Between the Cloud and a Hard Place:
A Study of Industrial Transformation in the Platform Age

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Abstract

It is now widely accepted that a new wave of digital technologies are catalyzing major changes in industries, workplaces, and social life more broadly. Phrases such as 'the future of work,' 'digital transformation', and 'disruptive technologies' are now part of the zeitgeist. This dissertation grounds these amorphous and heady buzzwords in existing processes of industrial change. Specifically, I investigate an ongoing shift in India's software industry. India's prominent software sector serves the computing needs of large US and UK corporations and therefore is regarded as an offshore industry. Emerging methods of organizing computing systems are unsettling the traditional services offered by information-technology (IT) companies in India. Based on qualitative fieldwork, I find that the ascendence of a distinct paradigm of corporate computing ('cloud computing) intersects with new competitive strategies and shifts in workplace relations. My analysis of this process highlights the special role of managerial decision-making and managerial precarity in actualizing creative destruction at an industry level. Considered together, this dissertation contributes to sociological debates on industrial transformation and social change.

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Chapter 1. Introduction

Of Fixity and Motion: Industrial Transformation in a New Digital Age

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This dissertation explores accelerations in industrial and organizational change in the context of a new technological convergence. Emerging public and scholarly discourses identify digital platforms as catalyzing new business practices and conditions of work, in advanced capitalist economies and the global South (Paus 2018; Sadowski 2020; Srnicek 2017; Van Doorn 2017). Using India's information technology (IT) sector as a case, I explicate specific shifts in the realm of fixed capital, corporate strategy, and managerial identity in order to conceptualize accelerated restructuring in a new digital age. This introductory chapter develops a broad analytic frame for the dissertation, before discussing the case and research process.

Industries, no matter how profitable or successful at one time, have a distinct tendency to slip into periods of crisis and reorganization. Firms, markets, and workplaces are continually in disarray, often in turmoil. Companies are perennially being restructured and managers always seem to be experimenting with new strategies of competition. For a system that is apparently unshakable, cycles of upheaval and transformation are routine. Large, seemingly invincible corporations spectacularly collapse, entire industries disappear into oblivion, and commodities flood and evacuate the market at dizzying speeds. Even the most dominant corporations never pause their search for new methods of renewal and expansion. This relentless dynamism means the market power of individual firms needs to be continually maintained and reinvented.

The constant threat and often reality of industrial crisis is at odds with narratives of capitalism – both from the left and right – that only focus on how effective and successful capitalist actors are at extracting profits and reproducing their power. The belief that firms are inherently or naturally successful in their attempts to produce, sell, and speculate, collides with the reality that the survival of the capitalist organization depends on very specific, and historically contingent conditions. Industrial expansion depends on ever-changing financial practices, modes of state support, geographical and organizational arrangements, consumer markets, and labor processes.

This fierce dynamism is certainly social disruptive, and depends on using and disposing resources, labor, and infrastructures. This dynamism also poses a grave threat to capital itself. It exposes and makes capitalist actors vulnerable to a range of internal contradictions. The 'external coercive laws' of competition propel firms to court change, which only induces new uncertainties. For Marx, the system as a whole is not driven by the 'good or ill will of the individual capitalist.' Rather, 'free competition brings out the inherent laws of capitalist production, in the shape of external coercive laws having power over every individual capitalist.' Marx argues that individual capitalists, in their efforts to compete with other capitalists and maintain an ever-increasing rate of profit, transform productive forces, which only further entraps them in competitive relations. The benefits accrued by creating new markets or adopting new methods to lower production costs are always temporary, as competitors are quick to adopt the same novel techniques to strengthen their own systems of production. Schumpeter too emphasized this propensity to change, mutate and expand when he wrote,

> Capitalism, then, is by nature a form or method of economic change and not only never is, but never can be stationary…the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers, goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates (Schumpeter 1976, 83).

This propensity toward continuous cycles of transformation is checked by a simultaneous preference on the part of individual capitalist organizations for stability and fixity. As much as free market ideologies celebrate competition, capitalists themselves abhor its coercive demands. Indeed, if asked, no executive manager will say they prefer conditions of hyper-competition and uncertainty. Yet they act in ways that only destabilize the industrial status quo and, in the process, their own structures and value-creating models.

This dissertation probes specific mechanisms of industrial and organizational change. Nevertheless, I take seriously the idea that there are strong counter-acting forces. Incessant, unpredictable change causes all kinds of problems and disruptions to capital. As Harvey writes, there are barriers 'capital itself erects against the tendency towards perpetually accelerating technological and organizational change' (Harvey 2006, 122). These counter-acting forces fetter the powerful imperative toward continual change. The modern, multidivisional firm itself arose as the dominant organizational form of capitalist production, as an attempt to barricade the instability of the market by establishing a large and robust zone of control and planning. Chandler (1977) showed how precisely the large modern corporation uses the *visible* hand of management to combat the dangers associated with the *invisible* hand of the market. Stability in markets, production systems, and labor relations, afford capitalist enterprises a number of things. Stability allows for planning and prediction, thus reducing the grave risk of sudden devaluation. It allows organizations to tighten control over their 'islands of planning,' protecting firms from the potentially devastating anarchy of the market. It allows for steady, predictable streams of revenue and profit, the gradual retirement of fixed capital, and calculated decisions around fresh investment (Clark and Wrigley 1995).

Firms through specific strategies seek out control not just over production processes, but also over the realm of exchange, which by definition falls outside the jurisdiction of individual organizations. For the capitalist, the attempt to monopolize the market is the best strategy of competition. As Foster et al. (2011) write, 'The desirability of monopoly, from the perspective of a capitalist, is self-evident: it lowers risk and increases profits.' As mentioned, no corporate executive actively wants intensified competition, as highly competitive markets are ridden with uncertainty and risks.

If capitalist firms prefer stability, what explains the dominance of an organizational and industrial strategy that actively unleashes instability in markets? Since the 1970s, firms have put a premium on flexibility: flexibility of labor relations, commodity portfolios, fixed capital arrangements, geographical locatedness, and so on. Despite the benefits, the fact is, the pursuit of stable conditions of production/circulation can be immobilizing, and can engender potentially dangerous rigidities. Organizations that solely chase fixity rather than motion invite the risks of being inertial. There are damaging consequences associated with the inability to adapt to new market conditions, new sources of competition, and new technologies. David Harvey in *The Limits to Capital* (2006) clearly articulates the contradictory pressure on firms to discover an impossible balance between being tied down and being fully untethered. The dual need for *fixity and motion*, produces a contradiction, one that exerts immense strain on organizational forms (Harvey 2006, 273). Being permanently at the knife's edge of fixity and motion is impossible, thanks to the destabilizing force of competition, which converts this mythical sweet spot into a moving target. Contradictory imperatives produce strategies that are effective only temporarily. Resolutions are necessarily tenuous and tentative.

At an organizational level, there are no easy answers and no stable solutions to managing contradictory pressures. Consider the following paradoxes. Deskilling and rationalization are effective ways of controlling the labor process (Braverman 1998). At the same time, excessive control of the labor process means that workers do not have the autonomy to make decisions; excessive top-down control leaves tacit knowledge underexploited and skills degraded - all of which can hamper productivity (Vidal 2019). Another bind: standardized mass production drives down unit costs, but also implies that firms have limited capacity to quickly adjust to or reshape consumer demand. Geographical decentralization too has tradeoffs. Maintaining spatially proximate centers of production and consumption reduces turnover time, but also means the benefits of exploiting uneven geographies is squandered. Reflecting the unsteady terrain of firm strategy, management practices that were once taken for granted have been replaced by new accepted wisdom. Instead of strictly implementing scientific management, new-age approaches promote worker autonomy, and an idea that work should be intrinsically meaningful. What is clear is that there is no transhistorical or decontextualized 'rational' management strategy, only contingent attempts that makes sense in particular historical and industrial contexts. Managerial actions are attempts at conquering the competitive field, efforts that only generate new sources of stress.

Given that social and industrial terrains are shaped by business strategy, it is surprising that the sociological study of corporate strategy and organizational change has been relatively neglected. Braverman differentiates between two preoccupations of the modern firm – management of the labor process and business management (Hales 2000). Sociology and adjacent disciplines closely study the former, but typically relinquish the study of the latter to business schools and mainstream organization studies. Although classical social theory rigorously engaged the field of competition and change, contemporary scholarship rarely does. As Brett Christophers notes, the 'relative dearth of latter-day secondary literature dealing explicitly with competition *and capitalism'* is evident (2016, 30).

Having said that, economic geography did closely track the shift from Fordist to Post-Fordist industrial organization and introduced a special focus on firm strategy (Clark 1994; Sayer and Walker 1992; Schoenberger 1988; Walker and Storper 1991). Erica Schoenberger's *The Cultural Crisis of the Firm,* stands out in its attempt to contend with questions of industrial strategy and its outcomes. She writes,

> When the stable competitive environment is disrupted, many things – including the organization of production, its temporal and spatial characteristics, and competitive strategies – must change. The question is how and with what effect (Schoenberger 1997, 25).

Schoenberger's analysis rests on the assumption that firms operate within 'strategizable' fields and competitive strategy emerges in response to a web of pressures and possibilities. To quote,

> The stress is on the indeterminacy of outcomes and the need to understand how strategies and different models of competition are actually produced in different historical moments and geographical circumstances, and with what effect. Further, I think it important to emphasize the inherent instability of outcomes, as the resolution of a particular competitive problem or the elaboration of a more general competitive model that embraces many firms inevitably produces new problems and challenges (1997, 24).

Such a framing opens up a dynamic terrain of inquiry where corporate actions and effects are not predetermined nor completely open-ended. It recognizes that capitalist organizations are entangled in various contradictions that generate instability and produce actions that are effective only temporarily and often generate new conditions of crisis and strain. Political economy gives us some general tendencies and structuring contradictions to work with, a conceptual apparatus to make sense of crisis and reorganization. Answering how, why, and to what effect industries teeter and collapse, or alternatively manage a renewal, demands that analysis move into historical and empirical registers.

At the broadest level, this dissertation is concerned with the following problem: What shapes accelerated change, when typically, industries and their managers have a vested interest in preserving their existing advantages? This reverses the question that Schoenberger (1997) is concerned with, which is - why do organizations and their managers *resist* change when their survival depends on it? Firms are invested in protecting their existing revenue sources and managers typically are keen on preserving their corporate units and their own jobs. Why and how do organizational actors actively accelerate destabilizing pathways of change? I focus on new actions and strategies that emerge in response to acute industrial uncertainty.

Over the last decade or so, a new *technological convergence* has occurred between cloud computing, networked devices, and big data (Pon et al., 2015), a convergence driven by ubiquitous, high-speed, low-cost internet. Pon, Seppälä & Kenney write, ‘this shift has significant implications for firm strategy, as it signifies not only a new playing field where the competition will be waged, but an opportunity for restructuring power and relationships within the merging value networks’ (2015, p. 22).

Questions pertaining to industrial change and uncertainty are particularly relevant today. If the shift from Fordism to Post-Fordism called for scholarship on economic and industrial change, so too does the current conjuncture. This technological convergence has produced a new cluster of mega-firms. Companies such as Google, Facebook, and Amazon, despite being ‘tech firms,’ affect competitive conditions in the non-tech economy. From retail, to advertising, to film and music, digital platforms and their corporate owners alter conditions of value creation. The Economist published a collection of essays with the title, ‘The Great Disruption: How business is coping with turbulent times’ and the introduction states,

> Change has speeded up. Disruption has become endemic…Schumpeter once said that the average firm stands on ground that is crumbling beneath its feet. The ground is more treacherous than ever (Wooldridge 2015, 2-3).

It would be a mistake to dismiss this as mere hyperbolic rhetoric. Take the following examples. As a consequence of music streaming, worldwide revenue in the music business fell by more than 50% in the period between 2000 and 2015 (McAfee and Brynjolfsson 2017). Retail giants continue to close down their brick-and-mortar stores, thanks to the growing dominance of online retail. Incumbent technology companies like IBM, Oracle, and SAP are frenetically trying to restructure their product and service lines. Therefore, the story is not just about the startling rise of platform companies (e.g., Facebook, Uber, Netflix). The fact is, the giants of the pre-platform world are altering their own business practices, while erstwhile heavyweights like Nokia and Kodak have been wiped out altogether.

These change processes are not restricted to or contained within the borders of western capitalist economies. The decades of globalization that precede this juncture mean that the corporate sectors of advanced capitalist regions are deeply entangled with the corporate sectors of the non-west. Not only are there cascading effects once lead firms in the west make new choices, but the actions of managerial elite at offshore economies and their workforces directly contribute to the making of platform capitalism. All these developments demand fresh engagement with theories of economic and industrial change. In the interest of analytically organizing the dissertation, this introductory chapter goes on to examine the tension between fixity and motion in three areas: *Fixed capital*, *corporate strategy*, and *managerial identity*.

1. Fixed Capital

The tension between fixity and motion is more literal and less figurative when it comes to the issue of fixed capital, for, the term itself alludes to material, embodied, or physical fixity. Buildings. Transportation. Machines. Plant equipment. Marx, however, argues against equating fixed capital with physical materiality. What we gather from a messy arrival at some kind of a definition in the Grundrisse is that fixed and circulating capital are relational categories. For Marx, fixed capital does not possess absolute properties. The classical economists used these terms regularly, but reified them. Marx notes that of the classical economists, Ricardo came closest to suggesting that ‘perishability’ is the key trait, i.e., the rate at which something is used by the production process. But, even for Ricardo, perishability is not defined in relative terms, but as a natural and innate attribute.[1] In contrast, Marx shows how fixed and circulating capital are extremely

[1] Marx with characteristic eloquence laments this reification, ‘This crude materialism of the economist who regard as the natural properties of things what are social relations of production among people, and qualities which things obtain because they are subsumed under these relations, is at the same time just as crude as idealism, even fetishism, since it imputes social relations to things as inherent characteristics, and

unstable categories. After all, someone's fixed capital is someone else's circulating capital. For him, fixed capital is that portion of the means of production that is consumed gradually, and therefore needs to be replaced relatively less frequently.[2]

In order to extract value, firms have to purchase the means of production. Yet, the fact that each input needs to be replaced at different points in time, poses an organizational challenge. Some inputs are regularly purchased, consumed, and replaced. These short and recurring cycles of use imply that circulating capital does not pose the same risks associated with fixed capital. In contrast, long term outlays into fixed capital are locked-in and disruptions can threaten the ability of the firm to recoup these large expenditures. That is, buildings and machines consume capital and their value is only gradually realized over time.

The fact that production and realization do not occur simultaneously, that the value process is retroactive (Henderson 2013, 15), presents a catch-22. To expand production, firms are compelled to make large investments that have long cycles of amortization. However, in an unstable market environment, large fixed assets can turn into dangerous liabilities (Schoenberger 1997). In a previous era, firms amassed in-process inventory, large buffer stocks, and capital-intensive fixed assets, based on a 'just-in-case' rationale and long-term forecasts (Sayer and Walker 1992; Vidal 2011). Maintaining idle capacity was a deliberate organizational strategy that only later came to connote waste and inefficiency. The Fordist just-in-case model depended on building in-house capacity so that firms could respond to fluctuations in demand. It was a unique way of managing market uncertainties and also resulted in creating barriers to entry.

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thus mystified them. The difficultly of defining a thing as fixed capital or circulating capital on the basis of its natural qualities has here, by way of exception, led the economists to the discovery that things in themselves are neither fixed nor circulating… (1973, 687).'

[2] To quote, 'The turnover of the fixed component of capital…encompasses several turnovers of the fluid components of capital. In the same time that it takes for fixed capital to turnover once, the fluid capital turnover several times…a part of its value much remains tied up in the old and persisting use form (Marx, 1993, p. 247).

While sitting on vast amounts of fixed capital allowed for expansion, disruptions to production or consumption cycles could be extremely dangerous. Fixed capital getting abruptly outmoded (as opposed to slowly depreciating due to wear) means that organizations might need to simply write off large investments, an act that eats into profits. Therefore, the pressure to protect existing investments must be considered as a force that checks continuous transformation. It leads to more conservative, path-dependent, and stabilizing decisions. While asset-intensive models are an advantage in stable market conditions and during periods of steady growth, at other times, large amounts of fixed capital are a source of rigidity and risk. Expanding capital-intensive investment may increase profits, but at the same time production costs also balloon. A larger and larger quantum of capital gets tied up and stuck for long periods of time.

This paradigm however was no longer tenable after the 1970s and western capitalism experimented with a new approach to this problem. The underutilization of fixed capital was suddenly unacceptable in a context where costs increased, profits rates slowed, and radically new sources of competition emerged. Underutilization became a sign of waste and inefficiency. Thus, post 1970s, instead of accumulating a vast and growing stock of fixed capital, companies shed their assets and began relying on a complex web of external suppliers (Coe and Yeung 2015). A new industrial outlook prevailed, one that prioritized flexibility, subcontracting, and just-in-time management (as opposed to just-in-case management). According to the new paradigm, waste in the domain of capital management and labor process had to be eliminated. Vertically-integrated American firms were dismantled, not just because of aggressive competition from Japanese firms or due to a falling profit rates, but also because of the rise of institutional finance. Private equity firms orchestrated takeovers and stripped-out corporate assets and resold them in chunks. 'As a result, about one third of the 1980 Fortune 500 disappeared during the 1980s, largely due to bust-up takeovers that collectively redrew the American industrial map (Davis 2009, 24).'

In what followed, market fluctuations were managed not by building internal capacity, but through externalization. Reconfiguring fixed capital arrangements was a critical technique to introduce flexibility into a system that was imbued with burdensome rigidities. It was in this context that western companies distributed risk across a network of geographically dispersed organizations. Under these arrangements, a sudden disruption in the realm of production or exchange meant that lead firms could alter, even suspend production without risking large-scale devaluation and sky-rocketing sunk costs. Outsourcing and offshoring are most often read as methods to dramatically reduce the cost of production. This certainly is the case. However, externalization is also a powerful technique of risk mitigation that tries to resolve the grave problem of fixed capital. In unstable market conditions, it is less risky to temporarily contract an external party and leverage its fixed capital and productive capacity, rather than take on the task of building capacity internally. Under the Post-Fordist regime, lead firms are constrained not by the immense weight of their own fixed and sunk costs, but by the contractual agreements with supplier firms.[3]

Externalization and the globalization of production networks represents one attempt at shifting from an asset-heavy production model to an asset-light paradigm. In a very tangible way, this strategy changed the world. It led to the deindustrialization in the global North and the concomitant (re)industrialization of the South.

In this dissertation, against the backdrop of the Post-Fordist preference for flexibility, I argue that platform-driven models represent another attempt at resolving the persisting problem of fixed capital. Fixed capital can be thought of as the long-term *infrastructure* of capitalist production. Infrastructure alludes to a subterranean scaffold that sets the

[3] Take a contemporary example. The collapsed demand resulting from the Covid-19 pandemic has greatly impacted the garment industry. However, it is the manufactures in Bangladesh who are stuck with unsold inventory and depreciating fixed capital, not the lead firms in the US. The global reorganization of production systems reduced costs but also offloaded risks. To protect themselves, western retailers simply cancel orders from suppliers and suspend contracts. The dire financial consequences of doing so are minimal for lead firms, compared to the suspension of production if the risks are entirely on their books. See: Sam, Chambers, ‘Primark’s coronavirus body blow to suppliers,’ 12 April 2020. The Times. https://www.thetimes.co.uk/article/primarks-coronavirus-body-blow-to-suppliers-b83853x5n

preconditions of social activity (Plantin et al. 2018). Historically, infrastructures – railways, machinery, pipelines – have been fixed, rigid, and expensive. From the point of view of capitalist organizations, an infrastructure that is hyper-flexible rather than rigid, cheap rather than expensive, exponentially scalable rather than fixed, and modular rather than monolithic, would be the stuff of fantasy.

The cloud platform is a manifestation of such a fantasy – a digital infrastructure that appears to release capital from the stranglehold of its necessary fixedness. Here the problem of fixed capital is not merely resolved through the social and geographical rearrangements of Post-Fordist capitalism, but through transforming its qualitative nature and organization. Asset-light cloud computing, as I argue subsequently, does externalize fixed capital in new ways, but it also modularizes and virtualizes it.

Gerald Davis (2016) offers a reminder as to why corporations as organizational forms and legal entities came to exist in the first place. Undertaking production at scale was hugely expensive and risky. He argues that modern firms came into existence precisely to enable the ownership of 'costly and long-lived' assets and to finance the growth of scale. What if this can occur without either building this stock of assets or without entering into contractual agreements with the organizational owners of such assets? What if the size and scale of assets and related productive activity expanded and contracted with minimal marginal costs? This is the offer that hyper-elastic platforms make (Davis 2016). The elasticity of platforms does not depend on incremental or proportional increases in fixed assets, rather, it depends on cloud computing - a computing paradigm that combines virtualized hardware, internet-based delivery of computing resources, and web-enabled applications. Platformization, I argue, is an attempt to unfetter the fixity of capital.

Of late, many argue that data has become the chief productive input (Couldry and Mejias 2019; Langley and Leyshon 2020; Sadowski 2020; Srnicek 2017; Zuboff 2015). Platform owners depend on the extraction and assetization of data that is now abundant, often free, and intangible. Data and software assets are increasingly central to value creation. Some even argue that this asset-form is more central to economic activity than traditional assets (Haskel and Westlake 2018). The focus on large-scale data extraction as a central feature of platform capitalism, is undoubtedly important. But what kind of infrastructure is the platform itself?

Platforms are a specific configuration of hardware and software that scales non-linearly. How was Zoom, the video conferencing platform company that became essential infrastructure during the Covid-19 Pandemic, able to suddenly support *300 million* daily participants in April 2020, when weeks before, it hosted only *10 million* daily participants? Network effects and big data cannot explain this elasticity. To answer this, we need to examine the sociotechnical attributes of contemporary digital platforms and figure out how these reformulate computing fixed capital.

New platforms are important not just because they have driven the rise of a new organizational form (Davis 2016), but also because traditional economies are being platformized. In fact, the reconfiguration of software assets blurs the distinction between a tech and non-tech company, with platform models spreading across industrial sectors.[4] The expansion of platforms is not just shaped by the anatomy of the digital infrastructure. Availability of low-cost labor (to sustain the 'gig' economy), economic deregulation, and an abundance of speculative finance shapes the growth of platforms economies (Srnicek 2017).

In the context of platform capitalism, dominant firms and their value-creating practices do face novel threats and industrial status quo are indeed destabilized. However, the demise of incumbent firms cannot be naturalized. The fact is that large, established firms adopt a range of methods in their efforts to contend with new opportunities and challenges. This brings us to the problem of competition and firm strategy.

[4] Is Uber a tech company or a transportation company? Is Netflix a media company or a tech company? Is Amazon a tech company or a retail company? In light of this blurring, it is helpful to think of the 'digitalization' of non-digital industries, as analogous to the financialization of non-financial companies.

2. Strategies of Competition

Corporate strategies are born out of specific market contexts and conditions. At the same time, organizational strategy generates those very conditions. The fact that the strategies of organizational actors converge to generate macro changes in industrial organization, make strategy the conduit through which structural shifts occur. Strategic action engineers and actualizes new industrial relations. In Schumpeter's words,

> Every piece of business strategy acquires its true significance only against the background of that process and within the situation created by it. It must be seen in its role in the perennial gale of creative destruction…(1976, 83).

Neoclassical economics, given its emphasis on efficiency and rational action, promotes a flat, uncomplicated reading of firm strategy (Alvesson and Willmott 2012; Fligstein and Dauber 1989). In contrast to 'rational adaptation theories' positing that firms mechanically adapt to market environments, sociological approaches take neither action nor outcomes for granted (Fligstein and Dauter 1989). Critical Management Studies (CMS) offers a post-rationalist approach to the study of corporate strategy. This subfield rejects the notion that corporations, at the behest of firm-level 'leadership,' solely behave in planned, systematic, and controlled ways. CMS rightly asserts that management needs to be treated as a complex and internally contested social formation. Scholars often borrow from and experiment with critical theory and post-structural thought to puncture the dominant framing of managers as 'depositories of impartial expertise who privilege the claims of technical, instrumental reason (Alvesson and Willmott 2012, 21).'

