—if we ignore the long-established department store icons in New York City, which still noticeably follow the European model—the shopping malls and the corresponding, always identical, chain stores they house have been struggling for survival for a long time or have already lost this fight. This development has been debated for a few years now under the catchphrase of retail apocalypse. (see, for example—albeit differing with regard to the assessment of the dynamic’s severity: Helm et al. 2018; Mende 2019) The shopping mall in particular, a social space so relevant to life in rural America and for the youth (Gestring/Neumann 2007), has even engendered an architectural history and style in its own right (see Lepik/Bader 2016). The crisis of the mall, however, is not only the result of online shopping, but set in during the financial crisis of 2008 (Allen 2019). Ever since, malls have been reinventing themselves or are being repurposed (from call centres to local production clusters to school buildings; see *ibid.*: 10–12). The dominant image associated with the US mall landscape, however, is already that of abandoned buildings being reclaimed by nature; at the same time, new types of shopping malls are being built, say, in Asia, designed to inspire consumption through theatrically presented spaces and architecture as a spatial experience (see Tabacki 2020).

of purchasable goods, the radical reduction of prices, the cheapness and the presence of labelling, extras and teasers, new products and new forms of presentation, free entry for all [...].” (Briesen 2001: 24; translation amended)

Just as the department store ousted small specialist shops (and the supermarket subsequently pushed out small corner or village shops), it is now itself faced with an existential threat, namely the “digital department store” (see Lehmacher 2017; translation amended). And just as there is a discussion about the power of the new and the threat to the old, there was also a social discourse at the time the department store emerged, in which it was referred to as that “loathsome form of enterprise” (Briesen 2001: 12) which was widely adopted in literature and—beginning with Émile Zola’s *Au Bonheur des Dames*—led to a “torrent of publications” between 1890 and 1914 and was taken up again from the 1950s onward (ibid.: 14); a discourse which Detlef Briesen interprets, at least in the case of Germany, not only as cultural and philosophical (see ibid.: 83–100), but also as interest driven (see ibid.: 151–177) and elitist (see ibid.: 231–246).

In this sense, Werner Sombart’s brief analysis of the department store as a “creation of the era of high capitalism” (Sombart 1928: 77; translation amended)<sup>22</sup> appears very relevant today: in his portrayal, the department store is characterised by a drive for profit, the optimisation of sales techniques and a quest for efficiency and rationalisation (see ibid.: 77–79); it is geared towards “the greatest possible increase in sales [...]; [the department store] is expansive, dynamic. Anything that facilitates this expansion of sales is embraced.” (ibid.: 81; translation amended) Taken from this perspective, Amazon would be nothing but the logical and digital ‘extension’ of the erstwhile department store (on this, see also Chapter 8.3). Despite all his criticism, however, Sombart also describes positive effects for customers that we find in an updated form at Amazon: for example, an increase in transparency regarding goods logistics, or online retailers’ company-operated delivery services (see ibid.: 80–85).

What has changed as a result of digitalisation, with its multi-billion dollar actors, then, are the ties to a physical place (and the inevitably finite storage capacity for goods that this entails) and the attachment to limited time frames (owing to industrial relations and specific office hours in accordance with traditional cultural norms): the city centre department store has given way to a global, digital version (see Lehmacher 2017); instead of the *bel étage* for womenswear, our own living rooms have now become marketplaces (see ibid.: 1–99). All of this is made pos-

22 Werner Sombart (like Max Weber or Karl Marx before him) suggested certain links between Jewry and capitalism, which obviously are very problematic from today’s perspective (see Barkai 1994)(see Barkai 1994) and which can be considered to form the basis of his analysis of the department store, although in this instance he focuses entirely on the specific form of the department store and its economic functions.

sible by the “miracle weapon called logistics” (ibid.: 169–180). And as online consumption moves from anonymous online interfaces (see Scheurer 2019: 9–12) to *curated shopping*—a kind of moderated retailer–customer relationship (see ibid.: 2, 17–18 and 38–70)—one feels strangely reminded of Werner Sombart’s observation that the customer friendliness in sales first disappeared during the introduction of the department store and was later rediscovered as a sales tool. While frequent customers once used to be greeted like acquaintances when entering a shop, Sombart explains, this habit was initially lost in the era of the department store, but: “More recently, we have been able to witness efforts to turn the act of selling into a personal experience again, specifically in the United States: it is the depersonalisation of the seller–buyer relationship that was fostered, especially by department stores.” (Sombart 1928: 79; translation amended)

What feels so different and new in our daily lifeworld, and is expressed empirically (among other things) at the level of consumption and in the changes to the department store, is obviously made possible—so our immediate experience tells us—by the more recent phenomena of digitalisation. That is one reason why it may feel tempting to locate the origin and cause of what is new in the immaterial, supposedly non-physical realm. We have already seen that digitalisation itself exhibits many physical characteristics, manifestations and preconditions (see Chapter 2.3). I shall refrain from repeating these arguments here. What is important is that all attempts at explanation based on the famous ‘one and zero’—into which supposedly everything dissolves—i.e. those that place the virtual and non-material centre stage, are implausible given the thoroughly physical nature of the Digital.

Overproduction, expansion and consumption as well as the corresponding need to permanently accelerate the circulation of goods and money while reducing the costs of the whole undertaking cannot, as a whole, be attributed to the Digital alone: it is apparent that we are dealing with economic mechanisms which—albeit often overlooked and analytically neglected—possess *an immense physical dimension*.

It is hard to conceive of anything more physical than enormous ocean freight ships and their cargo; who could think of anything more physical than a mountain of garments produced for online retail and which, if sales fail to materialise or items are sent back, are burnt (because it is more cost-efficient than repackaging or selling them at a lower price); there is hardly anything more physical than deep-sea cables or the thousands of small satellites that are being installed in order to mitigate the next crisis through even faster means of communication or to even turn it into a great business opportunity, at least for a small circle of private economic actors; there is little that is as physical as the rapidly progressing extraction of rare earths and ores to produce the physical elements essential to our digitalised gadgets (batteries, storage space, processors, displays, sensors); hardly any-

thing is more physical than the hard labour involved in lithium or cobalt mining, in the sweatshops around the world, as performed by outsourced content moderators for large social media corporations or in the jobs in packaging, distribution, warehousing and delivery for online retailers and the platform economy. Besides, even the companies we associate with physical products are increasingly developing software of their own.<sup>23</sup>

We often tend to turn a blind eye to many of these physical aspects of digitalisation and fail to recognise them in everyday life. One reason is that much of it is outsourced, neatly separated from the shiny image of the tech giants; outsourced to those socio-economic groups whom we ourselves, reflecting on digital capitalism as we do, also only encounter at our own front door when receiving the next food or package delivery (but not in our own neighbourhood, on holiday or in our own social circles); outsourced to people in other countries and on other continents. Considering the economy on a global scale (and to consider it any other way would make little sense these days), the phlegmatic vehemence with which the end of production capitalism or industrial capitalism is being proclaimed is indeed quite mind-boggling. Never before in the history of mankind have there been as many goods produced. Never before in the history of mankind has there been such rapid and comprehensive industrialisation. And never before in human history have there been as many early-capitalist forms of employment.

So, we may at this point summarise this as 'business as usual'. Thanks to digitalisation, acceleration and globalisation are becoming more pronounced than in the past. But at least the economic principles have generally remained unchanged. Digitalisation simply ties in extremely well with the mechanisms and requirements of the existing economic system that we call capitalism, a system which, as such, is highly susceptible to crisis. And it is not the Digital's fluidity or immateriality that facilitates this compatibility. Nor is it the unmatched genius or unscrupulousness of individual tech entrepreneurs in Silicon Valley. The reason is that capitalism, which has *not* ceased to produce but is, on the contrary, indeed *hyper-overproducing*,<sup>24</sup> hopes to perpetuate the needed circulation spiral this