In short, CMS reminds us that 'management' is constituted by people. People who attempt to shape collective decisions and their institutionalization. The question is what informs the decisions made by those accorded broad-based decision-making authority. What informs the decisions of top management and how do divergent motives shape actions and outcomes? CMS scholars therefore focus on the *doing* of strategy; studying how decisions are made and what shapes them (Jarzabkowski and Paul Spee 2009; Johnson et al. 2007). Put differently, strategy here is treated not as something a firm *has* but something that people *do* (Jarzabkowski and Whittington 2008). This processual approach, loosely termed the strategy-as-practice approach, focuses on the interactions between managers and the social process of decision making.

With strategy research, the methodological unit of study becomes the organization and strategy emerges as an outcome of internal contestations. Processual frames that prioritize the study of micro interaction run the risk of neglecting extra-organizational, structuring forces. The analytic challenge is to complicate the terrain of management, without assuming that managerial motives and actions are totally open ended, driven by various idiosyncrasies and identity-level phenomena.

Marxian frames should find it easy to deny the separation of organizational and market-level analysis, as it theoretically foregrounds the vexed 'unity of production and realization' (Marx 1973, 404). Nevertheless, it is useful to bring the strength of CMS to bear on industrial analysis – the strength being the recognition that 'management' is peopled by individual actors and is not an abstract monolithic force. Managers are not mechanical agents of maximization; their interests and actions are not simply predetermined by an abstract and uniform 'logic of capital.' The logic of capital is not articulated through a singular, self-evident industrial strategy that guarantees its dominance. Apart from the multiplicity of strategic means and ends, some Marxists emphasize that managers are simply not driven by rational-choice appraisals. For instance, Vidal (2019) extends the argument that managers are 'satisficers' rather than maximizers. That is, they settle for 'good enough' rather than the most 'efficient' practice.

Marxist framings are most useful to study firm strategies that aim to increase productivity through rationalization, control, and labor-displacing technology. Capital Vol. I illuminates the industrial tendency to shift from absolute to relative surplus value, that is, the increasing use of capital-intensive vis-à-vis labor-intensive production methods. Profits can be extracted by holding the productive forces constant and simply increasing working days, the number of workers employed, or by the elongation of the working day. This is the aggregate work time a firm has at its disposal.[5] In this scenario, a largely constant labor process characterizes the firm; what changes (increases) is only the number of workers who expend their labor power or the time they spend doing so. However, at some point this method of value extraction is no longer sufficient and this calls for a transformation of the productive forces. Here firms explore new instruments of production and also seek to 'resocialize' labor. The scholarly tradition associated with this labor process theory often focuses on work intensification and automation. However, firms maintain and reinvent their competitiveness by more means that the reorganization of an internal labor process. Firms also acquire other firms, advertise and sell their products in new ways, diversify output, experiment with organizational structure, increase financial value, invest in research and development, and so on. Shifts in strategy imply broad-based, future-oriented decisions that refocus organizational priorities (Schoenberger 1997, 151). Efforts to reduce labor and production costs is a major priority, but far from the only one. The terrain of corporate action is multifarious and conflicted, and is often pulled in multiple different directions.

Neil Fligstein (1990) differentiates between various modes of achieving control over internal and external environments. According to him different managerial factions have different conceptions of control. Finance, marketing, and operational units prioritize distinct forms of action. For example, manufacturing conceptions of corporate control aim to stabilize production by lowering input costs through vertical and horizontal integration. Marketing conceptions prioritize sales growth, segmentation and market share, while finance-based conceptions focus on shareholder value and the financial value of the firm. These diverse priorities cannot be seamlessly balanced, and the assumption that a perfect equilibrium is possible is misplaced. Instead, organizational goals are often

[5] The most common view of how absolute surplus value is extracted points to the elongation of the working day. More useful is to think of it as the *multiplication of simultaneous working days*, a phrase Marx fleetingly uses (1973, 386; 1973, 399).

in tension with one another, making it important to study internal power struggles and how these are shaped by larger political economy conditions, including regulatory shifts. Industrial change is associated with new practices that gain ascendence. Understanding why this occurs requires the study of crisis conditions, shifts in state power and regulation, and so on.

From a slightly different angle, Schoenberger briefly discusses the difference between two kinds of competitive threats (1997,126-127). First are routine challenges from existing competitors that typically lead to price and cost competition. These challenges might result in actions such as automation, product differentiation, and entering new geographical markets in search of consumers. In contrast, competitive threats can emerge from outside an existing order. In fact, entirely new sources of threat generate more intense and immediate problems (examples include the threat of Japanese production models to the American auto industry and the threat posed by the personal computer to manufacturers of mainframes).

The second kind of threat exposes the glaring contradiction between fixity and motion. Large established firms dominate within one competitive paradigm, but in the face of a major threat are weighed down by sunk costs, path dependence, and the entrenched interest in perpetuating 'success' through existing means. Success generates and depends on fixity. This fixity also tempers the 'gales of creative destruction' and protects the industrial status quo from the disruptive chaos of continual transformation. The double-edged nature of this fixity is exposed during times of crises, where established firms (known as incumbents) struggle to transforms themselves. These moments reveal the paradox of capitalist organizations both courting and fearing fixity.

Platform capitalism

In the context of platform capitalism, the owners of platform infrastructure dominate the new economy. They are rightfully referred to as a new class of rentiers (Sadowski 2020).

However, while there are strong monopoly tendencies at play, platform-based models unleash chaos in a range of unrelated markets, generating new forms of instability and hyper-competition. There is widespread sentiment in business circles that the value-creating structures of established firms across industries are uniquely under threat, that markets are dangerously unpredictable and punishing, that traditional business strategies are outmoded, and that the terms of competition have changed (Downes and Nunes 2014). Individual executive managers are often circumspect in their claims, living on a quarter-to-quarter basis and grappling with the impatient demands of individual and institutional shareholders. Indeed, the global corporate sector increasingly accepts and articulates the sentiment that only the paranoid survive and the rest perish (Grove 2010).

My analysis of the current era of flux follows Schoenberger's lead in speaking not of individual strategies, but changing models of competition and new strategy paradigms. Organizational forms and dominant strategies of competition have varied across the different growth-regimes, making it possible to identify shifting preferences of different strategy complexes. My analysis begins with the assumption that there is a stark contradiction at the firm-level between the imperative to intensify an existing production regime and the imperative to discover and create opportunities. Organizational scholars refer to this as the tension between exploitation and exploration (Adler et al. 2009; Benner and Tushman 2015). This paradox reflects the tension between the immediate drive to intensify production, and the long-term drive toward renewal through radically new opportunities of value creation. In as much as business consultants and management schools promise to show how the opposing pressures to preserve existing advantages and the imperative of market-making can be solved, Marxian analyses tells us that there are no absolute solutions to such contradictions.

In this dissertation, I theorize a particular organizational practice: market-making at the cost of cannibalizing the existing source of competitive advantage. Intense instabilities and new threats are fueling market-making efforts, even at the cost of displacing the profitable existing structures. I term this the *autophagic*, or 'self-devouring' drive, presenting it as a specific mechanism of industrial change. Autophagic strategies reflect the de-prioritization of market-preservation, and the re-prioritization of market-making. These techniques unfetter the self-protective fixity of capital and accelerate creative destruction.

From macro analysis of fixed capital regimes, to meso-level analysis of business strategy, the final segment of the dissertation takes on managerial analysis at a 'micro' or workplace level. Schoenberger (1997) rightly argues that managers slow down the pace of transformation not because they are irrational, but because they are involved in preserving the current paradigm that grants them certainty in the short term. However, once the pressure to experiment with a more radical change process mounts, the cleavage between the preservatory impulse and corporate renewal intensifies. Conditions of uncertainty unsettle managerial power structures, compelling us to examine managerial subjectivity, the hierarchical and graded nature of corporate structures, and the contradictions internal to managerial authority.

3. Managerial Structures and Identity

Marx explicitly argued that capitalists are not individuals naturally defined by greed or a thirst for power, but as *personifications* of capital. Which is to say, their structural position within a complex social system predisposes them toward certain action. More broadly, Marxian frames identify expanded reproduction or accumulation as an overarching feature of capitalist dynamics. At an industrial level, this implies that top management is driven to increase profit rates (and shareholder value). This theoretical claim opens up a series of sociological questions about managers – the nature of their authority, actions, and interpretations.

The previous section focused on how managers who prevail over high-level, organizational decision-making ('strategists') respond to external, competitive environments. It follows that the position of executive management is defined by the ability to shape orienting decisions and catalyze organization-wide changes in resource allocation, internal structures, broad workflows, changes to commodity lines, and so on. This specific kind of power is only enjoyed by a handful of managers at the upper echelons of the firm (Schoenberger 1997). Another factor makes this position unique. Top-level managers (unlike middle managers) are disciplined less by intra-firm dynamics, and more by the actions of top-level mangers in competing firms (Schoenberger 1997) as well as institutional shareholders. This section pivots from analyzing the outward orientation of strategic management to focus on managerial work at middle and lower-levels of the firms.

For Schoenberger, management identity can itself be represented as a peculiar sunk cost. She stretches the category of sunk costs beyond the domain of fixed assets to refer to a 'social asset structure, which is internalized as identity' (1997, 145). Embodied fixed capital investment, as discussed, acts as a counter weight against unchecked creative destruction. The resistance to change can also unfold through the identity-based protection of an existing turf. To quote,

> The threat posed by competing firms organized on a different model and around a different strategy […] is, then, not only loss of markets and devaluation of the real assets of the firm, but also loss of identity and devaluation of the asset structures of those managers (Schoenberger 1997, 145).

The analytical problem here is that of identification. To what extent does the reproduction and expansion of the firm depend on managerial identification with the organization? What happens when there is a disjuncture between corporate interest and personal interest among managers? There is no absolute or inevitable guarantee that a top manager will serve the interest of the organization (which is to reproduce and expand itself) instead of either resisting directives or prioritizing the acquisition of personal wealth over profitmaking. The personification of capital needs to be achieved. 'Good' capitalists need to be produced. Just like the field of competitive strategy, the field of workplace interests is neither static nor predetermined (Smith 1992).

As stated, this dissertation is concerned with contradictions internal to capital and internal to management rather than the capital-labor contradiction. The manufacturing of consent and the issue of resistance has been widely studied with regard to the management of labor. *What about the management of managers*?

There are both crude and subtle ways of aligning interests of managers with that of the firm. Firms have adopted a number of methods to align the two, so that it is in a manager's personal interest to act on behalf of the corporate interest. The common practice of linking not just the performance of top managers, but also the performance of a broad range of employees, with various perks (e.g., bonuses and stock options) speaks directly to this. CEOs, for example, are often richly rewarded and incentivized based on the financial performance of the firm in a fiscal year or even quarter. Post-1970s, the use of employee stock options became a key strategy of getting managers to serve shareholder value, which was increasingly becoming a key metric of corporate performance.

However, there are myriad other means of enhancing identification and loyalty that are more subtle. Post-Fordist management ideologies seek the loyalty of workers and managers using everything from new-age psychology, which focuses on work as a means of self-actualization, to threats of layoffs (Crain, Poster, and Cherry 2016; Newman 1999; Upadhya 2009). In a landmark study on corporate culture, Kunda writes,

> Under normative control, members act in the best interest of the company not because they are physically coerced, nor purely from an instrumental concern with economic rewards and sanctions…they are driven by internal commitment, strong identification with company goals, intrinsic satisfaction from work. These

> are elicited by a variety of managerial appeals, exhortations, and actions…(2009, 11).

Despite all these efforts to bring about a convergence in personal and organizational interests, cracks begin to show, particularly during times of uncertainty, faltering growth, and heightened managerial precariousness. A tension between protecting the long-term viability of one's job, on the one hand, and executing the corporate interest on the other, deepens. I argue that while this contradiction is relatively muted during high-growth phases, during periods of restructuring this disjuncture expands. In this context, furthering the agenda of top management might pose a direct threat to one's managerial authority, even one's occupation. Although scholars have found a general commitment to meritocratic ideologies amongst managers (Newman 1999), a recent paper found that during times of economic crisis, professional elites are less likely to subscribe to these ideals (Lopez and Phillips 2019). This finding speaks to the point that identification is unstable and shaped by broader structural contexts. Therefore, corporate structures, as with all structural phenomenon, throw up questions of agentive practice and identity formation.

Vicki Smith's *Managing in the Corporate Interest* (1992) is a rare book that places the problem of managerial subjectivity and organizational position at the center of study. She refrains from assuming 'a fit between the structures of control designated by top management and middle managers' consent to those structures (Smith 1992, 92).' The middle managers of her study are deeply critical of top management and resist the pressure on them to cut down their teams. They clearly articulate a perception of corporate restructuring that differs from that of strategic management. For instance, in this case, middle managers opt for transparency. They choose to tell their teams that their jobs are at stake; using transparent communication they call for a collective effort to increase productivity to buffer this risk. These managers criticize the attempt on the part of top management to scapegoat lower-level managers for their own myopia and decision-making failures. In this study, top management is widely viewed in negative terms by other managers.

In contrast, the unemployed managers of Katherine Newman's study (1999), were unable to de-identify from a system that had failed them. Newman, like others (Lane 2011; Sharone 2013), finds that middle managers justify and stigmatize their own precariousness, even in the face of systemic and largescale downsizing. As Kalleberg and Vallas note (2017, 19), with white-collar professionals 'research at the micro level tends to report a pattern of resignation or consent.'

These differing representations of middle managers as either dissenting agents with a semi-autonomous organizational positionality (Courpasson, Dany, and Clegg 2011; Smith 1992) or as people who have internalized the ideology of meritocratic individualism (Newman 1999), demonstrates the indeterminate nature of the managerial identity. Harding et al., (2009) also recognize that managers at times are implementors of new corporate strategies, and at other times, re-interpret and resist restructuring. The broader point here is that 'top-down intended change [becomes] an emergent and unpredictable process' (Balogun and Johnson 2005, 1574).

What explains the nebulous terrain of managerial action? I build on a small theoretical literature that recognizes that the majority of managers occupy a contradictory organizational position - simultaneously being agents and victims of the firm (Smith 1992; Willmott 1997; Wright 1985). Certainly, in the west, post 1980s, managerial work has been intensified and also often rendered superfluous. Managers occupy a confused, at times conflicted liminal space between these two subject positions. Management structures and a changing 'managerial labor process' inform what I call the *structural liminality* of middle management. Middle managers possess authority in the workplace, yet their own performance is closely monitored, surveilled and controlled. Indeed, the hyper-rationalization of management means that it is analytically difficult to cleanly separate the agents of control from subjects of control. Middle managers experience high-levels of overwork (Kelly and Moen 2020). They also possess varying degrees of decision-making autonomy and authority to enforce strategies and monitor labor process. This is how I interpret and respond to the recent call to pay more attention to the *middleness* of middle management (Gjerde and Alvesson 2020).

This broad framing of contradictory managerial positions informs the arguments that follow in the third and final segment of the dissertation. As mentioned, the broad consensus is that industrial practices are being upended in a range of sectors. If incumbent companies are rushing to alter their revenue lines and destabilize their own firms in their quest for new sources of value, it implies that middle managers are being recruited to implement new managerial visions. If the pressures on incumbent firms are generating new cost-cutting efforts, then mid-managers are again under new forms of strain that intensify the contradiction that permeate their organizational location. How this unfolds, and how firms attempt to benefit from the contradictory liminality of middle managers during periods of flux is an empirical question – one that I closely investigate in the final segment of the project.

In this introduction, I have discussed three key contradictions in the three areas of fixed capital, business strategy, and managerial identity and action. These represent the three pillars of the dissertation.

i. **Fixed capital**

   Contradiction: Fixed capital investment is typically vital for expansion, but also introduces risks associated with its fixity.

ii. **Business strategy**

   Contradiction: Firms grapple with the contradictory imperatives of market-intensification and market-making.

iii. Managerial action

Contradiction: Managerial actors are both agents and subjects of corporate control.

It is tempting to make a causal argument that a reconfiguration in the realm of fixed capital, disturbs dominant strategies of competition, which in turn recruits middle managers to implement changes despite the personal toll. In broad analytical terms this might be tenable; but 'proving' this linearity through a complex empirical case is challenging. Therefore, it is best to simply treat these realms as interconnected levels of analysis, where disruptions in each level affect the other.

With each of these three domains, I show how a particular fixed capital arrangement, a particular organizational strategy, and particular forms of employee action produce vexed responses to a sharp contradiction. Thus, in the three major segments of the dissertation I argue that: 1) platform strategies are an attempt to escape the enduring problem of fixed capital, 2) *Autophagic action* emerges as a response to the intensified tension between market-making and market-preservation, and 3) finally, the actions of middle managers who enable their own ouster from their firms, reflects the contradictions internal to managerial hierarchies. These are the broad-based analytical claims I make based on the detailed study of a special case of industrial restructuring.

The Case and Context: The Restructuring of Software Services Firms

From media to hotels to retail - a range of sectors are undergoing major changes both in their organizational fields and in their methods of profitmaking. The transnational, corporate computing industry, of which India represents a major node, is similarly going through a period of intense upheaval. However, before exploring the current upheaval, some context is necessary.

Western corporations over the last sixty years have been aggressively computerized. To develop an internal digital infrastructure, firms buy hardware, software, networking equipment, software services, and consulting services from a range of actors in the business-facing computing industry. This dissertation focuses on the changing terrain of the computer services industry, which includes consulting, programming, systems integration, and data center management services (Yost 2017). The annual revenue of this industry (world-wide) in 2014, was $954.8 billion. However, as Jeffery Yost (2017) notes, this industry is significant not just because of its large revenues, but because of the special role it plays in shaping the adoption of computers across other industries and organizations. Despite its significance, it has received much less attention than the hardware and software products industry – the other two pillars of the corporate computing sector (Yost 2017).

From the birth of the information-machine, a network of vendors supported and promoted its adoption as a business technology. This network of technology firms has undergone profound changes since 1958 when Harvard Business Review first declared,

> Over the last decade a new technology has begun to take hold in American business, one so new that its significance is still difficult to evaluate. The new technology does not yet have a single established name. We shall call it *information technology*.[6]

The distinction between software products and software services is important to establish here. This division is unstable, yet a working definition is possible: software that is standardized and sold to many organizations is a 'product,' whereas software code that is custom-made is a service. Firms that offer these services are known either as software services companies or as IT companies. Between the 1950 and the 1990s, the largest IT companies were clearly American firms that hired American employees.

[6] Leavitt, H, J., and Whisler, T. L (1958). Management in the 1980's. *Harvard Business Review*, Retrieved from https://hbr.org/1958/11/management-in-the-1980s.

The 1990s transformed the face of the IT services industry. Over the last thirty years it has been profoundly globalized, with India emerging are an extremely significant outpost. First, Indian companies such as Tata Consultancy Service (TCS hereon), Infosys, Wipro, HCL, and Cognizant[7] grew in size and stature. Second, US hardware and software companies built vast operations in India. For example, IBM, HP, and Accenture have large offices and workforces in cities like Bangalore and Hyderabad. These US companies, operating out of India, compete with Indian firms to win contracts with client firms in the US and UK.[8]

This global reorganization of the IT industry led to a boom India's software economy. To get a sense of the scale of growth these developments activated, consider the fact that sales from software exports rose from $164 million in 1991-1992 to $6.2 billion in 2001-2002 (Sharma 2015, 181). In India, the first decade of the 2000s saw yearly growth rates in software exports of 30 percent. The number of Fortune 500 companies that contracted vendors with a base in India went from 300 to 400 in a two-year period (2005- 2006) (Balakrishnan 2006). Total revenues of India's industry, during a five-year period (2000-2005), increased by 200 percent (Balakrishnan 2006). This growth has had tremendous impact on urban transformation and the expansion of a new middle class (Baviskar and Ray 2011; Goldman 2011). Considered together, this industry is significant in India as it impinges on social fields outside its own borders (Upadhya 2016).

The fact that India's software economy is inextricably tied to global patterns of IT consumption renders it a key springboard from which to understand the new world of comporting computing, business strategy, and organizational change. Over a short period of time, Indian companies went from offering low-end services, such as debugging code, to more complex, higher-level services (Peck 2017; Yost 2017). Over time, offshore

[7] Cognizant is labelled an 'Indian company' even though its headquarters are in New Jersey, due to the fact that is largely managed by Indians and its employees are almost entirely based in India.

[8] In parallel, a range of US companies also set up offshore development centres (ODCs) in India, where Indian employees developed technologies for the parent company (rather than for sale). This also supported the massive growth of software employees in India.

companies grew increasingly involved with developing and implementing software systems to do with payroll, accounting, inventory, and supply chain management.

However, as it turns out, this trajectory of breakneck expansion, based on the huge global demand for back-office IT services, began faltering around 2014. When I started conducting pre-dissertation research (June 2014), voices from within in the IT industry were expressing concern about the future of the sector, discussing technological disruptions, and the need to reinvent the core business. The CEO of Infosys, the second largest Indian IT firm, publicly said, 'While there are quarterly ups and downs based on a variety of factors, what really matters in our industry is the structural change…'[9] Through the course of my research, I noted unprecedented middle manager layoffs, pressures on traditional service lines, fluctuations in rates of hiring, proliferation of share buyback schemes, smaller deal sizes on average, reskilling initiatives, a wave of acquisitions, and new revenue lines. These served as key indicators that the industry was (and continues to be) in the throes of structural change.

This is true not just of Indian services companies. Global firms like IBM, Capgemini, and Accenture are also redefining their business strategy and revenue lines (Yost 2017). The giants of the software products world – Oracle and SAP – are similarly undergoing major changes and altering their revenue structures (Grant 2019). Relatedly, industrial analysts and journalists have closely tracked Microsoft's recent transformation, as it has gone about cannibalizing revenues from Windows licenses, the very source of its monopoly position in the products market (Thompson 2018). Meanwhile a new category of companies termed Software-as-a-Service platforms have entered the market. In fact, India is now home to globally successful SaaS companies, such as Zoho and Freshdesk, that compete aggressively against their US counterparts.

[9] Transcript of press conference: https://www.infosys.com/investors/reports-filings/quarterly-results/2016-2017/q2/Documents/transcripts/management-commentary.pdf (Accessed on 10th November 2016)

In short, the globalized world of corporate computing is transforming quickly. This implies that the global customers of corporate computing are altering how they access software, hardware, and IT services. At this point, in 2020, it is no secret that cloud-based computing is upending practices of the computing industry. Corporate software and data are no longer necessarily installed or stored on the client company's devices. Instead, the client can rent and subscribe to computing resources (e.g., servers, platforms, software applications) on a per-use-basis, as noted in the following definition,

> Cloud computing is a pay-per-use IT consumption and delivery model that enables real-time delivery of configurable computing resources […] Typically, these are highly scalable resources delivered over the internet to multiple companies, which pay only for what they use (NASSCOM 2016).

Keeping this context in mind, this dissertation responds to three questions that align with three areas of debate that structure this introduction:

1. How is the nature and organization of computing fixed capital changing?

2. What strategies do IT firms adopt to cope with their changing market?

3. How do *middle managers* at IT firms experience and respond to high levels of insecurity and job loss?

The Research Process

This dissertation is based on 20 months of fieldwork in India (15 continuous months in the 2017-2018 period). I conducted 99 semi-structured, qualitative interviews with 82 professionals associated with this offshore industry. Apart from interviews, fieldwork also entailed participant observation at business conclaves and meetings of emerging unions for IT employees. Research was primarily conducted in Bangalore, the national hub of India's software industry.[10]

I corroborated and extended data from fieldwork using a range of document sources. These included consultant reports, firm-level annual reports, expert blogs, and analyst reports. This sector receives a lot of press coverage in India, and I closely tracked the business press for information on corporate acquisitions, layoffs, financial performance, and other industry developments. These document sources allowed me to contextualize and verify certain observations made by industry informants and also gave me access to information that was missing from interviews.

Like other scholars examining new industrial practices (Vidal 2017; Whitford and Zirpoli 2014), rather than conduct a single firm-level case study, I chose to spread interviews across a firms and focused on particular employee categories.

[10] For interviews with software developers and entrepreneurs associated with a new economy of tech start-ups, including software-as-a-service (SaaS), I travelled to Chennai, home to a new ecosystem of SaaS startups.

I categorized the interview participants in the following way:

Interview Category	**Number of Interviews**	**Number of Interviewees**
Top Managers (large IT services companies)	15	14
Middle Managers (large IT services companies)	45	39
Professionals at Startup Ecosystem (e.g. CEOs, founders, developers, financiers)	35	25
Broad-based ‘Experts’ (e.g. Technology journalists, analysts, consultants, labor organizers)	15	10
TOTAL	**110**	**88**

Table 1 Study Participants

With respect to the complex terrain of software and software related firms in India, this study focuses on software services firms. As will be explained in more detail later in the next chapter, western client companies bought hardware and software products and simultaneously contracted with a company that offered software services. This IT services vendor would be tasked with maintaining, developing, and upgrading the client’s IT infrastructure.

While it is tempting to see Indian software services companies as underdogs that are controlled by their networks, such a reading would misrepresent the size, scale, and significance these companies have acquired over the last three decades. It is important to note that TCS, Infosys, and Cognizant are ranked in the list of top 70 digital companies globally, a list that is led by companies of the likes of Apple, Google, Amazon, and

AT&T.[11] In 2015, TCS generated over fifteen billion dollars in revenue, thus breaking into the list of top ten IT companies globally (Yost 2017). The majority of the individuals I interviewed were employed by top Indian IT firms whose annual revenues range between $7-20 billion. I refrain from using company names except when referencing publicly available data.

Those I interviewed constitute a hyper-mobile category of professionals, frequently traveling between client sites (US and UK) and India. Therefore, while most interviews were conducted face-to-face (at offices, coffeeshops, and homes), a few were conducted virtually over an audio or video call. All interviews were conducted in English. On average these in-depth interviews lasted two hours, with some extending to four hours.

With regard to sampling, I relied on purposive sampling techniques, methods particularly suited for elite networks that are otherwise inaccessible. For instance, I deliberately sought out interviews with specific executive-level managers, knowing that an interview with the Chief Strategy Officer or Chief Technology Officer of a top IT company would be invaluable, given my focus on the birth of new managerial agendas. I also pursued interview opportunities with specific mid-range managers. For example, managers who were in charge of traditional service lines such as 'infrastructure maintenance' were particularly candid about the threat of new technology trends. While members of top management discussed the new pressures on companies and their rationales for initiating new strategies, middle managers offered insights into the messy process of undertaking new strategic initiatives and also discussed their personal experiences of workplace precarity. Software developers and entrepreneurs linked niche startups that offers cloud-enabled business applications were positioned to give me a sophisticated account of changes in the domain of software creation more broadly.[12]

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[11] 'Forbes Top 100 Digital Companies,' 2019 Ranking. https://www.forbes.com/top-digital-companies/list/#tab:rank.

[12] This dissertation focuses on the restructuring of large IT firms in India that constitute the traditional software services industry. Parallel to this is another development: the emergence of a new breed of asset-light organizations in India that offers global clients specialized software applications using a Software as a

I pursued an inductive approach where interview guides were revised based on new findings and observations, and a tightly iterative process between interviews guides, in-depth interviews and analysis emerged. Throughout the research period, I maintained post-interview memos and transcripts of interviews. I then synthesized emerging themes and concepts by writing detailed 'meta-notes.' This enabled me to consolidate my analysis as meta-notes wove together themes that ran across multiple transcripts (Emerson 1995; Kiviat 2019).

Dissertation Overview

The next chapter offers a brief analysis of the recent history of IT offshoring and the dramatic rise of India's sector. Following this are three core chapters of the dissertation. These are not purely 'empirical chapters,' rather I attempt to craft three specific arguments to contribute to distinct literatures. While in some sense, these are standalone chapters, the sequence reveals clear analytical connections, with the first picking up the issue of a new digital fixed capital (which alters the market for IT services). The next chapter probes the issue of business strategy, mounting an argument at an organizational level. Finally, I analyze mid-managerial precariousness and layoffs, thus presenting an analysis of change at the level of work.

As mentioned, *Chapter Two* offers a short account of the rise of India's IT sector, focusing on the twenty-year period of rapid industrial expansion. This is a context-setting chapter. Rather than offering a chronological history, it examines two conjunctural moments: the Y2K opportunity, and the emergence of large off-the-shelf propriety

Service (SaaS) delivery model. I conducted a number of interviews with people associated with new tech startups. I draw on these interviews when conceptualizing cloud-based corporate computing, but do not venture into analyzing the new cluster of startups in detail. I found that the dynamics of this platform ecosystem were distinct from the traditional sector and therefore bracketed it out. While there are important analytical links, the restructuring of India's large companies and the mushrooming of new platform companies in India are relatively independent processes. The new startups in India serve a different clientele and are not direct threats to traditional IT companies.

software packages. I look at how these two moments presented corporate elites in India with opportunities to carve out an important place in the global network of software services.

Chapter Three takes on the task of conceptualizing cloud infrastructure as a new rendition of machinic fixed capital. I use interviews with IT managers and software developers to show how computing capital is being externalized, virtualized, and modularized in the age of ubiquitous internet. I draw from an emergent literature on platform infrastructure and also engage long-standing debates on sunk costs and industrial fixed capital.

Having shown the key sociotechnical attributes of this new digital infrastructure, *Chapter Four* engages the question of competition and strategy. I analyze a key finding: Indian IT companies and other technology companies are eroding profitable revenue lines in their attempts to enter the market of cloud software and services. I term this move to annihilate a profitable revenue unit, as a self-devouring' or autophagic act. This chapter builds on literature that identifies an organizational contradiction between 'exploitation' and 'exploration' or what I refer to as market-presentation and market-making.

Chapter Five explores managerial identities, actions, and roles in the conditions of uncertainty and flux. I examine the contradictory positionality of offshore middle managers suddenly rendered disposable. I theorize the structural liminality of surplus managers who go from being symbols of spectacular industrial expansion, to being viewed as unskilled relics of a past, with few prospects in the future. These highly precarious managers voice the corporate interest, implement new strategies, and 'voluntarily' resign from their jobs. I examine the tension between being both an agent and subject of corporate control. The empirical analysis contributes literatures on middle management and organizational change.

Chapter Six, the concluding chapter, synthesizes the three levels of analysis (fixed capital, competition, managerial action) and explores the distinctiveness of platform-driven industrial change.

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Chapter 2.

Setting the Stage: The expansion of India's software sector

Introduction

Journalists (Sharma 2015), industry insiders (Rastogi and Pradhan 2011), computing historians (Bassett 2016; Yost 2017), and social scientists (Balakrishnan 2006; Parthasarathy 2010; Upadhya 2016) have discussed a number of aspects pertaining to the rise of India's software industry. In a context where global North economies were eager to contract corporate services and IT work from low-cost regions, many answer the question: why India? Briefly, a large English-speaking population, state sponsored technical training, and other forms of state support (export zones, relaxed labor laws, tax breaks), represent some of the broad preconditions of the boom. Instead of rehashing a fairly well-known history in detail, here I focus on two specific issues that are central to industrial expansion:

i. The shift from on-site to offshore IT work
ii. The rise of new software products in the global IT market

I expound on these two aspects by interweaving narratives offered by two key interlocutors with insights from secondary literatures. Pavan and Kiran both started their careers in IT in the early 1990s. I interviewed each of them several times in my effort to piece together a recent history of the industry, its emergence and then its swift and staggering expansion in the 1995-2015 period.

The Shift from On-Site to Offshore Work: Pavan

In the 1990s, US companies were starting to recruit Indian software employees to work in the US offices on the basis of short-term contracts. This work regime was (in)famously known as ‘body-shopping’ (Aneesh 2006; Upadhya 2016; Xiang 2007). Indian engineers supported by temporary work visas, traveled on-site to the US in order to attend to client systems. Indian firms during this time, as Pavan said, ‘just provided customers with warm bodies.’ He continued, ‘This was the common parlance: how many warm bodies do you need?’ Pavan went on to describe how *body shopping* – the practice of employing low-cost IT labor to work on-site at company locations on hourly pay – was slowly replaced by *offshoring* – the practice of moving work itself to low-cost locations in the global South.

The Y2K crisis was a watershed moment for the Indian sector that paved the way for wide array of software work to be relocated to India (Balakrishnan 2006; Yost 2017). The fear that a global computer outage would follow when the clocks struck midnight on December 31 1999 had gripped the world. The concern was that computers would malfunction due to the transition from the year 1999 to 2000, as computers adhered to a double-digit representation of years and therefore going from 99 to 00 would expose a major bug. To quote Pavan,

> People suddenly began thinking ‘Oh my god, we are looking at an incredibly dangerous situation where all our computers might malfunction and stop working because they can’t handle the turn of the century.’

Averting this crisis would demand that millions of lines of code be corrected to render computers ‘Y2K compliant.’ This low-level and labor-intensive task presented the then fledgling Indian sector with a major opportunity, one that would forever transform the trajectory of the industry by cementing its export-oriented expansion. The Y2K problem needed to be fixed by a large workforce, willing and able to painstakingly sift through code written in an old programming language from the 1960s. Indian engineers, familiar with COBOL, took on what in the US was regarded as dirty work - the mechanical, routine, low-skilled work of fixing millions of lines of code written in an old language.

In 1999, a movie called Office Space was released in theaters across America. It was a dry comedy about the lives of IT workers in the US. Upon release it received a lukewarm response at best, and just about broke even. However, it went on to become a cult classic in the US, depicting the alienation of white-collar workers. The movie shows the mind-numbing drudgery that pervaded the lives of the protagonists. In one scene the lead character fleetingly describes his job:

> I sit in a cubicle and I update bank software for the [year] 2000 switch.
> You see, they wrote all this bank software and to save space, they put '98 instead of 1998. So, I go through these thousands of lines of code and uh…it doesn't really matter. I don't like my job.

India's IT sector took off when this very specific repetitive job was offshored. In Pavan's words,

> People in the US did not want to do Y2K changes and work in the COBOL world; they were happy if somebody else in a Third World country [was] sitting and doing it for them at very cheap prices. [American clients] were getting college educated kids who put in much more than eight hours a day. It would cost them the same as someone at a retail job at Walmart or flipping burgers in McDonalds. It was a great deal.

The Y2K problem gave Indian companies a foot in the door into international markets and they successfully used this opportunity to build trust and credibility with client firms. Steadily, Indian companies persuaded client firms to offshore more complex work, slowly convincing managers in the west to entrust offshore IT firms with tasks that were crucial to organizational process and information flows in customer companies. Pavan was working in the US during this critical juncture and witnessed the shifting tides first hand.

His narrative belies accounts of offshoring and deindustrialization that imply that the subcontracting of work to offshore vendors was smooth and solely driven by the agency of western firms intending to save costs. Pavan talked about the friction-filled process of persuading IT managers in the US to relinquish control and to trust an external party working in India with sensitive data and critical technical processes. To quote him,

> In the course of doing Y2K work that was not too sexy, you [were] building relationships with key decision-makers in the US. You started angling to get more work and [said] ‘look - you can see that I’ve got good people who can do good work. I have started looking inside your systems. I’ve looked at your code base. I can help you fix a lot of the other problems too, at a very cheap rate.’

On the part of Indian firms, Pavan emphasized the proactive practices of recognizing and leveraging the potential of the Y2K problem as a conjunctural moment. In retrospect, it is tempting to see the offshoring of IT to India as a natural or inevitable outcome; the result of rational choices made by US firms that were keen to exploit cheaper locales. However, it is important to also note that this transnational network was simultaneously forged and solidified by the Indian manager, ‘who [was] sitting right there in offices of US clients… constantly building relationships and looking for ways to grow his [own] business.’ Pavan talked about the important function of what he called ‘bridge people,’ that is, Indian engineers and corporate elites who were based in the US, to systematically convince US firms to subcontract back-office software work.

> You want to show your best face to the customer. They [Americans] didn’t know if [India] is the land of snake charmers or a bunch of guys who actually know computer software. These people in key roles at US firms were helping build confidence that says, ‘look I am speaking to a person who appears intelligent and smart, understands the domain, understands what goes into building systems. They will act on my behalf.’ We needed to build this confidence.

The relocation of industrial and office work to the non-west depended on the entrepreneurial activities of the business elite in developing countries – not just on lead firms aggressively seeking to lower their costs. The fact is that the Indian firms recognized and capitalized on Y2K as an opportunity. As IT offshoring intensified, Pavan talked about a mounting unease in US offices. American programmers and middle managers began to recognize 'a growing threat to their jobs.' He remarked,

> It's very disconcerting. Very scary. They started looking at their own senior management as people who were not looking out for their best interests, but only looking to maximize the profit of their organization. So Indian companies had to deal with that [apprehension] also.

From the perspective of the US workplace, the insecurities and simmering resentments needed to be deftly handled. This messy transition had to be effectively managed such that the silent hemorrhaging of software jobs in US occurred without attracting the attention of too many journalists, lawmakers, and politicians. Pavan said,

> They had to play the game of keeping local guys and remote guys apart, to keep everyone satisfied and not at each other's throats.

To avoid too much attention, Indian firms and their employees had to maintain a low profile, at the same time developing the trust of their corporate clients. To quote from Jamie Peck's *Offshore* (2017, 5), '…the negative political optics of outsourcing have contributed to a tacit policy of corporate quietude, or at least pragmatic discretion.' On the same theme of pragmatic discretion, Pavan said,

> It is a tricky thing. They have had to negotiate it in a variety of ways without making too much of a statement, or doing things that [could] further increase these concerns. [This] is part and parcel of this offshoring drama that has been going on for the last 20-25 years.'

The organizational quest for flexibility and methods to lower costs on the part of westerns firms is half the story. The geographical reorganization of computing services can also be explained by the success of new vendors in proactively persuading and nudging US corporations to allow offshore firms to manage their data and digital infrastructure. Furthermore, potentially disruptive frictions had to be successfully handled in a way that was conducive to largescale outsourcing and offshoring, so that organizational processes and work relations in US firms were not unsettled.

The challenge of managing increasingly complex transnational relations between different firms persists. Outsourcing arrangements, as Peck (2017) argues, generate new frictions and problems like that of managerial coordination, contractual disputes, security and integrity of IT systems, and so on. Nevertheless, despite these operational challenges, IT offshoring became a dominant and normalized business practice adopted by the vast majority large US firms, followed by UK firms.

Having discussed the Y2K opportunity and the subsequent rise of offshoring, the next section sheds light on another key dimension of industrial expansion: the changing organizational terrain of the global corporate computing sector. Here we meet Kiran, another seasoned IT professional who talked at length about the ascendence of this industry.

From Custom to Customized Software: Kiran

In 1992, Kiran began to work at a company in Bangalore that would soon become one of India’s top exporters of software services, catering to the internal IT needs of some of the largest firms in the world. In 1992, however, the company operated on a modest scale. Kiran described how she would talk to clients, understand their processes, return to her office, write the code, test it, make changes, and wait with baited breath when the software went live. She said, ‘There was immense learning. You were involved from requirements to implementation.' For her company, this was the era of custom orders, where engineers would write applications for corporate clients from ground up, or alternatively develop and extend existing software applications. At the time, as Kiran eloquently said,

> There was no separation between creation and repair; this happened together. We built it and we fixed it. There was no difference been making something and fixing it, or maintaining it. We saw it as together - all the same process.

This rather quaint, slow-paced period where software coding, testing, and maintenance were unified would end once IT services firms entered the era of rapid growth. This new era was propelled in part by the rise of new software products in the west. Before moving on, a reminder of the distinction between software products and software services might be helpful. Product players sell licenses to propriety software whereas the realm of software services is defined by contracts between clients and service providers that outline the specific IT service work to be performed in a given period.

Campbell-Kelly (2003), a leading historian of the software products industry, defines a product as 'a program that could be used without modification by a large number of corporate users (4).' Kiran, on the other hand, worked at a software services company. Just like a legal firm or an accounting firm, IT services firms make their money by deploying employees on client projects, and their profits come from the billable hours per IT employee charged to clients. IT services firms sign contracts with corporate clients that are called service level agreements (SLAs), stipulating the precise tasks to be undertaken and other contractual promises (Upadhya 2016). This is a very different business model from that of software product firms, which commodify a generic software program to sell to a number of clients. As compared to product firms, Kiran said 'we never owned the source code of the applications we built; we handed over everything to the customer.' This deceptively simple issue of who possesses and owns the source code shapes an IT company's workplace structures and revenue model.

The market for software products took off only in the 1980s (Campbell-Kelly 2003). In the 1990s, the products' market in the US saw major consolidation, and also witnessed the rise of what is called 'relational database technology' and a new product called Enterprise Resource Planning (ERP) (Campbell-Kelly 2003). The ascendence of ERP and the relational database profoundly shaped the expansionist trajectory of India's IT sector. A relational database is a type of database where data are organized according to pre-defined categories that link information in ways that proved to have many benefits. For example, it allows for flexibility in adding, renaming, and moving data around while the database is still running. This became an extremely popular technology among businesses, and in the 1990s the American company Oracle gained dominance in this space.

Similarly, the ascendence of ERP software in the 1990s was a highly significant development for the global computing industry (as well as the Indian IT sector). Until ERP emerged on the scene, customer firms had to manage a range of disparate software packages and also manage relations with a number of discrete vendors. ERP offered a distinct solution as it 'was a body of generalized, integrated software that could be customized for virtually any large business' (Campbell-Kelly 2003, 172). SAP, a German company, became the dominant seller of ERP software. By the time ERP emerged, for western companies which had already computerized in a piecemeal fashion in prior decades, it promised better and more efficient integration. Organizations with vast bureaucratic divisions purchased and implemented ERP to integrate domains such as accounting, logistics, and human resource management. 'Despite its obscurity,' Head (2003) writes, ERP became 'a driving force in the reshaping of American business.'

Why are these developments crucial to the growth story in India? We left Kiran at a point where her nascent firm worked on a small scale. Oracle and SAP's generic, industry-agnostic products granted Indian firms a unique opportunity for expansion. IT services firms offered to customize, update, and maintain these large generic software products. In the late 1990s, Kiran moved to a newly formed internal division within her company: The ERP unit. This change in Kiran's occupational position was emblematic of a broader shift in the global corporate IT sector.

The growing dominance of new product players (Oracle and SAP) reconfigured the environment in which Kiran's company operated. The firm had to respond to these new conditions. This new environment created new kinds of work and new opportunities for the growth of software services. As it turns out, standardized software products need to be customized, implemented, and updated regularly. This produced a boom in back-office IT work in India.

As discussed, Indian IT companies had already gained a foot in the door during the Y2K crisis. The rise of new software products, I argue, must be viewed as second conjectural moment that established the conditions for breakneck expansion. The low-end, mechanical task of debugging code during the Y2K crisis paved the way for the offshoring of higher-level work that was more specialized to specific clients and specific software systems (Parthasarthy 2010). Thus, software services firms in India got increasingly involved with client systems in domains such as payroll, accounting, inventory, and supply chain management.

Suddenly, firms like the one Kiran worked at were transformed into major global service providers, tasked with implementing pre-produced, 'off-the-shelf' software. 'We signed agreements with product players.' Kiran continued, 'We said to them: we will customize this for your customers.' In other words, they formed alliances with product firms, tying their fate to the increased sale of software packages produced by SAP and Oracle. The logic was simple: more product sales would mean more services contracts. Services firms quickly initiated mass training to ensure their workforces were familiar with the new products in the market. Indian firms reorganized their internal structures around these products and went on aggressive hiring sprees, recruiting engineers en masse to perform labor-intensive tasks associated with software maintenance.

For Kiran's company, the change was dramatic. In 2000, it employed less than 8000 people. In 2010, it had 110,000 employees, and generated over $6 billion dollars in revenue. Needless to say, the firm had not merely adjusted to a new products market, but had transformed by taking advantage of these new conditions. Thus, it had successfully claimed a spot in the international IT value chain as an intermediary between western product companies and their corporate customers. Meanwhile, US technology companies like Dell, IBM, and Accenture, saw the enormous growth in the back-office IT services industry, and quickly established their own IT services divisions in India, trying to get a piece of the growing IT services pie (Yost 2017).

During the conversation, Kiran sounded nostalgic as she relived the 1990s, 'We never anticipated this growth.' In the phase of rapid growth that followed, her organization became a different beast altogether. New organizational routines, rigid quality certifications, myriad hierarchies, a complex division of labor, and a new hardnosed CEO permanently ended the slower, small-scale era of the 1990s.

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In 2003, Kiran choose to move out of the ERP division of her firm as she did not want her life constantly upended by the demands of international travel. International travel after all was a core aspect of the lives of senior professionals in the industry.
In my effort to view India's software sector from the eyes of client corporations, I managed to secure an opportunity to conduct an interview at a large firm in Minneapolis that had a history of partnering with offshore IT firms. Minneapolis is a large corporate hub and home to the headquarters of behemoths such as Target and 3M.

Having arrived for the interview, I was told to wait at the front desk for an escort. Looking around, I inferred that many of the people milling about were either long-term US residents – Indians who had successfully made the coveted transition from an H1B visa to the green card – or alternatively, temporary Indian residents here to work on-site. Despite offshoring, IT firms continue to configure the right balance of onsite/offsite work with IT managers based in the US, ensuring that their sales and pre-sales teams actively win contracts to be executed by delivery teams in India. Today, the ratio of on-site to off-site work is roughly 70:30. This means, in any given project that needs a hundred Indian employees, seventy people would work in cities like Bangalore, while thirty employees would work in the US or other client locations.

These were precisely the people Kiran did not want to be - primarily because it would be disruptive to her family life in Bangalore. She said, 'I realized that there was an expectation that I travel. I wasn't comfortable with this. It was a delicately balanced situation at home. I did not want to disturb it by traveling abroad.' Kiran decided to separate herself from the booming ERP business and she moved to a more inward-facing role. Instead of working on the IT needs of client firms, she joined the internal IT division of her own firm, where she worked for the next ten years - upgrading ERP and related systems for her organization's internal processes, rather than for client firms.

Conclusion

This chapter, traces the rise of India's IT industry, emphasizes two critical moments: the Y2K problem and the growth of new software product companies. It serves as a backdrop to the analysis presented in the next three chapters, rooted in contemporary and ongoing shifts in the IT industry.

In June 2014, while conducting interviews as part of pre-dissertation research, a top-level IT professional in Bangalore, conveyed that the sector was at the edge of another historical juncture. During a long, open-ended conversation, he made it clear that the era of very high operating profit margins was over. According to him, a combination of factors was exerting new pressures on the IT business. Client firms were cutting their IT maintenance budgets, the technology landscape was changing, and the traditional services lines (application development and infrastructure management) were shrinking. He remained largely optimistic about the IT services sector managing a renewal, albeit with a few uncertain years to weather. He remarked, ‘In the 1990s, IT services had to learn to adapt to new technologies. [These] changes actually added to the market size, did not reduce it. We are good at adapting to new technologies and reinventing ourselves.’ He believed the sector would morph again, but possibly with a smaller workforce.

In hindsight, I am struck by the speculative tenor of the conversation. ‘We are at a cusp of something. There is confusion all over, right now,’ he said. Thus, in the summer of 2014, this interviewee was merely speculating on how the change would play out, rather than describing a real process. Over the next few years, the expected upheaval arrived at the threshold of the present.

As I returned from predoctoral research, one comment in particular lodged itself at the back of my mind. To quote this senior professional again:

> The cloud has changed the game. It disintegrates the IT stack. The disruptive effects are unimaginable. It is yet to be seen.

The following chapter sets out to explain and conceptualize the observation that cloud-enabled IT represents a rupture in the world of corporate computing. As mentioned in the introduction, computing resources (applications, hardware infrastructure, operating systems, storage capacity) can now be delivered to organizational and individual users via internet platforms. As users, we no longer store out data or applications directly on our devices. Instead, we use cloud-enabled applications (Google-docs, Dropbox, Netflix, Uber). The next chapter takes on the task of presenting a new digital conjuncture and explicates its significance from the point of view of corporate computing. In doing so, the analysis contributes to platform studies and long-standing debates on fixed capital.

Chapter 3.

The Platformization of Computing Fixed Capital

Introduction

Platform studies is at risk of neglecting the platformization of industry. Although platforms are now recognized as a defining feature of contemporary capitalism, most scholarship in the field of platform capitalism focuses on the consumer-facing digital economy (Grabher and van Tuijl 2020). Yet the fact is, firms much like individual users, also have the choice to employ platform-based tools and services. Companies now access data and computing infrastructure remotely from external vendors via internet platforms.

Over the course of the 20th century, information-technology (IT) came to represent a major form of corporate fixed capital, with corporations heavily computerizing production and bureaucratic processes. In advanced capitalist economies, the corporate office became a major site of IT investment with computing systems rationalizing information-intensive functions such as accounting, inventory management, logistics, and also machine operation in manufacturing (Baldoz, Koeber, and Kraft 2009; Davis, Hirschl, and Stack 1997; Head 2003; Yost 2017). Over time computing systems emerged as key infrastructures that coordinate, automate, and speed up corporate processes and globally dispersed economic activity.