23 For example, the arms and aircraft manufacturer Lockheed simultaneously features as an IT provider in the fields of mail sorting, social security or for the US Census Bureau: "Lockheed writes more computer code than Microsoft." (The New York Times 2004; quoted in Klein 2010: XV)

24 Admittedly, capitalism itself does not 'hope' for anything. Apologies for this reductionist, yet somewhat more readable wording. Rather, those who hope are its relevant actors (whether they regard themselves as such or not): corporate management (concerned mainly with growing shareholder value), strategists of major banks (who worry about growing bubbles), political actors (concerned with the growth of the national economy)—none of them will worry much about capitalism as a whole, but increasingly so about its susceptibility to crisis; and they will all bet and pin their hopes on a scenario in which the next major crisis is still far away (or at least not

way; because in this system each and every company hopes that digitalisation can help them attain surplus value realisation more quickly, at a lower risk and based on increasingly accurate predictive calculations. Some forms of digitalisation are indeed quite good at just that; others are not. At times the right horse is backed, at others an investment ends in failure.

Yet all this is occurring against the backdrop of the distributive forces having become more *economically* important than in the past. The significance of distribution has increased, and digitalisation—with its specific materiality—is simply particularly well suited for this scenario.

So, let us summarise the deliberations presented in the preceding sections (Chapters 6.1 to 6.3): at the macro-economic level, the distributive forces represent an integral part of the development of the productive forces. In this sense, they are certainly not a new phenomenon, but are nonetheless becoming more dominant, more dynamic, more efficacious and more intrinsically important for the system than in earlier stages of capitalism. And that is why digitalisation is so compatible with, and so eagerly embraced by, present-day capitalism and its actors. *On the whole, this constitutes the reason why the notion of a digital capitalism is certainly plausible when considering the (doubtlessly highly empirically relevant) phenomena.*

Current digitalisation acts as a driver of the development of these distributive forces, taking them to unprecedented heights (linked to equally unprecedented systemic risks). The implicit promise here, which is not new either, is that the logic of market expansion can be endlessly continued based on the means of communication, while crises of overproduction can, at the same time, be mitigated or even overcome. And yet, as in the past, the *means of communication* (even sophisticated digital forms) *will be unable to prevent these crises*. The reason for this can be found in the distributive forces: having only just become a significant element of the productive forces in their own right, they are forced to follow the same logic of market expansion and overproduction, being not only driven by the discrepancy between surplus value production (or, in the case of transport and warehousing, the surplus value option) and surplus value realisation, but threatened by severe immanent crisis as a result. *This is the reason for referring to the current stage of capitalism as distributive-force capitalism when seeking to analytically reveal the cause and significance of what is really new about capitalism in the digital era.*

In principle, however, nothing has changed. Commodities—i.e. products that have been produced exclusively for the market—already existed in the production of Trojan amphorae and of precious fabrics during the Renaissance. Similarly, humans have constantly expanded markets ever since they first engaged in barter-

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as imminent as the next board meeting or general meeting of shareholders). From all these specific concerns emerges a collective, quasi-structural and repeated 'hope' that it may just work out fine for a little bit longer. Hence the phrase about capitalism's hope.



ing and exchange. *However, market and expansion constitute the all-determining mode of production only under capitalism, and only since the onset of capitalism has permanent and increasing overproduction become an inevitable reality.* Consumption has been far more than an existential expression of life (as in the consumption of vital food) for a seemingly endless period of time. Consumption is a cultural technique and means of social distinction. *However, only under advanced capitalism and its permanent and increasing overproduction does consumption become that pivotal bottleneck of surplus value realisation and therefore an essential element of society and social behaviour.*