In order to demonstrate how a cloud-based IT paradigm represents a transformation in the nature and organization of this digital infrastructure, I draw from platform studies, computing history, and long-standing debates on fixed capital and sunk costs in corporate geography (Clark 1994; Schoenberger 1997; Harvey 2018). Fixed capital exposes a key tension. At the firm-level, investment into fixed capital is essential to remain competitive but also a burden that can engender dangerous rigidities. It is through fixed capital that a profound contradiction is expressed: the imperative to revolutionize production systems on the one hand, and the pressure to amortize existing investments on the other (Harvey

2018; Schoenberger 1997). In accordance with this conceptual premise, machines and technologies have been treated as key forms of fixed capital (Clark and Wrigley 1995). This chapter offers an analysis of what cloud infrastructure represents from the perspective of corporate consumers. I argue that cloud infrastructure not only turns fixed costs into variable costs, it also intersects with other flexible modalities afforded by a cloud-based computing environment. Like most infrastructures, 'cloud' does not represent a discrete innovation. Instead, it represents a convergence of different technical and organizational trajectories. In particular, the analysis presented examines how internet-led externalization, virtualization technology, web-based modularity, and resource sharing, converge to reformulate computing fixed capital. This convergence produces an infrastructure that is hyper-scalable. In turn implying significant reductions in upfront costs and also recurring costs associated with the IT implementation, customization, and upgradation of computing systems. Thus, this analysis goes beyond representations of cloud software as an externally managed, 'hyper-outsourced' computing paradigm. I argue that externalization combines with other shifts to render the *fixity* of machinic fixed capital exceedingly fluid.

The following analysis is best viewed as a conceptual exercise in theorizing this digital infrastructure, rather than an empirical analysis of cloud adoption and industrial restructuring (which I explore in the following chapter). In discussed the key feature of this IT model, I do not intend to imply that cloud adoption by firms is smooth or linear. Managerial decisions after all are not necessarily driven only by the rational choices of efficiency-seeking corporate actors (Vidal 2019). There are compelling counter-acting forces. Nevertheless, the market for corporate cloud platforms and attendant cloud services is growing faster than the traditional IT industry (Yost 2017). All major players in the business software sector are altering their portfolio of products and services to increase their cloud-based offerings. Therefore, cloud enabled-IT has become a trend to the extent that it merits serious theoretical engagement at the level of infrastructure and fixed capital.

Cloud-based computing, in paving the way for a hyper-scalable, elastic regime of asset management alters the competitive conditions of the corporate computing sector. India's offshore sector now claims as much as 55% of the global market share of IT services (Bhattacharjee and Chakrabarti 2015). The 3 million people employed by this industry implement and manage the *in-house* computing systems of the world's largest firms (including a majority of Fortune 500 companies). As discussed in the previous chapter, firms based in India manage the existing digital infrastructure of client corporations. Thus, managers, programmers, entrepreneurs, and analysts associated with this industry are well positioned to discuss cloud computing as a new method of organizing computing resources.

Conceptualizing Cloud-Based Corporate Infrastructure

The limited literature on platforms from an industrial and organizational perspective necessitates borrowing insights from multiple fields, including platform and infrastructure studies, and corporate geography.

Platform Studies

Platform studies, a thriving interdisciplinary field, examines on-demand logics and asset-light business models that define what is now called the 'platform economy' (Kenney and Zysman 2016). Digital platforms operate through networked devices (smart phones, tablets, desktop machines), to connect multiple parties as they engage in rapid transactions. Platform companies present themselves as sociotechnical intermediaries that allow users to access services and commodities on demand. Hall (2016) proposes that this be called the *renting* economy (rather than the 'sharing economy') as it allows people to rent assets (rooms, cars) and services (delivery, pick-up) on a per-need basis. This ability to employ resources through new data-intensive platform intermediaries has generated scholarly interest in new forms of consumption, work, and data extraction. Thus, contemporary platforms have reinvigorated interest in just-in-time dynamics, not so much from the standpoint of capitalist organizations, but from the perspective of individual users, consumers and ('gig') workers (De Stefano 2016; Irani 2015; Vallas and Schor 2020; Van Doorn 2017).

A new and promising strand of scholarship theorizes platforms by drawing from infrastructure studies (Barns 2019; Dieter et al. 2019; Gawer 2011; Plantin et al. 2018). This pivots attention from new digital companies to the platform itself as a distinct infrastructure. Platforms invite analysis from an infrastructural lens because of their ubiquity as all-pervasive socio-technical intermediaries (Plantin et. al., 2018). Like other infrastructures, platforms are invisible, taken for granted scaffolds increasingly vital for social and economic transactions. Much like the railways and electricity represented a new infrastructure for accumulation, so too do platforms (Kennedy 2018). This has inspired analysis that treats platform owners as a new category of network rentiers (Barns 2019; Kennedy 2018; Sadowski 2020; Srnicek 2017).

To chart out why platform-based computing is appealing to capitalist organizations, it is helpful to engage the *specific* sociotechnical qualities of platforms. Gerlitz et. al., (2018) explicate a multipronged research agenda for the study of apps as infrastructure. They observe that app infrastructures are not stand-alone discrete systems, but are best conceived of as intersecting and enmeshed systems, originating in multiple environments. The authors also make a call to explicate the modular composition of apps and discuss the interdependencies between different elements and agents that constitute the infrastructure. In a similar vein, Plantin et. al., (2018) also discuss the importance of identifying the linkages between a stable, core infrastructure and a more modular, variable, and reprogrammable layer.

The intersection of infrastructure and platform studies is an exciting space, where scholars closely attend to the sociotechnical character of contemporary platforms. However, the analytical focus is on networked smart phones and consumer apps defined by mass usage; apps and platforms are theorized as a new societal infrastructure that mediates social life at large, rather than distinct corporate and industrial infrastructures. Growing social and political concerns about the size and scale of Big Tech platforms (Facebook, Google, Amazon) also center platform usage by citizens and customers. Although this is undoubtedly a necessary and important foci, this conjuncture also calls for new frameworks that show how platforms inflect new logics into business-to-business (B2B) relations (Grabher and Tuijl 2020).

The focus on an analytically separate 'digital economy' can obscure how platformization is a much broader phenomenon. Financialization as a social process is a useful analogy. Scholars of financialization demonstrated how non-financial firms are now imbued with new financial logics (Krippner 2011). Similarly, as 'platformization' accelerates, it becomes harder to sustain an analytical distinction between the so-called digital economy and 'non-digital' industries. In light of this, I aim to contribute to platform studies by elaborating on platform infrastructure from the perspective of corporate and organizational usage. Today's software infrastructure represents 'a specific historical configuration of the relationships between hardware, software, and services' (Gerlitz et al. 2019). From an industrial and organizational perspective, a realignment of hardware, software, and services represents a restructuring of computing assets. Therefore, the ongoing platformization of existing corporate infrastructure calls for engagement with long-standing debates on machines and fixed capital.

Computing Systems as Corporate Fixed Capital

Fixed capital embodies the investment costs that support production over a *relatively* long-term period, and often takes the form of buildings, modes of transportation and communication, and various production equipment. Machines and technologies represent a major modality of fixed capital (Harvey 2018). Machinic fixed capital is expensive, embodying fixed and sunk costs that if not recouped, are a drain on profits. Sunk costs and fixed capital have historically been a disciplining and stabilizing force (Harvey 2018; Melachroinos and Spence 2001; Schoenberger 1997). Why? Because 'perpetual revolutions in technology can mean the devaluation of fixed capital on an extensive scale.' (Harvey 2018, 221). The threat of devalued fixed capital checks the drive toward continuous innovation, and also tempers potential disruptions. Once expended, these costs demand to be recouped, a compulsion that counter-acts against the relentless dynamism of production systems.

Fixed capital can be procured and utilized through one of two means: capitalist organizations can form their own stock of fixed assets or else can source it from the market. Organizations either invest in and maintain a large and stable stock of fixed capital to serve fluctuating needs ('just-in-case'), or alternatively manage flexible ties with external parties who would supply labor, assets, and services when needed ('just-in-time') (Walker and Sayer 1992). Economic geographers and economic sociologists have long studied and contrasted these two responses to the 'make or buy' conundrum, with the former being a characteristic of Fordism, and the latter, of Post-Fordist arrangements (Davis 2016; Sayer and Walker 1992; Schoenberger 1988, 1997; Vidal 2011).

Given that fixed capital investment and associated sunk costs constrain corporate decisions and the allocation of resources, the appeal of flexibility in this domain is clear (Gertler 1988). Unstable market environments increase the risk of devaluation and jeopardize planning around the gradual retirement of fixed capital. By the 1970s, the compulsion to lighten the weight of in-house fixed assets on part of western firms became overwhelming. Literature on Post-Fordist industrial reorganization points out that vertical disintegration went hand in hand with a new managerial quest for flexibility (Vidal 2011; Wood 1989). Corporations sought to be less tied down by large in-house fixed costs and began externalizing these costs. The term 'asset-light' is therefore not new and dates back to the pre-platform age. It is a phrase first used to describe companies in advanced capitalist regions that subcontracted the vast majority of internal functions (production, assembly, corporate services, and distribution). The 'core competencies' firms held onto were related to intellectual property and branding, rather than production capacity and distribution. The Post-Fordist firm altered its relationship to fixed capital by turning it into a flexible component to be harnessed via a range of intermediaries and external suppliers usually located in the low-cost regions of the global South (Coe 2004; Coe and Yeung 2015).

Platform-based IT represents another model of outsourcing, as it allows firms to access computing power on-demand from external providers. However, this paradigm represents a more profound reorganization of the architecture of corporate IT, where machinic fixed capital is shared, virtualized and modularized. To appreciate this, we need to engage with the unique attributes to the digital machine.

Digital machines have attributes that are distinct from industrial machines (Gertler 1988). The most important difference is that the information machine is reprogrammable (Chopra and Dexter 2008; Ensmenger 2010; Schoenberger 1997). The distinctiveness of information-technology itself lies in the unique relations between instructions ('software') and the substrate ('hardware'). With the modern computer, for the first time, machines became 'reprogrammable.' The relative autonomy of software from hardware made it possible to get the same piece of hardware to enact qualitatively different tasks just by feeding it different kinds of instructions. That is, the same hardware could be reconfigured as a different machine. The moment it became possible to encode and recode dissimilar instructions without dismantling the 'metal,' an unusually flexible form of fixed capital emerged. Programs could be installed, uninstalled, upgraded and integrated without parallel replacements in hardware. To quote Schoenberger, 'functional flexibility can be introduced via software, rather than through the hardware. The box will be the same but what it does will vary' (1997, 46). Thus, the versatility of flexible machines 'should be understood as a partial solution to the firm's contradictory need both for fixity and for mobility (Gertler 1988, 158).'

The analysis that follows demonstrates how a platform-based IT model greatly exaggerates and amplifies the already pliant character of computers. Melachroinos and Spence (2001) note that discussions in this scholarly domain have traditionally been more abstract than substantive. IT expenditure and computing assets enable a more grounded analysis of the changing dynamics between fixity and motion. My objective is to schematically identify the shift in the management, cost, and character of computing fixed capital. Here, a brief schematic history of IT management is useful.

A Brief Overview of IT Management

The history of IT management can be delineated according to three broad (and overlapping) phases.

i. Early Investment in IT systems (1950s-1980s)
ii. Externalization of Computing Labor (i.e., asset management) (late1990s-2010s)
iii. Externalization of Asset Ownership (2010s-Present)[13]

The initial computerization of 'mental work' in the corporate offices and factories of large firms represents the *first stage* of investment. The initial investments into in-house IT systems in the 1950-1990 period has been well-studied, both from the standpoint of computing and business history (Campbell-Kelly 2003; Cortada 2004, 2012; Yost 2017) and workplace transformation (Braverman 1998; Burris 1998; Head 2003; Zuboff 1988). Business and computing historians have tracked computerization across retail, banking, transportation, and public sector industries (Campbell-Kelly 2003; Cortada 2004, 2012; Yost 2017). In the post-war period, consultants, along with firms in the computing industry, marketed the computer as a technology that rationalizes information-handling bureaucratic functions. It was the corporate office that performed bureaucratic tasks - inventory management, order processing, accounting, and supply chain management. This was later rationalized by, what trade literature and consultants soon termed

[13] These three phases reflect dominant pathways and do not do justice to the multiple methods employed in these periods from an actor or sector-specific stance. There was variation in timing, i.e., firms and industries adopted the information-machine and changed the organization of computing assets at different points in time. Similarly, firms employed antecedents to the modern computer in the pre-1950s era. This is not discussed here. Nevertheless, this periodization serves as a broad schema on the issue of asset management and externalization, serving as a backdrop to the ongoing plaformization of IT.

'information-technology.'[14] Considered together, the hardware, software, and labor needed to manage the two came to represent the fixed and recurring investments firms made, regardless of sector.

The *second stage* unfolded in the context of a new managerial paradigm that prioritized 'core competencies' and espoused that firms subcontract everything else. From the 1990s onward, IT – its implementation and maintenance – came to be regarded as a non-core corporate function that could be *managed* by external, offshore vendors. Service providers with vast workforces in in countries like India won long-term contracts with large corporations. The dramatic rise of a thriving 'offshore complex' must be considered as being part of the broader quest for a spatial and organizational fix to the lackluster profit rates and growing costs of western firms (Peck 2017).

As previously noted, at first subcontracted IT work was accomplished through a labor regime referred to as 'body shopping'(Parthasarathy and Aoyama 2006; Upadhya 2016). Indian engineers and managers contracted through service providers and travelled to client sites physically. Over time this was largely replaced by 'virtual migration' (Aneesh 2006), where a workforce situated in India remotely developed and managed client systems. As with other forms of subcontracting, an external service provider promised to lower costs and enhance flexibility. A survey undertaken by McKinsey Global Institute showed that Indian workers with university degrees had the lowest salaries among engineers from 16 countries. At the time, the average wages of engineers in the US were $70,000 dollars per annum, as compared to the average of $13,580 made by Indian engineers (Aoyama and Parthasarathy 2012).

In this period, hardware and software systems continued to be largely owned by the customer firm. It was the development and maintenance of computing assets that was externalized to offshore vendors (Yost 2017). Software and hardware, once purchased by

[14] Data processing was not the only area of implementation. For example, computer aided modelling, simulation and design were other examples of early computerization. In any event, irrespective of their specific use, computers represented productive assets that firms widely invested in.

customers from vendors like Oracle and SAP (software products) and HP and IBM (hardware), was managed by IT services companies with workforces in India. In the early 2000s, business processes internal to client firms were re-integrated using a new suite of software applications called enterprise resources planning (ERP) (Head 2003). Customer companies spent millions of dollars buying licenses to use ERP from vendors selling enterprise software products (Oracle and SAP). After it was purchased, ERP was implemented by supplied by third party services vendors based in India. This first phase of IT externalization did not amount to a change in the organization or character of computing fixed capital per se. It merely reflected a shift in how fixed capital was maintained.

Cloud-based reorganization of IT needs to be seen as distinct from these changes associated with post-Fordist restructuring. It represents a transformation in asset ownership, and in the relations between the three elements of digital assets and their maintenance: hardware, software, and services.

The Platformization of Corporate IT

This section examines a convergence between four elements: externalization, virtualization, web-based modularity, and resource sharing. Each of these attributes imply significant shifts in cost and flexibility in the following areas of IT and its management: upfront fixed investment, implementation, customization, and integration. Taken together this suggests that platforms and their growing prevalence in the corporate domain signify a reformulation of computing fixed capital.

i. *Internet-Led Externalization*

Cloud systems promote the externalization of computing assets, where a company's data centers and server rooms, along with layers of software applications are outsourced. Therefore the 'locus' of software and computing shifts (Campbell-Kelly and Garcia-

Swartz 2008). This is now feasible at scale in the era of ubiquitous high-speed internet, where computing capabilities can be delivered over the web.

Importantly, externalization is better conceived of as an organizational phenomenon rather than solely a technological one; representing a shift in how computing assets are accessed and distributed. In fact, trade literature defines cloud computing as a unique mechanism of delivery (i.e., web-based), supported by distinct pricing models (i.e., pay-per-use). Instead of buying and owning infrastructure, clients have the option to utilize assets in real-time through a *subscription* model. Here, the computing and storage capacity is owned by an external provider.

From the perspective of a customer organization, cloud-based IT is a method of meeting IT needs by eliminating large upfront costs. Processing power, data storage, and software applications, are rented (rather than bought). Here the classic 'make or buy' decision is better expressed as a 'rent or own' decision. For corporate customers interested in cloud offerings, computing resources are not 'things' to be owned, maintained, and invested in. Rather, these are services to be accessed over the internet on demand. Put slightly differently, after the 'just-in-time 'IT labor regime (afforded by flexible offshore IT firms), we are seeing the rise of a 'just-in-time' computing regime. That is, not only does labor 'migrate' *virtually* (Aneesh 2006), so does processing power, storage capacity, and applications.

To quote a developer I interviewed, 'the way software is distributed has changed so much. People don't 'get' software [anymore], they just 'run' it.' This distinction between 'getting' and 'running' IT indicates the shift from IT as an internal asset, to IT as an on-demand service. Top executives of IT services companies discussed how cloud computing grants their clients the option to not invest in their own independent in-house systems. As a recently retired Chief Technology Officer of one of India's top IT firms said,

> Cloud is the aggregation of computing available on tap. [Firms] don't have to build IT infrastructure to use IT infrastructure. [They] don't need to worry about owning servers and systems.

The professionals I interviewed discussed how cloud computing renders IT so fluid and elastic that it can be procured 'on tap.' From the standpoint of debates on fixed capital, this is critical. This paradigm transfers fixed computing assets from the bucket of long-term capital expenditure (CapEx), to routine operating expenditure (OpEx). Computing systems are a significant expense for firms. Technology analysts show that companies spend up to 7% of their annual revenue on IT, with the average small firm investing 6.9% of its revenue on IT, midsized companies spending 4.1%, and large companies, 3.2% (Kark et al., 2017; CIO 2005). The Chief Information Officer's (CIO) department is responsible for the investments and maintenance of internal computing infrastructures. The organizational unit that represents the IT department is a 'cost center' (rather than a 'profit center'), thus incentivizing the reduction of capital expenditure here.

Interviewees reported extremely sluggish growth, at times declines, in revenues from traditional software services such as IT maintenance. IT managers noted that client corporations were less willing to spend their technology budget on the upkeep of basic IT systems or 'lights-on' IT. The annual expense of software maintenance amounts between a sixth and a quarter of the one-time cost of the license. Thus, if a software costs a million dollars, the recurring annual cost of maintenance is likely be around $180,000. It is this recurring cost (variable), as well as the licensing cost (fixed), that the cloud-based paradigm reduces and renders flexible. To quote a former Chief Strategy Officer (SCO) of a major Indian IT firm,

> A large chunk of what Indian companies do is maintain IT infrastructure. If firms go to the cloud, it means they don't have hardware infrastructure to maintain; so, where is the business? The traditional ADM model (application development and maintenance) is shrinking.

A senior manager interpreted the significance of the cloud by highlighting ownership, saying that processing power and storage 'is available today with a swipe of a card on a pay-per-use model. You don't need to own data centers. You don't need huge infrastructure.'

A potential advantage of an externalized model with flexible pricing ('pay-per-use') is that it reduces idle capacity, this in turn allows clients to increase and decrease their usage according to short term forecasts. This 'just-in-time' logic, for example, is very appealing to the retail industry in the west, which sees major spikes in sales during certain periods in the year such as Christmas and Black Friday. Instead of sitting on unused capacity all year round in preparation for one week, retailers can increase their consumption during the short window when their IT needs spike.

I had a unique opportunity to interview a senior IT professional at one of the world's largest retail chains, an American company. To quote,

> With the cloud you can scale up and down as you need it. Our peak usage of our applications is Thanksgiving to Christmas. We have to build our systems to that scale to take that load. [There has been] no choice but to have that capacity all year. With cloud you can scale…[T]he public cloud has ease of use; you don't need resources and people maintaining those systems.

This is the promise of externalized systems consumed over the internet: rapid, scalable computing infrastructure available only when needed, thereby loosening the rigidities associated with long-term, fixed IT investment. The management of sunk costs is a key area of concern for firms (Clark 1994). Server capacity and applications that are *rented* stand to eliminate the lump sum cost of *buying* servers and other hardware and software products. I argue that while asset externalization is a critical aspect of cloud infrastructure, there are also other key dimensions that need highlighting. The rest of this section focuses on: *virtualization*, *web-based modularity, and resource sharing*.

ii. Virtualization:

It is evident that the cloud does not represent a single, discrete innovation. It is a culmination of varied developments that together reformulate how IT infrastructure is delivered and constituted. Cloud-based delivery of IT intersects with virtualization technology. Virtualization allows multiple operating systems and applications to simultaneously run on the same hardware, as it grants software the ability to *simulate* different hardware. Virtualization, as one software developer said, refers to 'instances of computers inside computers. Earlier on, the chip could run instructions, but now a layer of software can emulate hardware, and run codes that earlier only hardware would process.' I interviewed an IT manager with thirty years of experience, who discussed the virtualization of hardware by saying, 'With virtualization you can just add memory – without even shutting down the server. You can 'plug and play' extra capacity. Once you can have multiple virtual servers in one physical server, it is an *exponential* move.' Cloud infrastructure allows enterprises direct access to virtual machines and software applications. This transforms the relationship between hardware and software, and also enhances the relative autonomy of these two elements. To quote a software engineer,

> The entire infrastructure is a script; a configuration. You fire up a script and it does everything else. The cloud allows you to program your infrastructure. Otherwise, you would have had to physically get your hardware and software. Now, you can take it to such a level of abstraction that it boils down to a single script which can trigger other scripts.[15]

Virtualization also means that capacity can be deployed and destroyed without writing off what otherwise would be a sunk cost. Another developer discussed this ability of firms to

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[15] A script here refers to a series of instructions (code) that runs on another program, rather than the processor (hardware).

create and destroy computing infrastructures with rapidity and with few financial consequences,

> When you spin up new servers, you aren't procuring the hardware. You are accessing the virtualized layer on top of someone else's infrastructure. This is the virtualization of a computer. It lets us create and destroy servers at the click of a button.

Cloud-enabled computing represents a modality of corporate flexibility that goes beyond externalization. Fixed capital, under this model is not merely externalized, but virtualized. Cloud computing gives enterprises real time access to hyper-scalable virtual machines. Fixed capital here sheds its *fixed* nature not-merely through reorganization, but through a radical reformulation of the hardware-software relation. To quote a developer, with virtualization 'the machine became very elastic. You can now buy portions of a box – if you want, by the hour. You can buy pieces of hardware – if you can still call it that. You rent virtual machines.'

In parallel to the virtualization of hardware, is the recent rise of 'containers.' Here, software applications are packaged in a way that makes them neutral or agnostic to specific computing environments, thereby allowing for complex forms of resource sharing. Put simply, if virtual machines represent an abstraction at the hardware level, then containerization represents an abstraction at the level of the software, the operating system. The developer just quoted continued, 'Containers are a cheaper way of doing virtualization. In each virtual machine you can run multiple containers. Containers help manages complex interdependencies when systems are so dispersed.'

Cloud-based computing must be seen as a means of distribution; a mode of delivering shared computing resources and virtualized technologies.[16] Existing writing by

[16] As a technology journalist states, 'virtualization is software that manipulates hardware, while cloud computing refers to a service that results from that manipulation. (Rivera 2018)'

commentators focuses on the cloud simply as mode of distribution and delivery. But the *capabilities* being delivered via this distribution mechanism changes over time. The fact that client firms can now 'spin up' extra servers depending on their immediate needs, without having to actually procure and install new hardware and software on their premises. Thus, computing infrastructure is malleable, fluid and also easy to scale at lower costs. This implies a major reduction in hardware costs. That is, a reduction in fixed costs and capital expenditure.

iii. *Web-Based Modularization*

There is another way to think about this new found flexibility. Cloud software simplifies the *implementation* of IT as it intersects with web-based modularity. One manger described this as a 'do-it-yourself' approach to corporate IT,

> [Software] only needs minor modification and tweaks. Anything I want I get from a service catalogue. It's like the do-it-yourself, modular furniture that IKEA provides.

Although, web-enabled modularity has recently been recognized as a core facet of the platform environment (Plantin et. al., 2018), the implications from the vantage point of corporate users need to be explicated. The software engineers and managers I interviewed widely discussed this as a shift away from monolithic, independent, and 'bulky' on-premise IT.

Software applications in the era of advanced browser technologies and web-enabled apps are neither standalone nor tightly integrated monoliths, but are connected by application programming interfaces (APIs). APIs can be thought of as the 'hooks' at the ends of software; these hooks might be exposed by the firm or developer so that other applications can easily connect together. One programmer describes APIs: 'it is a collection of code, a set of functions, that can be accessed by a developer to let different components talk to one another.' To quote the co-founder of a startup that offers developers certain standardized, ready-to-use tools, 'APIs are just a way for two services to communicate. You can write an application in a way that every piece is talking to another piece. If the API endpoint is consistent, then you can change things without disrupting the other pieces it is communicating with.' Once discrete applications can be connected through APIs the monolithic structure of software is reformulated. In the old world of IT services, application development and management were sources of revenue for offshore IT companies. Traditional revenue sources are under pressure. As a former Chief Technology Officer told me, 'This is now compositional programming, drag-and-drop programing, not writing. You don't have to ever code. You drag and drop…plug and play.' In a similar vein, a co-founder of a SaaS startup said to me,

> We are exposing our APIs for others to hook into. I build the product in a way that makes it easy for developers to plug in. Our software opens at its end points, it offers hooks to others. They can just read the documentation and plug in. Even large companies are changing and have no choice but to open up the ecosystem.

In sum, the new cloud paradigm converges with significant changes in the world of software development. From the perspective of application development, developers do not have to write or build software from the ground up; they can rely on new web-based frameworks that enhance reusability, speed, and flexibility when it comes to the creation of cloud-enabled software. To quote the website of a popular framework for web development: 'Django makes it easier to build better Web apps more quickly and with less code. Built by experienced developers, it takes care of much of the hassle of Web development, so you can focus on writing your app without needing to reinvent the wheel.' Just like Django, many tools and frameworks are free, open source, and are increasingly used to produce software. The co-founder of a startup in Bangalore that creates back-end tools for developers noted that her company 'tries to abstract away as much as possible.' Indeed, this company states its ability to minimize '…the back-end code a developer needs to write by providing certain application programming interfaces [which] gives you the ability to create a cluster on a cloud and access to the infrastructure needed by a developer, to create an application within seconds.'[17] These are new developments. She noted that a running joke was that software companies advertise for developers with five years of experience in technologies that did not even exist five years ago.

Over time, numerous ways of reducing 'cognitive overhead' have emerged. Reusable components and pieces of pre-existing code represent a form of resource-sharing, one that reduces the amount of effort and time that goes into software production and deployment. One programmer discussed how there are a lot of standard building blocks that developers have at their disposal. These gradual developments in software creation combine and converge with cloud-based delivery model. From the perspective of corporate IT, APIs and standardized 'building blocks' reduce labor-intensive implementation and integration costs. These processes are simplified. It is now potentially easier for a client firm to implement new software application as it no longer involves the laborious process of deployment and integration associated with the traditional on-premise licensing model.

Here, we see a changing economics of software creation and implementation that combines with the virtualization and externalization of computing fixed capital. The full repercussions of the simultaneous simplification and enhancement of IT-systems on the existing back-office IT industry that has been so integral to the creation and upkeep of the older IT regime remains to be seen.

iv. Resource-Sharing

The final aspect of the cloud-enabled paradigm I emphasize is resource-sharing in the age of broadband internet. In the words of a manager, 'earlier each machine was allocated to separate customers. The same box - the same physical server - you are now trying to use

[17] A cluster can be thought of as an interconnected set of servers that share the load in the event that a server fails.

across multiple customers. We can now configure it so that it is allocated differently per customer.'

Multi-tenancy and resource sharing are far from new. Historians of computing have carefully studied *time-sharing,* which in 1960s allowed multiple corporate tenants to use the same computing system over a network (Campbell-Kelly and Garcia-Swartz 2008, 2008; Kennedy 2018; Yost 2017). The rationale of time-sharing was clear. In the age of extremely expensive mainframe computers, only a few organizations could afford to invest in this particular form of fixed capital. Time-sharing involved multiple corporate users sharing networked computing resources. This brought down the cost of computing at a time when it was unaffordable to most. By the late 1960s, an industry had emerged around the commodification of computer time (Yost 2017). But by the early 1980s, this model declined and slowly fell out of use. The microprocessor and the personal computing changed the economics of computing in the 1970s (Yost 2017; Campbell-Kelly and Garcia-Swartz 2008).

Today, the providers of cloud-based services are doing what others in the computer industry had already attempted decades ago: turning shared computing power into a business. Resource-sharing, in the era of reliable, ubiquitous hi-speed internet, allows an age-old premise (the sharing of computer time) to operate on a much grander scale.

What does the aggregation and the sharing of centralized computing infrastructure imply from the perspective of corporate IT and fixed capital? As noted, the provider of cloud software centrally manages the infrastructural resource that others tap into. This is precisely why individual consumers no longer need to update the software on their devices using CDs. Individual users of software applications and operating systems avail of simultaneous updates, whether on phone, desktops, or tablets. From an organizational perspective, the task of upgrading and revising IT applications and systems has been a complex, expensive, and a vast endeavor for corporate organizations. This is an expression of the inescapable imperative to not just invest in fixed capital, but to continuously maintain it. The formation of fixed capital is not a one-time event. Computing systems, for example, need to be updated, repaired, and changed. Aggregation and centralized sharing can have powerful effects in this regard.

When software is procured and manually installed or altered by the service provider instead of the user (individual or organization), it simplifies maintenance and upgradation processes and reduces these costs. The software provider hosts the system and continually makes changes to the software, releases new versions, fixes bugs, adds new features – that instantly updates the software for all users. From the perspective of firms, this immediately diminishes the need for technicians to painstakingly update every 'on-premise' system each time software is updated. If APIs reduce implementation costs, resource sharing reduces customization and upgradation costs.

Again, Indian employees of the offshore IT sector are all too aware of these shifts, given that customization and upgradation have historically been a major source of revenue. The head of a company that rents out cloud software said,

> The on-premise model had a few flaws. Each deployment was done new and afresh. Whereas in the cloud era, deployment, configuration, management bug fixing - everything is done remote[ly], everything on *common infrastructure*, and at a price point that is very low.

The above analysis has attempted to illustrate different aspects of cloud IT, each of which implies reconfigurations on the cost and flexibility fronts. This new regime of IT use marks a break from on-premise or in-house IT. Table 2 sums up the crisscrossing elements of a cloud-based IT environment and their attendant domain of change. This schematically separates the different dimensions for analytical clarity.

Facet of a Cloud-Based Ecosystem	Externalization	Virtualization	Web-Based Modularity	Resource Sharing
Reductions in Cost & Increases in Flexibility	Upfront Investment	Hardware & Software	Implementation & Integration	Customization

Table 2: Cloud computing and changes in IT management

Conclusion

This chapter employs insights from corporate geography, platform studies, and computing history to highlight the key attributes of platform-enabled, IT fixed capital. Although the sprawling literatures on new techno-social conditions reference cloud computing, it is rarely the central object of analysis. Often when it finds mention, the emphasis is on the materiality of server farms as energy and capital-intensive infrastructure. Here, I approach the issue from a different angle and present a view of this infrastructure from the lens of corporate customers, showing how it promises new forms of flexibility. I examine how precisely a new fixed capital regime produces a 'shift in computing resources from scarcity to abundance' (Kushida, Murray, and Zysman 2015). To do this, I build on the recent work of platform and infrastructure studies scholars who stress re-programmability and impermanence (Gerlitz et al. 2019; Plantin et al. 2018; Velkova 2019). I add other important elements to those discussed, such as virtualization, resource sharing, and externalization. The significance of all of these shifts from an organizational standpoint becomes apparent when infrastructure is viewed as corporate fixed capital. Analyzing the character of platforms shows that digital assets are not only being reorganized but also reconstituted. For instance, hardware virtualization and new forms of abstraction in the domain of software alters the nature of the information machine. This calls for more research into how computing power is being 'assetized' anew – to reference the frame developed by Birch and Muniesa (2020).

Why is it significant that machinic fixed capital is being virtualized, modularized, and externalized? Fixed capital almost by definition represents a source of rigidity – investment into it cannot be easily transferred and demands to be systematically recouped over time. Moreover, because the value of the fixed capital depreciates both by use and by the market when it is rendered obsolete, a portion of fixed capital is at risk of becoming a sunk cost, i.e., non-recoverable (Melachroinos and Spence 2001; Clark 1994). Given that fixed capital investment and sunk costs are both a threat and necessity for the creation and realization of value, this becomes a vexed area of firm strategy (Clark 1994). Once enterprises commit long-term investments to particular sites, these decisions limit and constrain corporate action. The inability to write off large costs and the risk of abandoning existing productive investment becomes a source of path dependence. In light of this, the appeal of a form of fixed capital that is abundant, hyper-scalable, easy and relatively cheaper to assemble and disassemble, becomes clear. Platformization challenges the assumption that technological investments at the firm-level are almost by definition 'fixed.'

Fixed capital that virtualizes the metallic substate (hardware), is loosely clipped into place via APIs, and *subscribed* to and delivered on-demand, affords flexibilities of a new order. This is true for both, large, established firms and small, new entrants. The fact is, fixed capital investments and sunk costs generate barriers of entry (Melachroinos and Spence 2001), and contemporary platform infrastructure subsidizes entrepreneurial activity across multiple sectors. Indeed, the managers and engineers I talked with, discussed how powerful computing infrastructures are suddenly affordable at scale and is something that market players regardless of their size and resources can access. Cloudengined platforms such as Uber, Zoom, and Instagram can scale up to host exponential growth in usage without making huge fixed investments of their own. Therefore, cloud-computing represents the infrastructural precondition of the 'pop-up,' asset-light platform company that Davis (2016) discusses. India too has seen an explosion in platform companies in different sectors. While literature engages the new business models of platform companies (Sadowski 2019; Srnicek 2016), this chapter stresses the fact that traditional corporations (the clients of Indian IT) also have access to hyper-flexible computing infrastructure.

There are other benefits to a fixed capital approach. At present, much is being said about organizations turning to new technologies based on artificial intelligence and big data. Interviewees report that client firms are developing new web-based sales channels, or using sophisticated analytics tools to new ends. In other words, these organizations are making fresh investments into information technology, implying either an increase in IT budgets, or a reallocation of investment capital. A fixed capital approach attends to patterns of capital allocation. Applying such a perspective to IT in this era of flux is helpful. The changing anatomy and economics of computing offers firms a chance to unlock capital that was previously sunk into fixed, in-house assets. The use of software that is rapidly scalable and simultaneously cost-effective frees up new streams of cash that can be reinvested elsewhere. Shifts in budgetary allocations reveal how new corporate strategies and workplace changes are financed and how the dominant rationales are at play. Employees in India are uniquely positioned to speak to these changes. IT managers in India observe that clients are redeploying their IT budgets to experiment with new capabilities in the area of big data, artificial intelligence, and the Internet of Things. Thus far, the bulk of IT expenditure has been devoted to keep 'lights on,' i.e., to maintain and update in-house digital infrastructure. Cloud-based IT gives firms the option of cutting fixed costs and also turning CapEx into OpEx so that 'they can plough the money back into new initiatives' (senior IT manager, interview). If it is true that the new corporate technologies based on AI and big data are proliferating in workplaces across the world, it is important to understand new patterns of managerial decisions and investments. These decisions on the part of client firms impact existing relations with IT service providers.

During my interview with the professional at the American retail company (previously quoted), I asked if the relationship with Indian IT services partners had changed. She said, ‘We used to have a lot of presence with Tata, Wipro and Infosys [major Indian IT players], they were big providers for us… we diminished this substantially…2-3 years ago the decision was made. We can now do more with less.’ I followed up by asking what happens to the ‘lights on’ IT budget when this occurs, to which she replied, ‘It shrinks. We have actually given back money to the organization. We cut our licensing and maintenance budgets.’ This clearly has a direct impact on Indian IT companies and corroborates something I heard routinely during fieldwork: There is pressure on traditional service lines and therefore, IT companies need to offer customers new services. Offshore IT companies in India are under pressure to explore new engines of growth that do not depend on firms simply maintaining and upgrading in-house IT. Software product companies that depended on the sale of licensed software also feel the pressure to renew their products portfolio and revenue models.

Although it is true that client firms are looking to adopt cloud-based applications and methods of software management, I do not intend suggest that the transition is linear or that all customers are transitioning their on-premise systems in toto to a cloud environment. The fact is, corporate clients are concerned about the security of their data and the cost of the transition. A former Chief Strategy Officer noted that their largest customer segment are big banks and insurance companies. These players are risk averse when it comes to new technologies, particularly those that have implications for data security. In his words, ‘They will not suddenly move everything to cloud. Existing legacy systems cannot be so easily disrupted.’ Another senior manager observed, ‘It’s happening piecemeal. These organizations have hundreds and hundreds of applications.’ Speaking to the same point, a third manager said, ‘We cater to the largest companies.

They are using cloud for certain pockets. Even if a few applications move, the core applications may not shift.'

In any event, the market for cloud-based software and services is growing at a rapid pace. In the next chapter, I show how offshore IT firms in India are implicated in these client decisions to move away from the traditional IT regime. Established software and software services firms are racing to nudge their clients toward cloud software and cloud services. Having outlined what is at stake with a cloud-based software regime in this chapter, we arrive at the issue of how IT firms in India are responding to the challenge posed by cloud software. That is to say, how are IT firms that mastered the art of winning contracts to manage in-house IT systems of customers, responding to these new conditions? This brings us to the question of firm strategy in the face of new constraints and uncertainties.

Chapter 4.

Organizational Autophagy: Cannibalization as a strategy of competition

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Introduction

This chapter investigates the manner in which changing market conditions engender new strategic practices in the context of an emergent technological conjuncture. Specifically, I examine the how managers at large IT firms deliberately accelerate a decline in their prevailing structures of profitmaking, in a bid to enter the market for cloud services. This chapter theorizes these acts as a distinct engine of industrial and organizational change.

The expectation and the growing evidence that cloud-based IT will expand as a trend pushes IT managers in India to seek out new sources of profits to replace existing revenue streams. They begin to advocate for cloud-enabled IT and encourage their customers to adopt it. Thus, as a way to cope with the challenge of cloud-based computing, managers contribute to the actualization of the threat. I refer to the act of eroding a still growing and profitable revenue model as a form of *autophagy*, a word of Greek origins that translates to 'self-devouring' or 'self-eating.'[18] Using this as a metaphor, I develop *autophagic action* as a concept to analyze how and why IT managers accelerate the obsolescence of the prevailing structures of profitmaking.

As mentioned, the managerial decision to disrupt an existing paradigm of profitmaking needs to be analyzed in the context of competing organizational imperatives. Sociologists, geographers, and management scholars identify a strong imperative on the part of capitalist enterprises to preserve and extract maximum value from existing investments and structures of profitmaking (Abernathy 1978; Benner and Tushman 2003;

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[18] Thanks are due to Yagmur Karakaya who alerted me to the word 'autophagy.'

Gupta, Smith, and Shalley 2006; March 1991). Competitive strategies focused on maximization have historically taken different forms. In the post-1970s era, scholars have discussed what I call market *intensifying* competitive strategies that are oriented toward cost cutting, flexibility, and labor process reconfigurations (Cappelli 1997; Crowley et al. 2010; Smith 1997; Vidal 2011; Wood 1989). Apart from intensification drives, capitalist organizations also seek out new market opportunities (March 1991; Schumpeter 1976). On an abstract level, the competing forces of market intensification and market expansion can be regarded as driving what Sewell (2008) refers to as capitalism's restless and expansive dynamism. At an organizational level, management scholars refer to this tension as 'the productivity dilemma,' i.e., the dilemma between chasing productivity gains and investing in distinctly new sources of a value.

While sociologists have studied intensifying practices in detail, the *market-seeking* business practices, as a topic of study, has been of far more interest to strategists at business schools. Yet, management scholars themselves note that there is limited firm-level research on how companies redirect strategy away from maximization goals and thereby attempt to break the 'lock in' logic of the prevailing engine of profit (Burgelman 2002) The conditions in and the processes by which industries *switch* from a market-preserving to a market-seeking orientation remains undertheorized despite the implication these switches have for industrial reorganization and workplace dynamics. To theorize how new threats fuel a market-seeking drive at the cost of preserving dominant modes of profitmaking, I engage scholarship on competing corporate strategies. Literature on competitive strategy is useful insofar as it offers a framing device that centers contradictory industrial imperatives (Adler et al. 2009; March 1991).

The analysis presented is based on a study of IT companies that contend with cloud computing, a technology paradigm that, in the words of one IT manager I interviewed, represents an 'existential threat.' IT companies have vast operations in India. Indeed, according to a conservative estimate, India accounts for more than half of global market share in IT services (Bhattacharjee and Chakrabarti 2015). I use the ongoing restructuring of India's IT industry to show how managerial decision-making shifts in response to a new threat.

Cloud computing stands to alter the dynamic between the corporate buyers and suppliers of information technology. In an era of cloud-enabled software systems, corporate customers do not necessarily have to invest in *their own* data centers and IT departments. Instead, customer companies have the option to *rent* computing infrastructure directly from the providers of cloud-based hardware infrastructure and software. This potentially undermines the business models of a wide array of players that sell software, hardware, and services to corporations through traditional means. Cloud-based computing thus presents leading firms in the software sector (including offshore IT services companies) with a major challenge.

This case offers a valuable window into managerial decision-making as an industry contends with new forms of uncertainty. Based on qualitative interviews with managers and other employees of this sector, I study the practices that speed up the obsolescence of prevailing revenue sources and corporate units. Senior managers at IT services companies pre-emptively undercut dominant revenue streams by introducing competing service' lines. They are driven to actively embrace and promote the technologies deemed as dangerous to their business models and revenue streams.

Often organizations refrain from introducing new products and services that directly compete with existing ones. Yet, software companies, both Indian and multinational, are doing precisely this. Specifically, I show how IT companies promote cloud technologies *despite* the threat it poses to their revenues. This fuels the threat of cloud IT and reinforces the core expectation that cloud computing is future of IT. To use the expression of an executive-level manager I interviewed, this chapter theorizes how and why IT firms strive to 'kill the goose laying golden eggs.'

This chapter is structured as follows. To present a coherent conceptual framework for the study of corporate cannibalization, I first engage with literature on contradictory strategic imperatives. The empirical analysis is divided into three sub-sections where I analyse (i) managerial narratives of a looming crisis, (ii) the concrete manifestations of autophagic action, and (iii) the way an autophagic agenda is implemented. I conclude with a review of the core argument.

Analyzing Contradictory Strategy Imperatives

Organizational scholars outline a paradox between 'exploitation' and 'exploration.' They argue that the drive to exploit prevailing structures and the drive to explore new avenues for growth are fundamentally contradictory (Adler et al. 2009; Benner and Tushman 2015; March 1991). In this section, I focus on these contradictory forces to properly situate autophagic action as a strategic undertaking. In what follows, I synthesize organizational analysis of competing strategies, with a processual approach to managerial decision-making in conditions of uncertainty.

Market-intensifying versus market-seeking strategies

Market-intensifying strategies that preserve and strengthen existing advantages are diverse and varied. Firms intensify existing production models through cost and variation- reducing efforts that often focus on new techniques of routinization and rationalization (Benner and Tushman 2015). For example, in the 1980s, firms in the US began to widely implement new standardized quality measures (e.g., Total Quality Management, Six Sigma), best practices frameworks, and business process reengineering programs (Baldoz et. al., 2009; Head 2003). At their core, these programs aimed to rationalize corporate processes, reduce costs, and closely monitor workflows (Benner and Tushman 2015, 2003). Companies also attempted to maximize returns by subcontracting and externalizing work and production processes (Coe and Yeung 2015). Scholars also distinguish between innovation that is oriented toward intensification versus exploration.

When it comes to firm-level innovation, ‘exploitation’ is associated with incremental (as opposed to radical) innovation that is focused on modifying and improving existing product/service lines (Christensen 1997; Hill and Rothaermel 2003). Apart from efficiency-seeking action and incremental innovation, I also view efforts to increase sales of existing commodities as an expression of a market-preserving logic. Sales-improving efforts - either through product differentiation, advertising, or other marketing tactics, reflect the impetus to maximally extract profits from existing structures and commodities. Analytically, these diverse techniques are held together by the commitment to *deepen* prevailing advantages rather than explore new ones.

Unlike mainstream economics, economic sociology does not elevate ‘efficiency’ as the dominant explanatory frame to understand corporate behavior (Fligstein and Dauber 1989; Fligstein and Dauter 2007). Therefore, the claim that firms are efficiency-*seeking* in their attempts to maximize profits, is different from stating that economic actors *are* ‘efficient.’ My intention here is to analytically separate competing organizational imperatives that shape corporate practices. To this end, this literature distinguishes between the organizational goals of rationalization, intensification, and control on the one hand, and the discovery of new sources of profits on the other.

In chapter two, where I discussed the recent history of India’s IT sector, I stressed the entrepreneurial activities of Indian IT professionals in the 1990s. Once they successfully convinced US firms to offshore large chunks of IT work to offices in India, IT organizations grew dramatically in scale, leading to rationalization of work practices. Indeed, offshore IT companies have adopted many techniques of intensification over the last three decades. For instance, IT companies sought international quality certifications and implemented standardized best practices (Balakrishnan 2006; Yost 2017). These certifications were a way to enhance trust and increase credibility in the international market for software services and, in turn, strengthened existing service lines. More crucially, in their effort to stabilize existing revenue lines, companies found ways to reduce costs and engage in cut-throat price competition (Peck 2017).

Dominant service lines were intensified through efficiency-seeking measures. Over time, offshore companies reduced the number of workers on-site in the west, in favor of low-cost, off-site project execution in India. The 'body-shopping' work regime where Indian IT workers physically traveled to the US and EU was increasingly replaced by 'virtual migration,' i.e., remote working from India (Aneesh 2006; Xiang 2007). At the same time, offshore companies intensified their service lines in other ways. In keeping with the efficiency-seeking and variation-reducing orientation of exploitative strategies, these firms consistently furthered task fragmentation and the atomization of work (Upadhya and Vasavi 2012). As Peck notes, 'the streamlining and standardization of organizational systems and business processes—in order that tasks can be deskilled, decomposed, and decoupled from more expensive 'onshore' locations—is integral to how this business works (2017, 11).' Taken together, protecting existing revenue lines by closely calibrating costs has been a key strategy for companies facing an intensely competitive and commoditized vendor environment.

Apart from pursuing market-preserving or intensifying attempts, capitalist organizations explore new drivers of growth by building new internal capabilities or by investing in or acquiring other companies (O'Reilly and Tushman 2013). Literature on exploratory, market-seeking activity focuses on corporate entrepreneurship (Covin and Miles 1999), R&D-led radical innovation (Ahuja and Lampert 2001), and diversification (Fligstein 1990). However, this body of work does not distinguish between exploration that is inherently based on the erosion of existing revenue sources (*autophagic* exploration) and mere expansion. Autophagic strategies are, for example, distinct from the strategy of diversification. Diversification is a means of spreading risk across markets, a strategy 'pioneered by large firms to stabilize their overall structure' (Fligstein and Dauter 2007, 115-116), rather than to disrupt or cannibalize it.

Again, take the example of IT services companies in India. These firms have diversified and expanded their service lines from the early years of debugging Y2K software. For example, IT services companies offer clients services associated with software development, as well as other services to do with Business Process Outsourcing (e.g., payment processing, HR management). Introducing new service lines represents the attempt at entering adjacent markets. However, autophagic action, as I define it, refers to the introduction of *competing* revenue lines, where one eats into the other. Here, the market-seeking drive is pursued at the cost of protecting the existing turf. In this context, companies commit to a new business plan and strategy that actively involves displacing an existing growth engine with a new one. Unlike diversification, here growth is predicated upon hastened obsolescence.

While outlining exploitative and exploratory strategies, the consensus amongst scholars is that the drive to intensify and protect existing investments and advantages tends to override the compulsion to explore radically new opportunities. Organizational theory explains this strong imperative to adopt intensifying strategies in two ways: resource competition and path dependence. In the first case the literature points out that companies have access to finite resources and are faced with the choice to *either* to invest in their existing production models *or* to pursue new avenues of expansion. In short, channeling resources into one domain necessarily means redirecting it from the other (Gupta et. al., 2006; March 1991). Second, exploiting and enhancing existing advantages provides tangible, predictable, and relatively quick results. This further justifies the continued focus on prevailing structures. This self-reinforcing tendency produces a path dependent emphasis on exploitation (Gupta et. al., 2006; March 1991). The risk that new sources of value will annihilate existing profits can be regarded as the third frame that explains the inertial thrust discussed in the literature.