Due to overproduction, market expansion and consumer culture, the efforts (and costs) required for linking up production with consumption (which, moreover, demands constant modification) increase in advanced capitalism: *in order to deal with circulation and costs*, that is to say, to maintain the former while keeping the latter as low as possible, entirely new forms and realms of productive forces take shape. I have already outlined the three that are most important (see Chapters 6.1 to 6.3). Given their increased significance and related (factual and economic) intrinsic logics, I refer to them as ‘distributive forces’, seeking to define them more precisely in analytical terms. What is new is not the underlying motivation of their respective application (see Chapter 5), nor is it their intrinsic systemic significance for retail, sales and profit. What is by all means new under advanced global capitalism, then, is their heightened relative significance among the productive forces:

- *Advertising and marketing* were not invented during capitalism. Even in the barter economy, a sporadic surplus of, say, wild boar meat will have led each hunter to pitch their own as the best and freshest meat. Or take, for instance, the excavated mural paintings in Pompeii which revealed not only beautiful pictures and graffiti, but also announcements and praise for goods and services. The court and church painters of the Renaissance will have developed some form of marketing strategies in order to receive an order from another royal court or bishop. Ever since the invention of print, public space has been used as an advertising board—this happened long before the invention of the advertising column or, subsequently, the fluorescent tube. *However, only in advanced capitalism do advertising and marketing become the crucial precondition for selling the ever rising glut of overproduced commodities, while re-stimulating consumption time and again through ever-more targeted and sophisticated techniques in an attempt to enable maximum value realisation.*
- *Transport and logistics* must have existed before agricultural society. Whenever humans were forced to hoard provisions—due to changing seasons, unpredictable weather conditions, the rationing of meat, and the fact that the current year’s plentiful yield of wild berries might be followed by a poor harvest the next—methods and ways of transport and storage were invented, refined

and perfected, from the leather pouch containing dried meat, as ‘Ötzi the Ice-man’ was found to have carried with him, to the ships used by the Vikings in their raids and the trading roads of imperial Rome. Warehousing and transport are always objectively necessary. This requirement drives innovation and generates entire lines of business and professions. *However, only in advanced capitalism do transport and logistics become a crucial precondition for moving, quite literally, overproduction and market expansion and to be able to reliably and evermore rapidly connect the places of surplus value genesis (based on a global division of labour) with the globally dispersed places of surplus value realisation.*

- Likewise, *control and prediction* represent age-old cultural techniques that may not have been invented in Ancient Egypt but were perfected by the Egyptians with the help of mathematics during the construction of pyramids: it was the only way to plan and coordinate the armies of workers and scholars, their alimentation and provisions and the constant flow of materials, such as building blocks and timber. Humans began making predictions and forecasts regarding floods or harvests early on, be it based on observations in the natural world and inherited knowledge regarding the respective micro-climate, or through the calculation of the trajectories of celestial bodies. And, of course, even in the Hanseatic merchant kontors or the trading bases of the Fugger merchants, counting and calculating formed the basis for optimising flows of goods or calculating price options. *However, only in advanced capitalism do control and prediction become the crucial precondition for rendering the ensemble of overproduction and market expansion, advertising and marketing, and transport and warehousing calculable and thus predictable in all their complex overlappings and interactions.*

The three distributive forces described here, which currently have a considerable impact on circulation and the related costs, have long been digitalised, as demonstrated by the examples given. Likewise, the ERP systems covered towards the end of the last section constitute a digital attempt to pool and connect all real processes and their respective operational logics from distinct departments within a single business enterprise, to subsequently enable such links between companies along (and across) value chains and, finally, to couple all this as closely as possible to the market and consumers. What we find in all this are fluent transitions between ‘old’ and ‘new’ forms of digitalisation, which have, of course, for a long time referred to much more than just accounting 4.0—instead encompassing the digital facilitation of surplus value realisation in all its different stages, interdependencies and nexuses. Before we take a closer look at the more recent empirical phenomena of digitalisation from the perspective of the distributive forces (Chapter 8), we will first briefly address some theoretical issues once more. A few clarifying remarks regarding the distributive forces seem appropriate to allow for an understanding of the centrality of this analytical approach to digital capitalism.