Exploring new markets, commodities, and innovations can undermine revenues from the existing business model. Therefore, firms might desist from monetizing new opportunities in the event that this could potentially destroy their prevailing profit source. The pressure to maximally recoup investments and sunk costs is a disciplining force that tempers exploratory endeavors (Harvey 2018). For instance, Bell Telephone deliberately chose not to sell the integrated telephone handset for years, despite having successful developed it (Reich 2002; Schoenberger 1997). This ensured that the new device did not eat into the profits drawn from the company's existing products. Similarly, Kodak invented the digital camera but refrained from aggressively marketing it as this would undermine a major source of profits: the sale of film. There are many such examples of companies withholding new products from the market to ensure that profits from existing investments be 'fully mined' (Schoenberger,1997, 89). When it comes to IT companies, the global demand for low-level service work has been so overwhelming that there has been little incentive to focus on anything other than gains purely based on labor arbitrage. IT Companies have 'sunk significant costs into what have become massive revenue generators' (Peck 2017, 125), and have refrained from aggressively pursuing radically different service lines. Software products companies such as SAP and Oracle along with their India based service providers could have pushed their global corporate clientele toward cloud-based computing ten years ago. However, doing so would have resulted in killing their dominant source of profits: the sale of on-premise software and attendant services. The compulsion to protect the source of existing profits was a strong counter-acting force.

Subsequently, I will show that the tides have shifted in favor of cloud-based IT. I argue that the pressure to explore future opportunities for growth becomes paramount when the core business - no matter how profitable in the present - is profoundly at risk.[19]

Considered together, the exploitation-exploration frame is useful in that it highlights contradictory corporate imperatives and can explain particular trajectories of transformation. However, research in this area has insufficiently examined how and why the *switch* from a market-preserving to a market-seeking orientation occurs (Burgelman

[19] A contemporary example would be of the retail sector in the west. Large retail chains continue to draw the bulk of their revenues and profits from brick-and-mortar stores. Yet, at some point over the last decade retailers read the rise and expansion of online retail as inevitable. Based on this, retail chains made an autophagic choice to actively push customers away from their stores to their online platform. I argue that the timing of this interpretation and ensuing action shapes the pace of transformation in the retail sector.

2002). Corporate strategy scholarship, as Critical Management Studies (CMS) argues tends to be prescriptive and model-oriented, rather than process-oriented (Alvesson and Willmott 2012). In contrast, sociological and CMS-based approaches, are more attuned to issues of power relations and micro practices. A processual approach would attend to decision-making processes that spurn autophagic change, while remaining cognizant of extra-organizational, market-level pressures.

As noted, corporations are locked into feedback cycles where decision-making is constrained by the yoke of sunk costs and previous competencies (Burgelman 2002; Leonard-Barton 1992). This helps explain why strategic orientations get cemented. However, when and why does a strategy complex get reconfigured such that the imperative to explore new opportunities becomes an overriding imperative? As Lounsbury and Crumley (2007) ask, where do new practices come from? To answer this, it is critical to pitch an analysis at the dual registers of the market and the organization. Since competition is both a *condition* and a *practice* (Christophers 2016) and corporate strategy mediates these two levels (Schumpeter 1976), the sociology of markets and organizational sociology are necessarily bound together.

As different players with growing clout promote cloud technologies, the degree of freedom in decision-making enjoyed by IT companies in India begins to shrink. It is true that offshore companies are suppliers in buyer-driven production networks (Peck 2017). However, while choices are circumscribed, managers still employ strategic decision-making to navigate the shifting market for corporate IT. In what follows, I examine how managers at offshore IT companies confront the challenge posed by cloud computing and choose specific autophagic pathways.

On-demand computing infrastructure

Cloud computing grants organizations on-demand access to a ‘a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be *rapidly provisioned* and released with *minimal management* (Mell and Grance 2011, emphasis mine).' In lieu of maintaining their own systems, customer firms have the option to provision IT resources (computing and storage capacity) from a centralized provider much like other utilities such as water and electricity.

Amazon Web Services has a huge lead – a first mover advantage – in what is referred to as the 'cloud wars.' This is a battle between AWS, Microsoft and Google over who owns the underlying infrastructure - the servers, platforms, large-scale data centers. New internet companies with few investments in internal computing infrastructure (e.g., LinkedIn, Netflix, Twitter) have driven AWS' phenomenal growth. In contrast to AWS, the 'corporate IT' industry serves the 'enterprise market,' made up of the largest companies in the banking, manufacturing, and retail sectors. There is no self-evident reason as to why their clients - massive companies with hefty sunk costs in in-house computing systems - would be willing to transition to a new paradigm of IT use. Counter-acting forces that slow this transition include the cost of transitioning systems and grave concerns around data security. Moreover, the rapid provisioning of computing infrastructure that requires minimal management, stands in sharp contrast to the long-standing production and sales model of the computer industry. Incumbent technology companies have had a vested interest in slowing down the pace of cloud adoption as it threatens their business model.

In the next section, I argue that these counter-acting forces are losing traction and incumbent actors in the software sector are competing to promote cloud software. While it is too late for incumbents to compete with Amazon and Microsoft in the data center space, leading software and services firms are attempting to offer their clients cloud-enabled business applications. In light of this, I analyze the process by which IT companies in India attempt to replace existing service lines, how managers rationalize this act, and how employees are encouraged to undermine still dominant revenues streams.

Cloud Computing as a Threat

All the managers I interviewed, regarded this cloud-based paradigm of IT consumption as destabilizing. IT services firms are sometimes referred to as ‘system integrators,’ operating between client firms and software products firms, working to *integrate* the various components of IT systems. India’s IT sector thrived in part because software systems were discrete and disparate, giving intermediaries a chance to offer integration and management services. The cloud-based paradigm purportedly flattens this by giving software providers centralized control in a way that reduces the need for systems integrators. As one IT professional said, ‘the cloud guys have exposed the middlemen, the complexity is not needed [anymore].’ The impetus to offshoring IT work came from the fact that in-house IT systems needed to be customized and maintained, and that there was a low-cost labor pool available to do so.

The rise of a cloud-based model of delivering IT poses a challenge to software firms that depend on clients owning and investing in their own in-house assets. As a former Chief Strategy Officer of a leading IT firm noted, the advent of the cloud ‘changes the game’ as previously the clients ‘bought [hardware and software] and these things had to be implemented. Earlier each application had to be repurposed. Today this [technology] is available to anybody on tap.’ He then pointed out the implications of this development for his industry:

> Now look at this from the IT services point of view…there has been a lot of systems integration work to do and this is where our large projects came from. Technology was bulky…today technology is so thin. People can just buy it off the shelf. This is an incremental threat to our business.

Similarly, another senior manager emphasized the threat of on-demand IT where processing power and storage capacity are ‘available today with a swipe of a card on a pay-per-use model.’ In this case, he said, ‘[clients] don’t need to own data centers.

[They] don’t need huge infrastructure.’ He concluded with an assessment of what this meant for firms like his:

> Traditionally companies built or bought their own apps, so an army of people [were needed] to build, code, test it. If you replace that with software-as-a-service, then you don’t need as many people to maintain it. *The rationale for outsourcing [to Indian IT firms] is no longer there*.

This is the promise of cloud systems to corporations: rapid, scalable computing infrastructure available on a rental basis. ‘Run of the mill’ IT as one manager put it, can now be very easily accessed and consumed. Cloud computing gives customer organizations a way to use computing resources without making long-term investments. In the words of the Chief Technology Officer of one of India’s leading IT firms, ‘cloud is the aggregation of computing available on tap.’ He noted that client companies ‘don’t have to build IT infrastructure to use IT infrastructure. [They] don’t need to worry about owning servers and systems.’ If client firms access storage and software on-demand, they bypass the arduous and expensive task of implementing their own IT systems. This drastically reduces the large upfront software license costs as well as recurring labor costs associated with infrastructure maintenance.

It is widely held that the annual cost of software maintenance represents between one sixth and one quarter of the software license cost (Spencer 2014). So, if a software package costs a million dollars then the recurring annual maintenance cost is $180,000. It is this recurring annual cost and the initial licensing cost, that the cloud paradigm reduces. ‘A large chunk of what Indian companies do is maintain IT infrastructure. If firms use the cloud, it means they don’t have the hardware infrastructure to maintain; so, where is the business?’ asked a former Chief Strategy Officer. He added, ‘If companies don’t have their own applications, but share apps sitting in the cloud on a SaaS basis (software as a service), then where are the applications to maintain and upgrade? Competitive pressures are coming at us from all fronts.’ This perspective was routinely voiced during interviews with middle and senior managers at India's top IT companies. The narrative that emerged was a dire one, signaling a potential end to India's IT story; a story that only until a few years ago was aggressively upbeat and resolutely expansionary in nature.

On first glance there is no reason to view this narrative as anything other than what it claims to be: a description of a new threat ravaging the industry. However, firm-level financial data contradicts this crisis narrative. Far from making losses, there is little evidence of even a significant dip in profits. Managers and industry commentators articulated an alarming narrative of looming crisis. Yet, as Figure 1 shows, profits have steadily grown and as Figure 2 demonstrates, so have the revenues.[20] These data do not fit the image of an industry in the throes of a major crisis.

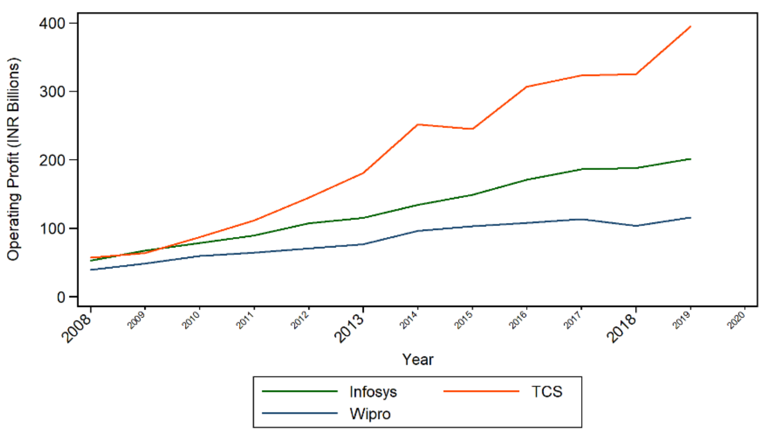

Figure 1: Profits over time of top three Indian IT companies

Credit: Amay V. Narayan

[20] These graphs are based on publicly available financial statements compiled from annual Reports of companies.

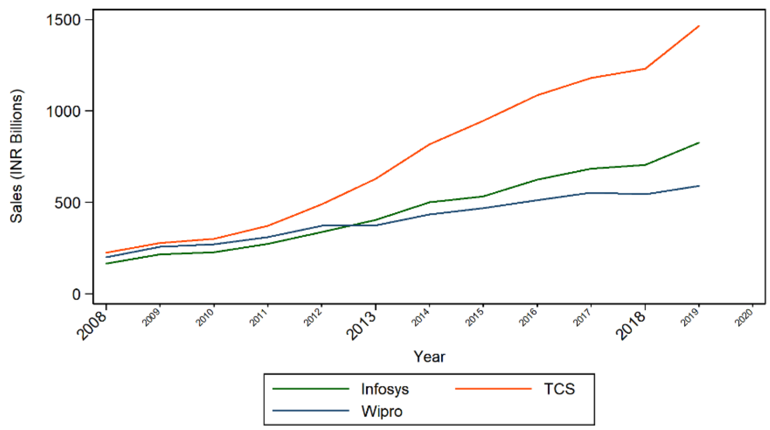

Figure 2: Revenues over time of top three Indian IT companies

Credit: Amay V. Narayan

This disjuncture between financial data and interview data is striking. It suggests that the perception of the threat is at least partially anticipatory. After all, despite the dramatic forecasts of cloud computing's tsunami like rise, there are reports of piece-meal, even sluggish adoption (Eide 2019).

Beckert (2016) proposes that economic actors predicate action on an interpretation of a particular future outcome as being inevitable. Competition, as Beckert (2016) notes, enforces the future orientation of economic actors. The interpretation of future outcomes sets agendas and guides the distribution of resources. A radically new set of strategies therefore reflects a shift in *expectations*. At certain junctures, when expectations shift, corporate actors introduce and experiment with new strategies. Therefore, I argue, the switch from exploitation to exploration as a corporate priority can be analyzed with reference to actor-specific *expectations* of market shifts.

This is not to say that cloud computing as a trend is not 'real,'; rather that the trend is actualized by the actions of incumbent players across the corporate computing industry. Indian IT companies are certainly not speculating on cloud computing as a trend in a vacuum. Indeed, upper management is reading particular signs, including the behavior of other firms (hardware, products, and services players), as well as the desire on the part of customer companies to cut their IT maintenance budgets. With more and more software companies offering cloud-based options, the 'choice' to offer cloud services is in a sense an induced, even forced decision. However, the timing of this decision – the partially anticipatory element and the methods of implementing such a decision – is important. If existing software and services companies are quick to shift into an autophagic mode, it implies an acceleration in the pace of organizational and industrial change. To quote a top-level manager,

> Look at our revenues. Seventy percent still comes from traditional offerings, 30 percent From digital offerings. This 70 percent isn't static; we need to transform it.'

I followed up by asking why they need to annihilate their traditional offerings. He replied,

> Because it will shrink. It is being replaced by the rise of digital and partly because we are also cannibalizing it.[21]

This explanation clearly shows how autophagic action represents a blurring of structural pressures and agentic strategy. In other words, traditional sources of profits are shrinking both because of the market and because of the strategic decision to speed up the decline and replace it with something else.

This manager continued to describe how in 2015, the revenues of his companies were reclassified according to three streams. Stream 1 was termed *mature* or 'traditional revenue.' Stream 2 was 'older services that [were] still growing rapidly' also known as *maturing* revenue. Stream 3 was called 'emerging business.' Below is a clear narration of the company shifting priorities toward market-making. To quote the same top manager again,

> So, to answer your question - what would you do if you were the head of a shrinking business? You would profile your revenue into slices. And then you would behave towards each of those slices very differently. *Mature* revenues have

[21] 'Digital' in industry speak is a shorthand for new technologies – cloud computing, big data and analytics, Internet of Things, and so on.

> to be made efficient and automated. You extract profitability out of it. With *maturing* revenue, you have to make sure you keep winning deals and your market share is high. And then you need to start betting on *emerging* businesses. It is a bit anarchic right now. You need to know how to exploit that anarchy.

How to Kill the Golden Goose: An analysis of autophagic action

In the context of new uncertainties, managers at IT firms attempt to cash in on the latest technology trend and nudge their customers towards it. There are multiple ways to view the process by which IT firms embrace cloud computing despite being a disruptive trend. I present four pathways through which autophagic tendencies become visible in this industry. Using interviews and document analysis, I discovered that software services firms:

i. Migrate their own in-house IT Systems to a cloud-based environment
ii. Introduce new services lines that undercut existing ones
iii. Partner with product companies to sell their cloud offerings
iv. Invest in/acquire companies that sell cloud software and services.

I elaborate on each these points below.

Interviews reveal that IT firms are moving *their own* internal applications to a cloud environment. Top management at IT companies find that cloud software offers them the same advantages related to cost and flexibility that it presents client organizations. When asked if the threat from the cloud was serious, a high-level executive of a leading Indian IT company emphatically said, 'Absolutely. Why talk about clients? Let's talk about *our* company.' He went on to tell me how the providers of cloud software routinely pitch their product to him: 'They want me to put my systems on the cloud. If I am a forward-thinking enterprise, even I want to rapidly improve my costs.'

Another middle manager similarly discussed the pressure on him to adopt cloud software. He emphasized that client companies are under a lot of pressure to cut costs and are doing this by optimizing their IT budgets, something that the cloud model promises. He then noted that his own IT firm is similarly under pressure to reduce costs and is moving its internal applications to a cloud ecosystem. 'The same challenges the American CIO [Chief Information Officer] on the client side faces, our own CIO also faces. We are also told: move to the cloud! Move to the cloud!'

New service lines in India will gain traction only if customer companies believe their offshore partner possesses the capability to execute qualitatively different contracts. IT companies lobby their clients by using their own internal cloud-based systems as evidence. For example, I interviewed a manager who also revealed that her own firm was in the process of turning to cloud-hosted applications: 'We use many applications that are hosted in the cloud.' She reported, 'Some of our own data centers are laying empty!' The fact that her own company had opted for cloud software to meet its internal IT needs and had unused on-premise data centers was a revealing piece of information. She added that internally implementing a cloud-hosted system was a way to signal to clients that her firm had the relevant expertise and know how. In other words, her company used *itself* as a case study to signal to clients that they had the capabilities to execute the transition to cloud computing.

With the widely held belief that traditional services (infrastructure management and application development) are no longer going to drive expansion, IT companies actively seek out the decline of these revenue streams. They offer clients services that directly undermine their leading revenue lines. Specifically, these firms are aggressively promoting cloud options to their clients with the hope that they win contracts to enable the transition. Apart from migrating their own IT systems to a cloud-based model, these companies have begun to themselves offer cloud services to clients. In other words, firms challenged by cloud computing now compete to offer client firms cloud-related services. I asked the former Chief Technology Officer (CTO) of one of the largest IT services firms how he understood the contradiction at play here. He rhetorically paraphrased my question, 'Yes*, why would you want to kill the goose giving you golden eggs?* Why would you want to accelerate the problem?' He saw the killing of the goose as being risky but also an opportunity to generate revenue in the short term.

IT firms are hired to migrate data and on-premise systems to a cloud provider. Indian IT firms do not produce cloud software or own server farms. Instead, they offer corporate services associated with the transition to a cloud-based ecosystem. Strategists in this sector now seek to generate revenue by speeding up the adoption of cloud software, i.e., they aim to leverage the same threat that encroaches upon their primary source of profit. I asked middle managers involved with these new service lines to interpret and reflect on this contradiction. These employees recognized the irony of undermining their own revenue sources, but saw it as inevitable, alluding to the intense pressure of survival in a competitive, rapidly changing market. 'The move to the cloud will happen with or without you. You just want to be around when it happens.' Another mid-level manager put it differently when he described the pressure, he felt from two distinct sources: 'When it comes to advocating cloud solutions, there is pressure from both ends, from the customer and your own firm.' A third manager spoke of the compulsion to offer clients cloud services knowing that competitors are already making their pitches: 'It's killing us! But if we don't do it, someone else will.' Each of these quotes conveys that new competitive pressures and the consensus that cloud adoption will inevitably occur, pushes IT firms to accelerate the turn toward cloud computing.

Software product firms (like Oracle and SAP) that grew in an era of the on-premise model and their Indian services' partners find themselves in a situation where they must become key agents of cloud promotion. IT firms are entangled in long-standing relationships with software product companies. These product companies now enlist Indian IT firms to promote their cloud products to client firms. A major way in which IT companies participate in the undoing of their leading business unit is by selling clients products that undercut their own still-dominant revenue streams. Large product companies having ties with Indian companies are able to exert pressure on them. Employees at Indian firms who work closely with their product partners to sell cloud software elaborated how they together lobby client companies. These employees describe the process by which they 'educate' clients about cloud options and actively push their clients to make appropriate choices. One employee explained that the product partner was pressuring her firm to 'evangelize' their cloud-based products to existing and new customers. Another employee routinely drew up proposals that involved a one-time data migration service to the cloud. IT companies encourage clients to invest in cloud solutions with the hope that they will be contracted to migrate data and software to the cloud, despite knowing that once migrated, the software will not require maintenance and will eat into the recurring revenues of the firm. Thus, paradoxically the industry most threatened by the trend toward cloud computing is compelled to become a major proponent of it.

Acquisitions are the final technique of autophagic change I discuss. IT firms acquire or invest in companies that make, sell, or implement corporate technologies that are disruptive to their own service lines. Acquisitions per se are a well-known and well-theorized aspect of corporate strategy; however, the literature on acquisitions does not distinguish between market-intensifying acquisitions and market-seeking acquisitions that fuel cannibalization. IT firms have been actively buying stakes in companies that sell disruptive technologies. Just over the last two years, Cognizant - a leading IT firm - has acquired four companies that are associated with Salesforce.com products, Infosys has acquired two, and Wipro has acquired at least one. Saleforce.com is one of the world's largest Software-as-a-Service (SaaS) companies that hosts pay-per-use cloud applications. HCL acquired a Minneapolis-based company that sells Microsoft's cloud products that competes with Salesforce.com. In general, Indian IT companies have been acquiring US software and consulting firms, thus establishing their status as multinational corporations. These acquisitions reflect an attempt to strengthen presence in the ecosystem of cloud technologies.

Apart from cloud computing, the IT firms are also investing in advanced automation tools. Offshore IT companies do not build cutting-edge software tools internally. Instead, they buy up startups with their huge cash reserves. Automation in the domain of IT work also challenges the revenue models of IT companies. Advanced automation aims to reduce the role of IT labor in the context of software testing and maintenance. This disturbs the prevailing revenue model of IT firms in India. As these firms charge clients rates that are calculated based on labor costs, the tools that automate the labor-intensive work performed in IT companies put these firms in a tricky position. Reducing labor cost undercuts the prices they demand from customers. In describing this predicament, a Chief Strategy Officer summed up the dilemma of embracing autophagic strategy as a 'necessary evil,'

> Automation is a critical threat to our labor-based model. You have to embrace and cannibalize yourself. It's a very big decision to take; *it's a necessary evil*. Automation is killing what you have - it is an *immediate threat and an immediate necessity.*

IT companies use a pricing structure known as Time and Effort pricing. Here, costs and revenues are measured on the basis of the number of workers and the number of hours billed to a client project. Labor costs are burdensome but they are also the basis on which firms charge their clients. As automation reduces the number of people required for a task, it erodes an organization's ability to charge their customers a higher rate. If clients are aware that their IT vendor is automating processes, they will demand a reduction in prices. In the words of the Chief Strategy Officer mentioned above,

> If I automate, I will not get those savings, but my customer will just ask for a discount. My top line will fall. Yes, it is reducing my cost, but by reducing costs I am reducing revenue.

Despite the threat of automation eating into their revenues, IT services companies are making financial investments in startups that produce these software tools. An employee who works in the area of security solutions told me that his firm was investing in new tools focused on automation. 'We know that over a period of time they will take away the run-of-the-mill security operations work away from us. It will be a bot that will deal with a virus outbreak somewhere, clean it up and fix it. Typically, you would throw people at the problem but now it can be automated.' He concluded by saying, 'We really have no choice. *So, we cannibalize ourselves and make some money out of that.'*

Popular narratives of 'disruption' usually focus on a new entrant that disrupts dominant practices of an incumbent firm. What we are seeing here are practices by which firms begin to disrupt their *own* structures of profitmaking.

Autophagy in Practice

Corporate strategy research, despite focusing on the contradictory imperatives to preserve existing revenues and explore new opportunities, tends to see the process of 'management' in neutral terms. Managers are often treated as neutral arbitrators of competing demands (e.g., Birkinshaw and Gupta 2013). Organizational autophagy, however necessarily, destabilizes managerial positions with entire sub-units being de-prioritized in the interest of a new growth driver.

A senior manager I interviewed in charge of new (exploratory) service lines explained that the employees associated with traditional services take issue with his unit receiving special treatment as it drew in little revenue. He observed that his team received perks, bonuses, and salaries that far exceeded the company norm, only because top management was trying to encourage the growth of new exploratory units. Moreover, the performance metrics of the unit as a whole were different; it was not judged by revenues but by the success in winning new deals (however small), in new areas of growth. This manager expressed the core contradiction between new and existing corporate units. He stated that old units - despite generating overwhelming profits - were suddenly deprioritized and ended up financing new units. To quote him, ‘the traditional unit funds the ‘new’. So, [that old] unit is funding *my* investments. That’s how I’m holding afloat. From the perspective of the organization this is okay…I’m anyway bringing higher revenue per employee.’ An executive-level manager explained the organizational challenge,

> New age companies [startups] don’t have the problem of managing their legacy investments. Those are asset light companies and we are incumbents in our industry. Seventy five percent of our business is sitting in old stuff. That has to be maintained because that’s what is giving your cash.

Firms are in a position where they need to accelerate the decline of their cash cows. The exploratory drive, which is premised on the de-prioritization of largest business units and their employees, is ripe for conflict and turmoil. I emphasize the shifts in the balance of power within firms, where some units are privileged over others, and where some managers gain power while others are side-lined. This was evident during the period of field research – I tracked a surge in managerial layoffs among mid and senior managers.[22]

How do companies implement a corporate strategy that is threatening to their own employees? In order to attack a major profit source, corporate executives first need to commit to the strategy themselves and override skeptical voices within their strata. I interviewed a Chief Technology Officer who played a key role in reshaping business strategy in response to cloud computing at his IT firm. Given his instrumental role in altering the strategic orientation of a large IT company with almost 200,000 employees, it is worth dwelling on this three and half hour long interview. First, he reviewed with me a crucial meeting where the CEO decided to disrupt existing service lines.

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[22] ‘More pain for mid-senior IT employees as large companies plan further layoffs,’ 11 November 2019, India Today. https://www.indiatoday.in/business/story/more-pain-for-mid-senior-it-employees-as-large-companies-plan-further-layoffs-1617737-2019-11-11

> I told him: the cloud will interrupt this business. He asked how much was at risk. I told him – we are doing $250 million in [in-house IT] asset management. We will start by losing $100 million and very quickly we will lose all $250 million. He said okay, 'let's make our target for cloud $200 million, to offset this. We can make that money from the shift to the cloud itself, to minimize the impact.'' [Interview, 5 June, 2017].

This comment represents a clear articulation of autophagy as a practice: offsetting future decline of profits by proactively killing off the revenue unit in jeopardy.

Convincing the CEO in this case was relatively easy. The real resistance came from the managers below where protecting the dominant arm of the business was deeply rooted in the instinct to protect one's occupational turf. Next, this former executive described his conversation with the manager heading the 'infrastructure management' unit of his firm (the unit most at risk), who was incredulous about the new strategy. Typically, this senior manager would take orders from clients - for example, an order request for 3000 servers - which his unit would then execute. In the words of the CTO,

> I asked him how the client knows he needs 3000 servers. He said, 'I don't want to ask that question! If I am a builder and someone asks me to build a villa why would I ask – why do you want to build a villa?' I said, 'no, no you aren't getting my point. If you tell him that you can use the cloud and have it set up with only 1000 servers, don't you think you will add value to his business?' He said 'Sir! Why on earth would I want to lose 2000 servers!' 'Well,' I said, 'if you don't do it, someone else will, right? It's just a matter of time.'

Employees associated with the traditional business have to either be 'persuaded' to enact autophagic agenda, or else circumvented. In order to successfully destroy strong revenue flows, strategists and other executives have to forcefully impose the agenda with different top-down methods. Thus, a professional from the CTO's group was placed in each business unit to drive this strategy. Senior managers noted that the people who needed to be monitored and supervised most closely were those making sales. They had to be pushed to undermine current revenue creation in the name of future growth. Only if the sales people and middle managers were convinced, would the counter-intuitive strategies espoused by the upper-level management be actualized. To quote the former-CTO again, 'We incentivized sales guys. It's difficult to convince the sales guy to sell the cloud business which currently is just accounting for $1 million dollars, while, the data center business is giving you $10 million.' Thus, top management rewarded middle managers using bonuses and pay hikes to accelerate new services lines and undercut existing ones.

I also found that IT managers promoting cloud software tried to circumvent the IT department on the client side. Interviews with sales people revealed that they at times try not to pitch cloud products to IT decision-makers on the client's side who have an interest in preserving the old IT regime. One interviewee told me that he actually strategizes his sales pitches so as to bypass the IT department of customer firms and talk directly to executives who are interested in optimizing costs. He knew that cloud computing threatens IT jobs on the client's side and the head of IT might resist investing in his cloud offering for this reason.

These narratives reveal the vexed process by which disruptive strategies proliferate through social practices of persuasion, coercion, and various strategic actions. More broadly, the cloud market gains traction when a range of networked actors, in relations of dependence and competition vis-à-vis each other, promote the adoption of this computing model, successfully silencing opposition. For example, a sales person at an American hardware company with operations in India informed me that until the early 2010s, he would sell in-house computer hardware by emphasizing the security risks associated with cloud solutions to customers. Cloud computing, which enables the sharing of computing resources, presents a grave challenge to hardware companies that depend on individual customers buying their own servers and hardware. Initially, hardware and software firms with strong ties to the traditional IT regime resisted the challenge posed by the rise of cloud computing by feeding security fears and emphasizing the high cost of migration. With increased momentum, these counter-arguments, as the salesperson mentions, lose traction. Now, firms threatened by cloud computing are themselves on the forefront of pushing these technologies to manage the pressures of a changing market.

Conclusion

Yeung and Coe (2015) note that post 1970s, the three axes that firms are most concerned about are: cost, flexibility, and speed. Cloud computing promises improvements on precisely these three axes. However, it remains that the market for new products – no matter how alluring - has to be actively created, managed, and sustained. While there is a growing discourse on frenzied technological change, it would be a mistake to suggest that cloud technologies simply sell themselves (Wajcman and Dodd 2017). Therefore, the growth of cloud software and services need to be analyzed through the decision-making dynamics of organizational users. This IT paradigm is characterized by certain attributes (as the previous chapter detailed). Yet, these attributes alone do not explain how, when, or why this technological regime proliferates.

Not long ago, the fears around security were overwhelming and rendered cloud adoption slow. Clients needed to be convinced to trust an external vendor with their data and also to believe that cloud computing resolved problems rather than created new ones. They had to be convinced that *renting* rather than *buying* software is financially advantageous and that the high cost of migrating legacy applications is worth it. My analysis focuses on how offshore services' vendors are recruited by new competitive pressures to become lobbyists for a computing paradigm. This paradigm in turn threatens to annihilate their existing revenue sources.

As I mentioned, a core objective of this chapter is to establish the *autophagic* imperative as a useful analytic lens in the study of industrial transformation. By pivoting attention to the pursuit and capture of new sources of value, even at the cost of preserving existing systems of profitmaking, the concept seeks to illuminate a distinct source of the restless and 'expansive dynamism' of the capitalist economy (Sewell 2008). In doing so, it analytically bridges market-level forces and agentive action to show how the preservation of existing organizational advantages is disincentivized. This analysis points to a methodological pathway forward: when, why, and how firms participate in the erosion of their dominant profit engine can by studied by investigating the agenda-setting decisions and interactions of top-level management.

Here, a transnational approach is valuable. The rapid globalization of the corporate services industry from the 1990s onward means that the emergence of a new paradigm of IT organization shapes and is shaped by global relations between western clients and their existing offshore services vendors. Employees of India's offshore sector are key actors who are enlisted to alter the IT systems of western firms. Just as IT employees contributed to large-scale debugging during the Y2K crisis, and then to the implementation of ERP software, so too are they involved with the transition toward cloud-based computing. The use of new corporate technologies on the part of large banks, retail chains, manufacturing companies in the US and UK, calls to be analyzed vis-à-vis the actors who are tasked with managing the digital infrastructures of organizations. What is distinct about this moment is the fact that emerging IT services necessarily demand the decline of existing services, something that puts Indian IT firms in delicate position.

That said, the pressure of adapting to a cloud-based environment is felt not just by the Indian IT firms. Analyst literature and the business press show that over the last decade, companies in the corporate IT industry *regardless* of their market position are experimenting with autophagic action. This is therefore not a uniquely 'Indian' phenomenon where powerless firms in a global value chain are forced to kill their business units. From IBM to Oracle to Infosys, the entire gamut of incumbent players has depended on the sale of in-house corporate computing. Each of these companies is now trying to claim a portion of the cloud market by cannibalizing existing business units.

Microsoft, in its bid to dominate the market for cloud infrastructure, actively side-lined its Windows business division, to becoming a competitor to Amazon Web Services (Thompson 2018). While AWS, Microsoft, and Google compete in the domain of cloud-based servers, platforms, and storage systems, SAP and Oracle are working to produce specific cloud-enabled business applications for their enterprise customers. For Oracle and SAP too, strengthening the foothold in the cloud market comes at the cost of protecting their dominant product lines (Grant 2019). Thus, cannibalization has emerged as a dominant strategy of renewal for a wide swath of players.

The strategy remains the same across the different actors. However, the outcomes are uneven. Oracle and SAP are able to directly enter into partnerships with Amazon Web Services in a way that Indian IT firms cannot. Accenture can re-establish its status as a major consulting firm, in a way that Indian IT players cannot. At the same time, this is hardly the end of the road for Indian firms. Recognizing the shifting tides, Indian IT services firms are offering clients new services. They are migrating software and data to a cloud-enabled environment, offering new services based on data analytics, and also developing specialized capabilities for specific industrial verticals. Therefore, although the IT services companies in India are constrained by the asymmetries of power in their networks, they engage in a range of strategic actions. Despite being restricted by the demands and actions of client firms, as well as the pressures levied by more diversified competitors and product companies, the question of agentive action remains relevant. The companies in question have vast cash reserves and make decisions about its allocation, as well as the specific timing and pathways of transformation.

The obvious next question pertains to the workplace effects of this turbulence. This chapter has focused on the decisions, practices, and rationales of top management. The way in which these decisions reverberate through workplaces, the multifarious implications for labor process and the structure of work, needs close attention. In 2017, when the bulk of this research of conducted, it was simply too soon to capture in detail the shift in labor process and the restructuring or work practices. I had caught the industry right when it was in the eye of the storm. Therefore, while there remains much work to be done on organizational change in India at a micro-level, I did hone in on the most visible trend at the time: unprecedented layoffs.

The next chapter offers a detailed analysis of how and why employee layoffs became a key manifestation of the unrest in the sector. Importantly, those who were losing jobs were mid-career employees who had swiftly moved from 'technical' to managerial positions during the heady years of rapid growth. The analysis of the next chapter moves into the terrain of the third broad theme of this dissertation: mid-managerial experiences and actions. To frame the main insights, I build on a small literature on the contradictions internal to managerial structures and what some call the 'managerial labor process.'

Chapter 5.

The *Contradictory Liminality* of Disposable Managers

Introduction

Scholarship on unemployment and precariousness among the professional classes first emerged in the 1980s. Until then – the world over – white-collar employees had rarely been subject to mass layoffs (Barley and Kunda 2011; Lopez and Phillips 2019). More recently, in the aftermath of the dot-com bust and the post-2008 recession, research on precarity has seen a major resurgence (Lane 2011; Rao 2020; Smith 2002; Van Oort 2015). In response to flexible and precarious forms of professional work, a growing section of scholarship adopts the term 'liminality' to describe the vexed experience of being 'betwixt and between' different roles, organizations, and workplace identities (Ybema, Beech, and Ellis 2011). This chapter develops *structural liminality* as a concept to capture contradictory tensions that permeate the world of precarious middle managers.

Middle managers are known to experience high levels of insecurity, overwork, and job loss (Hassard and Morris 2018; Kelly and Moen 2020; Newman 1999). Indeed, many have argued that middle management in the era of Post-Fordist cost cutting and flexibility, has been re-constituted or even dismantled. Yet, simultaneously, middle managers remain agents of various corporate agendas and are often tasked with implementing new strategies (Smith 1992). They remain part of the managerial function, possessing various degrees of decision-making and supervisory authority.

How do the contradictions that inflect the organizational position of managers manifest in their actions, practices, and interpretative lens? The fact is, middle management roles are defined by the contradictory liminality of being both agents and victims of corporate action. Despite extensive research on middle management, important theoretical questions about the *middle-ness* of middle management remain unanswered (Gjerde and Alvesson 2020).

From an empirical standpoint, most research on corporate downsizing and layoffs focuses on advanced industrial regions (McCann, Hassard, and Morris 2004). Globalization figures prominently in research on deindustrialization and the restructuring of manufacturing, but is rarely given centrality in studies on professional labor (Peck 2017). With over forty years of corporate restructuring in advanced industrial societies, it might be tempting to view this case as part of a natural progression toward more flexible and 'flatter' organizations, a process simply in keeping with a broad global trend. Rather than naturalize corporate downsizing and middle manager layoffs, the proceeding analysis shows how the uncertain predicament of managerial employees in India is structured by specific factors and practices, including the specificities of IT offshoring.

India's software sector emerged in the 1990s, when companies in the US and Europe began to subcontract and offshore a range of white-collar work including software labor (Aneesh 2006; Upadhya 2016; Yost 2017). The birth of the software services industry in India was a direct outcome of the downsizing efforts and layoffs with IT in advanced industrialized countries (Peck 2017). Today, barely twenty years later, the Indian sector is itself being restructured. Indeed, the same generation of workers who were initially swept up by rapid expansion, promotions, and frequent pay raises are now deemed 'dead weight' and swiftly laid off.

This chapter proceeds as follows. The next section develops *structural liminality* as a frame by integrating insights from recent debates on liminality with scholarship on middle management. After an outline of the research methods, the subsequent section demonstrates 1) the production of surplus offshore managers, 2) the manufacturing of 'underperformance,' and 3) the phenomenon of mass resignations. These three facets together show how firms target middle managers in the context of downsizing and how managers either voluntarily or involuntarily participate in rendering their own job obsolete. The final empirical section shows how mangers, despite being targets of corporate action, participate in the intensification of their own precarity by acting as emissaries of the restructuring agenda. The discussion and conclusion section synthesizes the main argument and conveys the importance of studying the contradictory, structural liminality of managers.

Developing a Theory of Managerial Liminality

Sociologists and organizational scholars have been experimenting with the term liminality, and its import to work and employment studies (Newman 1999; Sturdy et. al., 2009). Particularly post 2008, there has been a growing body of work on liminal processes, positions, and places both within and between organizations (Söderlund and Borg 2018). The basic premise is that organizations and people often occupy different kinds of 'in-between' spaces that are by definition ill-defined and ambiguous.

Inspired by the anthropological treatment of liminal situations as transitionary and temporary, MBA programs, training workshops, and consulting processes, have each been studied as liminal sites (Czarniawska and Mazza 2003; Johnson et al. 2010). Others find the concept to be useful with respect to the study of temporary workers, entrepreneurs, consultants, and sub-contracted labor. The fact is a large number of people now work across organizational boundaries, frequently moving between jobs, clients, and projects (Daly and Armstrong 2016; Sturdy et al. 2009; Swart and Kinnie 2014; Winkler and Mahmood 2015). Scholars who emphasize the flexibility of contemporary employment and work relations use 'liminality' to analyze identity construction under conditions of precariousness and flux (Beech 2011; Garsten 1999). Taken together, engagement with liminality allows researchers to develop analytical tools better suited for work environments defined by flexibility, instability, and precariousness.

Although promising, there are some shortcomings to this body of work. The corporate structures, industrial practices, and power relations that render liminal experiences so vexed are curiously under-explored. At best, these are presented as background to rather than constitutive of liminal logics. Despite the focus on temporary work, important issues such as work intensification, deskilling, and job loss remain understudied in this literature. Instead, what comes to the fore are sensemaking attempts and the identity struggles of actors who do not have a stable sense of organizational belonging (Ybema et. al., 2011). This is an important, but partial aspect of organizational and workplace liminality.

If *ambiguity* or *fluidity* remain the central themes, then studies on liminality will perpetuate a negligence of broader market dynamics, corporate structures, and power relations. A theory of organizational liminality would do well to elevate *contradiction* rather than ambiguity as the analytical thrust of the concept. There is broad consensus that liminality is fundamentally about 'in-betweenness' in workplace contexts. In every substantive context, this begs the question - in between *what*? How do the two poles relevant to a particular liminal condition profoundly shape the conflicted, paradoxical reality of being 'in-between?' I propose *structural liminality* as a concept that blends the interpretive approach to intersubjectivity (pursued by organizational scholars of liminality) with analysis of industrial transformation, managerial power structures, and global political economy. The problem of middle management demonstrates the utility of structural liminality as an approach.

The Structural Liminality of Managerial Employees

Middle managers by definition occupy an in-between liminal space the corporate structure. Corporate structures, despite decades of downsizing, delayering, and re-organization, continue to be defined by differentiated management functions and complex hierarchies. The stratified large corporation first discussed by Chandler (1977) remains characterized by several middle layers of management and an ever-growing number of managers (Littler and Innes 2004).

These corporate layers present an analytical challenge. Middle managers play a key role in monitoring work and executing the decisions of top management; in this sense they are representatives of the firm (Hales 2006; Harding, Lee, and Ford 2014). Mid-level managers tend to be absorbed by the discourse of 'leadership' as they are seen as employees who execute actions on behalf of the firm and as individuals with a degree of managerial authority (Gjerde and Alvesson 2020). At the same time, middle managers constitute a workforce that is itself precarious, overworked, and exploited (Kelly and Moen, 2020). Over several decades, the upper echelons of large firms have mastered the art of controlling, rationalizing and intensifying the work of subordinate managers (Hales 2000). In light of this, there is often a sharp separation between studies that emphasize mid-managers' ability to execute strategic action and hierarchically maintain work processes (Currie 1999; Currie and Procter 2005; Rouleau and Balogun 2011) and studies that stress their own precariousness, alienation, and hyper-rationalized environs (Gabriel, Gray, and Goregaokar 2013; Hassard and Morris 2018; Ogbonna and Wilkinson 2003; Raito and Lahelma 2015). These two registers of managerial work need to be simultaneously analyzed. The fact is their structural liminality results in a complex interplay between power and powerlessness.

Historically, labor process theory and the research it has inspired, grants centrality to power relations and industrial structures. Yet, for labor process theorists the dual aspect of middle management has been a thorny issue with some emphatically rejecting the idea of a 'managerial labor process' (Armstrong 1989). Braverman's (1998) classic text – the bedrock of labor process literature – has been used to establish a clear separation between managers as agents of control and workers as subjects of control regimes. It is therefore a matter of some irony that the book's core empirical focus is the deskilling and application of scientific management to a clerical and mid-managerial workforce. Indeed, Braverman himself identified the contradiction at hand: numerically, most managers control and routinise work of lower-level workers while their own labor is systematically regularized and controlled (Braverman 1998; Hales 2000; Willmott 1997). For some time, this problem of middle management could remain a somewhat abstract, theoretical one

(Willmott 1997; Wright 1985). However, with unprecedented and escalating mass layoffs, middle managers went from having their labor rationalized and controlled to having their labor *expelled* from the domain of work. In light of ongoing rationalization, offshoring, and managerial layoffs that cut across industrial sectors, world regions, and historical conjunctures, the contradictory liminality of the managerial occupation has only appeared to intensify.

The following sections examine the contradiction between the strategic and supervisory role enjoyed by middle managers and the simultaneous extraction and expulsion of their own labor. Analyzing both dimensions simultaneously best illuminates the contradiction that is ever-present in most managerial positions, one that grows starker when managers in large numbers lose their jobs. 'Liminality' from this perspective goes beyond the descriptive observation that many organizational positions are ambiguous and therefore compel individuals to stabilize their identities (Ybema et. al., 2011). This is no doubt true. But what structures and industrial conditions engine this ambiguity? how exactly does the tension between being a subject and agent of corporate control express itself in various contexts and to what effect?

In responding to these questions, scholarship must focus not just on the narratives and stories middle manager articulate and the 'identity work' they engage in (Beech 2011; Harding et al. 2014; Paton and Hodgson 2016; Sims 2003; Thomas and Linstead 2002), but also the contradictory *actions* they undertake and the benefits of this liminality that are accrued by the firm. The precise industrial and corporate structures that engender a tense, nebulous positionality need more attention. For instance, my study on offshore IT managers finds that the structural liminality of managers is profoundly shaped by particular *structuring forces* such as the sudden surge in global demand for low-skilled IT work and the corporate structure with a vast middle management that rapidly emerges. These structures and industrial trajectories shape not just the interpretations but also actions of thousands of offshore managers who are suddenly - like the technologies they manage - viewed as obsolete.

In this context, I find that companies attack administrative layers while at the same time soliciting the active involvement of managers in the restructuring process. The analysis shows how mid-career corporate employees are implicated in the very organizational processes that threaten their own positions. For as Smith (1992) notes, it becomes the prerogative of the middle manager to eliminate waste and inefficiency at lower-levels while themselves being viewed as 'waste.' The language of 'flab' and 'bloat' is integral to the Post-Fordist corporate lexicon. These terms are nothing but euphemisms for mid-managerial employees who come to embody inefficiency. In light of these considerations, an approach that centers structural liminality, engages both industrial structures and conflicted subjectivities, and in doing so addresses a major dichotomy between macro-structural and micro-experiential analysis (McCann, Morris, and Hassard 2008).

To center the predicament of the managerial middle, I actively pursued interviews with employees who had 10-20 years of work experience at the top IT firms based in Bangalore and fell into the 38-50 age bracket. The career path of an Indian engineer is famously predictable as most engineers, after completing their degree programs, are promoted into the lower rungs of the managerial hierarchy within the first 5-8 years at an IT company, a phenomenon I analyze closely in the following sections.

The Structural Liminality of Disposable Managers

As noted in previous chapters, IT companies in India expanded at a staggering pace in the first decade of the 2000s. For example, the second largest Indian IT firm had around 6000 employees in 2000. By 2010, the company employed over 100,000 people. This boom is entirely attributed to the volume of IT work that was offshored from the US and Europe to India during this time. The phase of rapid corporate expansion in India quickly produced an organizational structure defined by a very large segment of middle managers; reportedly this segment constitutes around 1.4 million employees (Alawadhi and Mendonca 2017).

Citing new destabilizing technologies (e.g., cloud computing and advanced automation) and the outmoded skills of the workforce, over the last five years, the sector witnessed large-scale middle management layoffs. During this time a new discourse on managerial underperformance gained traction and justified escalating job loss. Upper management resolutely maintained that the sector as a whole was suffering an acute skill crisis and that victims of job loss were 'underperformers' (e.g., PTI, 2017). Yet, if this was indeed the case, one might expect layoffs evenly spread across middle and lower bands of the firm. However, as Pavan, a middle manager said, 'these guys with ten years under their belt…there is a bull's eye on their back.' The fact that layoffs targeted employees higher up on the pay scale rather than entry level workers attests to the fact that firms were looking to cut costs. Echoing this, the CEO of a recruitment company challenged the discourse of a performance crisis. In an interview he offered simple arithmetic, 'you can hire 10 entry-level programmers if you sack one project manager whose salary is 30 lakhs (3 million INR per year).' He continued, 'People in their late thirties and forties are particularly vulnerable.' As a recruiter, he used the sudden surge in applications from unemployed managers as indicative of the level of distress. The following analysis identifies three distinctive elements to the process by which a large number of mid-career managers lost their jobs.

i. 'Deskilling' of offshore IT managers
ii. Manufacturing underperformance
iii. Mass resignations

I. *The Problem of Skill: why offshore managers feel 'deskilled'*

As mentioned, to justify the targeting of middle managers, the industry generated a new narrative of underperformance that held managers responsible for their alleged poor technical skills. In order to make layoffs palatable, companies promoted a new image of the average manager who was inept and bereft of skills, irrelevant to the future of IT. It became commonplace to bemoan the lack of up-to-date programming skills and 'domain specializations' amongst middle managers.

Importantly, the middle managers I interviewed did not critique this as a ruse to justify layoffs, but themselves articulated a sense of having lost their technical skills. Academic debates around deskilling have largely focused on the role of mechanization, automation, or appropriation of worker knowledge. In this regard, scholarship focuses on firm-level control regimes, rather than market-level forces. In contrast, IT employees explicitly articulated a sense of having been deskilled by a global market that sought out low-cost work at the low-end of the skills spectrum.

Propelled by global demand, during the period of breakneck expansion, IT firms resolutely pursued projects that demanded basic, low-level programming skills. Firms in India responded to client companies that sought out low-cost labor capable of performing repetitive, routine technical work. In fact, interviewees described run of the mill IT work using terms such as 'commodity work', 'manual labor' and 'donkey's work.' US and UK firms looked to specifically subcontract low-level tasks, sometimes in outmoded and almost defunct programming languages. Firms in India discovered that these basic services were tremendously profitable simply because of the huge volume of work being offshored.

Indeed, the Indian industry was thrust into the spotlight when companies in the global North in the late 1990s needed programmers who knew COBOL, an old low-level language from the 1960s that few in the US and UK are still trained in. Sneha, a middle manager, discussed the challenge of providing customers with workers who were trained in 'ancient languages and programs that aren't even taught in colleges.' She laughed and said, 'I call it *preskilling*.' Her use of this term reflected how global demand fostered an offshore workforce trained in practices that in the rest of the world were more or less obsolete. Another employee said it felt like a 'cattle farm.' He described what it was like to begin his career in 2005, coding in COBOL and 'feeling like a fossil at 21,' again, touching on the theme of pre-skilling.

Interviews with top management further revealed the lure of low-end projects. One executive-level manager candidly explained how low-skill work such as manual software testing offered much higher margins than 'more skilled work.' He went so far as to say that top management deterred middle managers from encouraging higher-level projects because it 'didn't give you margins as high.' He continued,

> it is a funny thing – the lesser skill you have, the higher margin you get due to the high volume. The more you grow, the worse it gets in terms of skill. *You deskill to grow. The linear business model involves mindless scaling and you scale by deskilling*.

In other words, the growth of a labor-intensive model focused on back-end IT maintenance was necessarily based on promoting low-skilled work. An interaction on an online forum illustrated this. An anonymous post asked. 'How does it feel to get stuck into support projects in big IT companies like TCS, Infosys Wipro despite being good at coding?' An emphatic and evocative reply from an employee at one of these top companies said,

> It felt empty**.** I was the top performer in my training, and was told that I have a bright future ahead. I tried to remember when was the last time I had written some code professionally, and wondered how it would feel to have my code run in production somewhere. It is not a happy feeling, if you can relate.

Similarly, Vivek, a middle manager, explicitly discussed his sense of being deskilled by the industry. To quote,

> In the technology world technical skills rule supreme and you lose touch with technology. Gradually you get dis-associated from it. Just like I did. Now I am just another manager…I have generic skills and am more expensive.

This business model produced another phenomenon: a career trajectory where engineers were rapidly promoted into the lower rungs of middle management during the years of high growth. A middle manager wryly remarked, 'as the saying goes, all good programmers [were] turned into bad managers.' Typically, within five years, entry-level employees entered roles such as 'project manager,' where the chief concern was project delivery, ensuring deadlines were met, and enforcing well-functioning workflows. This is why Kunal, another employee explained, firms in India were 'top heavy' with so many managers. In order to keep employees motivated, firms created elaborate hierarchies based on what a technology journalist referred to as 'bogus [job] titles.' Pavan echoed this, 'There is nowhere else to go except to become a manager. In the west techies are paid more than mid-level managers. IT services doesn't incentivize. When you are mid-career it is easier for companies to get rid of you than re-train you.'

Taken together, a large and always growing middle management tier was a key aspect of industrial expansion, integral to the business model. Now with increased pressure to cut costs, companies looked to scapegoat middle managers and justify layoffs. The discourse of 'underperformance' individualized the question of skill, recasting it as something managers brought upon themselves through their inaction.

This gloomy narrative stands in sharp contrast to the experience of being a manager during the recent period of boom. This was an aspirational job that upwardly mobile professionals courted. Not long-ago managers would 'boast about how many people worked under them.' Now, Joseph continued, 'If you get overly promoted it is not a good thing. You don't want to be in the limelight. You'd rather hide.' This analysis shows how managerial liminality is generated and experienced in the context of rapid industrial expansion and IT offshoring. Precarity is shaped by the vicissitudes of economic globalization that swiftly produces and discards mid-managerial employees. Rapid, large-scale hiring of engineers quickly generated a large, expensive managerial middle. Thus, the structural liminality of managers is shaped by an ironic fact: success in moving up the corporate ladder – something that engineers, incentivized by perks, bonuses, and status agentively pursued – later intensified precarity. These ironies and dissonances go beyond this confused terrain of aspiration and precarity. As I show next, the *actions* and practices of middle managers are similarly ridden with tensions.

II. *Generating Evidence of Underperformance*

The charge of underperformance and poor skills had to be backed by evidence, and so companies produced it. Priyanka, a middle manager at a leading firm said that until recently her firm maintained an annual appraisal system. Suddenly the company began conducting appraisals every three months on the basis of entirely new criteria. Sharan, a manager at the same firm described a new system metaphorically called 'Newton's Cradle.' A Newton's Cradle is a device where one metallic sphere displaces another by its momentum. To quote Sharan,

> If a person has not been promoted in five years or has been in the same project for 3 years, he is identified as a 'newton's cradle candidate.' In the system he would get marked as NC. If the system marks a person with NC you cannot renew him in the same project. The system will not allow you to.

The firm created another rule: people on the bench without a project for more than 15 days were to be seen as underperformers. Creating impossible scenarios where crisscrossing rules intentionally made it impossible for employees to succeed was an effective way to individualize blame. The fact was that firms control promotion rates. In an effort to control costs companies greatly reduced the frequency of promotions and salary hikes and also cut the number of people 'on the bench' not being billed to clients. Yet firms created a new rule wherein people who had not been promoted in recent years were marked for underperformance. New jargon rationalized this with one firm calling it 'band inertia,' a malaise that an individual comes to be afflicted with.

Similarly, another company that sorted employees into different performance 'buckets' established that anyone with an MS Rating (Mostly Satisfactory) was liable to be laid off. A second rule stated that anyone 'on the bench' for more than a month would lose their jobs. Yet, the in-house software system that allocated people to projects would remove people with an MS rating from the deployable pool. This meant those with MS rating were forced to be on the bench. Non-assignment to a project suddenly became a signal of underperformance when actually firms control who can be assigned to a project and when. Instituting new appraisal criteria, ratcheting up target requirements, and creating new rules to separate 'bad' performers from 'good' performers became common practices. One employee said sarcastically, 'isn't it strange how everyone lost their skills suddenly in 2017?'

Thus, the production of 'objective' performance indicators – however contradictory – gave validity to an otherwise loose claim around incompetence. These techniques legitimized underperformance as a valid charge and paved the way for the final step: voluntary and involuntary mass resignations.

III. *The Curious Case of Mass Resignations*

In India, although thousands of IT managers lost their jobs, they did so without having every been 'fired' or officially 'laid off.' No one was issued letters of terminations; there was no hard evidence of major layoffs in the sector. In a context where these highly visible IT companies wanted to avoid bad press and any chance of a legal backlash, employees were encouraged to 'put in their chapters.' People simply got absorbed by attrition statistics.

Managers in this context engaged in a particularly vexed form of self-preservation: they would resign to avoid the stigma of being fired. Firms leveraged this tendency to their advantage and created conditions that 'encouraged' employees to submit resignations. Employees saw terminations as a black mark against their professional record and were concerned that it would affect career prospects. Once they received a negative appraisal, or even heard rumors of their name appearing on a ‘list’, they submitted resignation letters. That is, even the possibility of receiving a termination letter was enough to get employees to quit. As nefarious as this sounds, it made employees feel like they were making an agentic choice to quit.

Apart from rumors of lists and informal conversations with their bosses or HR, managers read other signs that they were not wanted. Interviewees said that authorizing ‘parallel power centers’ was a clear indication that the firm signaling a redundancy. This meant that a manager would soon be replaced by someone lower down in the corporate structure. Joseph, a middle manager quoted earlier discussed this form of signaling.

> You do this in subtle ways…make it difficult for them, make them report to someone who is a peer. Change the reporting structure intentionally, [give] no hikes or leave them out of key discussions and strategy planning…

Thus, companies got rid of managers by threatening their positions in a variety of ways, including mind games and subtle cues. Sometimes, the whole process occurred so subtly that employees who had quit did not recognize themselves as having ‘lost’ their job. During an interview, Sharan, who had recently resigned, paused his narrative to ask aloud, ‘Wait, was I considered a lay off?’ Managers in effect ‘chose’ to quit in order to save face and protect their reputations as good employees. To quote Ananth,

> When I have spent 15 years in the organization and you are asking me to go by telling me to put my papers down, without giving me a severance package… [I am] just saving face…I think the industry likes it because you don’t have to make a huge pay out. You can just call people, pressurize them to quit rather than give them a fair share when they leave. It’s all being done below the covers.’

Often immediate superiors would have informal conversations, expressing sympathy and gently suggesting employees contribute to the ‘voluntary attrition’ of the firm. Sneha went so far as to call the act of convincing ‘good performers’ they were in fact ‘bad performers’ as *gaslighting.*

Towards the end of 2017, managers became more reluctant to quit. It became apparent that managerial downsizing was an industry-wide trend and finding re-employment was very hard. Companies shifted from persuasive to coercive methods, leading to ‘forced resignations,’ typically achieved by human resources withholding documents needed for reemployment (‘experience letters’), threatening negative performance evaluations, and spreading rumors of an industry-wide blacklists. What was previously achieved through signaling and persuasion was later accomplished through overtly coercive means. In any event, the resignations continued.

Thus far, my analysis has focused on industrial processes and corporate practices key to the rendering of middle managers as targets of the firm, how they were drawn into the process. The dissonances and contradictions of this experience has been implicit. However, interviewees made comments that more explicitly reveal the contradictions associated with their structural liminality.

Managers as Agents: The Promoters of Corporate Restructuring

Middle managers are not merely targets of corporate action. By virtue of their role, they also represent and act on behalf of top management. Ananth clearly articulated the contradiction that pervaded his life. He critiqued the ‘surreptitious’ practice of forcing managers to quit and added ‘You don’t have collective bargaining in the Indian IT industry - that’s the problem. *I am saying this wearing the hat of a worker. If I were to wear the hat of a manager, I would argue something completely different.’* In using the trope of ‘two hats’ Ananth expressed his dual subjectivity and role - his managerial role and his experience as a subject of intense employment insecurity.

As executers of corporate policies, middle managers played a key role in administering appraisal policies and implementing new strategies on behalf of the firm. As discussed, firms implemented new criteria for performance evaluation. Given the graded corporate hierarchies, general managers were compelled to rate the performance of junior managers on criteria they themselves violated. In other words, they were agents of a punitive process of appraisal that they themselves were subject to. Daisy noted that she was forcing people out of her team on the basis of a criterion that she herself was violating. She was 'encouraging' people who had not been promoted for over three years to resign when she herself was as it turned out, suffered from 'band inertia.' She said, 'I also can be asked to leave.'

Joseph described how managers were enlisted to further an agenda that only compromised their place in the firm. For example, top managers incentivized middle managers to shrink their teams. Smaller-teams made middle managers feel more precarious. Joseph noted the perverse irony of securing your place in the firm by accelerating a process that only rendered you more dispensable. To quote, 'the moment you make those choices, [you] become vulnerable, [your] team becomes smaller…[your] purpose is questionable. *You are digging your own grave.*' Another manager stated the basis of rewarding good managers was changing. Instead of rewarding on-time, quality execution and management of large teams, managers were rewarded for devising new plans that simplified work and shrank team size. This aimed to erode the older 'mind set' wherein managers boasted about how many people work under their supervision. Thus, middle managers were entrusted with executing a managerial vision that only exacerbated their own sense of vulnerability in the organization.

This contradiction surfaced in interviews in another way. Managers believed that the industry had no choice but to adopt a restructuring agenda and advocated for the adoption of new business strategies. Their managerial role meant that they were keenly aware of and involved in the discussions occurring within the upper echelons of the company. They used the same corporate jargon as top managers (e.g., 'core competencies' 'lean' and ‘right-sizing’). Middle managers displayed a keen understanding of the imperative to cut costs and experiment with new strategies. Interviewees discussed the inevitability of threatening technological trends and advised that companies invest in ‘higher value-adding services’ and move away from the basic, labor-intensive service lines pursued thus far. Managers, as the previous chapter established, discussed how they have no choice but to cannibalize their existing service lines.

Managers described the new pressures on their firms and themselves suggested that to remain competitive, the firm must aggressively implement a new strategic vision. In fact, Saurabh, a middle manager critiqued the myopia of his firm and argued that the top leadership was not doing enough to reinvent the business. The managers interviewed moved effortlessly from the managerial vantage point, to then describing or alluding to the acute uncertainties defining their own lives. It was typically toward the end of the interview that the narrative would become more personal and the details of stress, strain and precariousness would emerge. The disjointed nature of the conversation, where the individual sometimes offered a lofty take on corporate renewal, wearing the hat of a trade analyst and at other times an account of the personal and social toll that downsizing efforts had, was striking.

The insight into broader industrial and technological dynamics engendered a profound sense of ‘inevitable’ disruption and job loss. Ajeeth spoke for two hours using the dispassionate tone of ‘management.’ As we parted ways I inquired if he was personally worried. He responded, ‘why feel pressurized when something is inevitable.’ Similarly, Ananth also discussed a sense of the inevitable,

> I have to prepare for the eventuality that unlike my father I am not going to be able to work in the same industry till I’m 60. I was always clear that I would get fired at some point, the question was when.

This resonates with Newman's classic study on the downwardly mobile managers, where she found middle managers to be sympathetic and cognizant of the competitive pressures led to their own ouster (Newman, 1999). However, here I interpret this not just as an internalization of a cultural ideology but as function of their 'structural liminality' within the firm structure. They are after all structurally part of the managerial function – therefore, this sense of acceptance and inevitability is an outcome of being deeply attuned to the conundrums of top management.

Conclusion

This chapter explicates the contradictions internal to managerial structures and corporate hierarchies. In doing so it contributes to a small literature that correctly identifies through rich empirical analysis the conflicting structural position of being both an agent and subject of control (Hales 2000; Harding et al. 2014; Smith 1992). Newman (1999) shows how unemployed middle managers display a dissonant and liminal subjectivity. For example, Newman argues (1999) that chronically unemployed managers suffer an acute crisis of identity and self-worth. In contrast, I interpret structural liminality not as a consequence of being in-between jobs, but as a condition that is inherent to a vexed organizational position, one that places middle managers experientially between the world of managerial authority and the world of alienated and precarious managerial work. Structural liminality, as a framing device, strives to better capture the inherent contradiction of managing in 'the corporate interest' (Smith 1992) while being disposable, often at the edge of redundancy oneself. This is the pathos of the disposable and liminal middle manager.

This chapter draws out the various aspects of this contradictory positionality using a specific case - that of the offshore IT manager. The sudden and vast demand for low-level software work from western economies produced a massive workforce in India that specializes in basic, back-office IT skills. Top management in India responded to high demand by rapidly scaling up their employee base and pursuing contracts that engendered low-skilled technical work; work that was quickly routinized and further fragmented (Upadhya and Vasavi 2012). In this context of expansion, offshore IT managers raced up the corporate hierarchy during a period of exponential growth, only to be unceremoniously declared 'unskilled underperformers.' They then co-created the conditions for themselves and others to 'resign' by implementing incongruous and punitive criteria of appraisal. Their managerial positionality and insight into the broader industrial context leads them to empathize with their industry as it contends with new pressures (rising cost structures, new competitive conditions, and changing technology). This sense of inevitability arises, I argue, because they 'see' like managers and have a bird's eye view of a changing landscape. The managers of this study deliberate the forms of corporate action and strategic approaches viable from the perspective of an industry facing tough and changing market conditions, while experiencing an increasingly hostile workplace. Considered as a whole, this case reveals how swiftly the predicament of offshore IT managers transforms, with the rapid production and destruction of professional jobs all occurring within a short two-decade period.

Theoretically, this case demonstrates the difficulty in maintaining a strict analytical separation between the agents and subjects of corporate control when managerial structures are internally stratified. 'Middle management' is a broad and internally diverse corporate segment that represents a conduit for the intensification of work at lower levels of the firm. Increasing productivity at the firm-level is often achieved by intensifying the demands placed on middle management. The threat of job loss, intense performance pressures, and a sense of the inevitability of industrial change compel middle managers in India's software industry to actively advance the restructuring agenda, by shrinking their teams and supporting the cannibalization of dominant revenue lines.

As the Indian IT sector makse an attempt at corporate renewal, one thing becomes clear: firms depend on the precarious liminality of middle managers to execute a vision that only threatens to make them redundant. By examining the practices of middle managers, this study highlights how change occurs through a process of cannibalization. Thus, organizational and industrial change depends on autophagic actions not just at the level of top management but also at lower rungs of the corporate hierarchy.

Here, I show how the structural liminality of middle management is leveraged. That is, change unfolds once precarious managerial employees are persuaded or compelled to further a restructuring agenda that increases the risk of their own positions being obsolete. Organizational goals (e.g., cost-cutting and the introduction of new revenue lines) are met once precarious middle managers are successfully recruited to cut their teams down, implement punitive performance metrics and even resign en masse. Despite the vast and always growing terrain of labor process analysis, very few studies have probed how managers 'are organizing not the distant labor processes of subordinates, but *their own* labor' (Braverman 1998: 236). The fact is, managers not only facilitate the hyper-rationalization of managerial work but also its expulsion.

Focusing on contradictory liminality brings greater nuance to the critical study of management where the interests and actions of managerial employees are not taken for granted. Thus, this concept advances a nascent literature that explicitly theorizes contradictions internal to management through empirical study (Harding et al. 2014; Smith 1992; Vidal 2017). The fact remains, managers are not rational choice actors who mechanically perform abstract functions: coordination, control, and extraction. Rather they contend with multiple contradictory imperatives (Vidal 2019). As Smith notes, there is nothing 'preordained' about the role, experience, and interests of middle managers (1992, 93). Theorizing the contradictory liminality of a large swath of managerial employees allows for a more dynamic reading of the interplay between structure and agency. Middle management is not a monolithic or internally consistent workplace category and different industrial conditions and contexts engender distinct terrains of interpretation and action. Smith's (1992) overriding argument is that middle managers are sometimes *unsuccessfully* recruited to manage themselves out of jobs. Others too focus on how middle managers sometimes actively challenge the dictates of top management (Courpasson et al. 2011). In other words, these authors emphasize how middle managers resist the imperative to restructure. Conversely this study finds that middle managers *do* in fact manage themselves out of jobs when an industry is determined to aggressively cut costs and reduce the number of mid to late career employees. In such hostile circumstances, they are compelled to co-create the conditions for their own obsolescence, though their own 'agentic' practices. It is important to reckon with the muddiness of a situation where a manager 'chooses' to resign to avoid being fired. Here, structural pressures and agentic choices are impossible to disentangle. This analysis of liminality allows for a complex framing of structure and agency where middle managers appear neither indoctrinated agents nor as self-aware dissidents. Such an approach makes room for inchoate interests and subjectivities by theorizing the inherent contradictions and dissonances of the middle managerial position.

This analysis represents a step toward redressing a sharp bifurcation defining the literature both on middle management and organizational liminality: a separation between structural and subjective registers (McCann et al. 2008; Söderlund and Borg 2018). Structural liminality as a concept furthers the study of managerial rationales, actions, and subjectivities without relegating industrial and organizational structures to the background, nor predetermining the effects of these structures.

Chapter 6. Conclusion

In 2003, an Indian software worker, who I will call Joseph, found himself in a small town in Minnesota. He had been sent from Bangalore to visit the IT department of a factory. Shortly after his arrival, he realized that local employees read his presence as a threat. They had (rightly) inferred that they were at risk of losing jobs to people in Bangalore. During a meeting, Joseph turned to someone to make casual conversation and politely enquired, 'so what do you do?' The American employee sitting next to him loudly declared, 'I am a network administrator and *nobody* is taking my job.' The room awkwardly went quiet, with people nodding in agreement. In a coffee shop in Bangalore, 14 years later, Joseph laughed at this uncomfortable memory and ended the anecdote by saying, 'now to think we have reached a point where *we* ourselves are going to be replaced.'

For him, like many others, life had come a full circle. In a short span of time, employees of IT firms in India went from being threats to professional workers in the US, to now themselves facing high levels of job insecurity. The striking element of this story is just how swiftly India's offshore sector moved from rapid, breakneck expansion, into a period of restructuring. One might suggest that restructuring is simply the result of a mismanaged growth period or the result of hyper-competition between a large number of global and Indian companies. I would challenge such readings and instead argue that this is a unique moment of structural change. Hyper-competition and managerial inefficiency simply do not explain why the industry in 2005 was on a path of high growth based on traditional service lines, but in 2015 was in turmoil.[23] In the words of Ananth, a middle manager, 'We have barely seen one generation come into IT and retire from IT.'

[23] I base my claim that India's industry is going through structural, rather than routine changes on the simple fact that every single large Indian IT company – Infosys, Wipro, TCS, HCL, Cognizant, and TechMahindra sought out new techniques of renewal around the same time. The perception and the reality that the market for IT services is changing, produces a generalized condition experienced by multiple actors. Add to this the fact that foreign technology firms that generate IT services revenues out of India, are also being restructured. Dell, for instance, was quick to divest from traditional IT services altogether. Dell sold off its services subsidiary to the Japanese firm NTT data in 2015, after it had on initiated one of the most expensive acquisitions the global computing sector had ever seen. It acquired EMC based on a cash-and-stock deal

In light of this, the task I set for myself was to explain and understand the mechanisms which actualize such a transformation. My claims can be organized according to shifts in three, intersecting domains. The first of these involved **digital infrastructure**. I have argued, that as cloud computing allows firms to leverage computing resources through hyper-scalable and on demand modes, IT systems no longer represent the fixed investments that companies make. Computing capacity can be *rented* from the providers of cloud-based applications, hardware capacity, and data storage, rather than *bought* via traditional IT players. The platformization of corporate computing means that digital infrastructure is shaped by web-based modularization, hardware virtualization, and resource sharing. This technological convergence and the rise of new competitive dynamics associated with it, restructures the global market for software services. This catalyzes new managerial experiments in India.

The second set of transformations I analyze involve **organizational restructuring**. I study how market-level uncertainties compel leading actors to preemptively cannibalize prevailing profitable revenue structures. I refer to this process as *organizational autophagy* and examine how managers decide and justify the erosion of their core units. Autophagic action is generated by a vexed process of decision-making, within the terrain of strategic or executive management. I argue that global shifts in computing accelerate when firms and managers most at risk by the new cloud-based IT model, are compelled to promote cloud-based computing.

Third, I analyze changing **conditions of work**. My research shows that aforementioned shifts in management practice unsettle existing work arrangements. In this context, I

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worth $67 billion. The acquisition of EMC gave Dell a major presence in the space of virtualization technology, which as discussed, is a core element of cloud computing. In 2015 Hewlett Packard underwent a historic split, where the hardware division was cleaved off from the IT services division, with the latter being renamed Hewlett Packard Enterprise (HPE). HPE tried to compete against Amazon and Microsoft. Recognizing the impossibility of this, HPE began offering hybrid solutions that blended cloud-based and in-house computing models. Today, a number of incumbent players are choosing this path, including IBM, Cisco, and Oracle. The transformation of Indian IT companies has to be read along these shifts occurring in every corner of the computer industry.

explore mid-managerial precariousness in incumbent IT firms, looking at the fraught process by which managers are compelled to co-produce the conditions of their own insecurity. I study the threats to mid-managerial work, without a framework of calling upon the explanatory powers of automation as a frame. Work-displacing processes are complex and often have to do with broad-based shifts in markets, organizational decisions, and shareholder pressures, rather than the introduction of a labor-shedding technology at the firm-level.

The core chapters of this dissertation are framed by specific literatures and the gaps I identify. Keeping aside the 'newness' of this analysis vis-à-vis scholarship, in the remainder of this conclusion, I explore what might be - 'new' per se. Technology has always changed, industries have always grappled with new competitive conditions, and historically work structures have routinely been disrupted. What is different about this moment?

Industrial Transformation: Explaining Acceleration

Computers have long been integral as technologies that mediate organizational processes. However, digital technology until the spread of the internet constituted largely discrete systems owned by individual users and individual organizations. Starting in the 1990s, the internet began integrating relatively autonomous systems. With the growing ubiquity of high-speed internet and networked devices (desktops, laptops, phones, tablets), digital technology has been reorganized on a grand scale.

Previously, in order to use computing capabilities, organizations would have to procure hardware, software, networking gear, and labor from a complex constellation of vendors. Now, software, data, and hardware capacity are owned and delivered 'on tap' by remote providers. This shift leads to an exponential increase in computing capacity available to every user and also introduces flexibility in usage at low costs. A good analogy here is that of the power grid, where electricity is supplied by a service provider and

consumption can be scaled up and down by users (Mosco 2015). Therefore, computing infrastructure can now be considered a utility (Kennedy 2018).
It is true that Amazon, Google, Apple and Facebook control important levels of this infrastructure. Yet, solely fixating on Big Tech as infrastructure rentiers of our times can neglect some important facets of the current infrastructural regime. This infrastructure is highly malleable. It is characterized by a stable core and a hugely modular, elastic, and reprogrammable periphery (Plantin et al. 2018). Baldwin and Woodard (2008) argue that platform architectures are defined by components that have low variation, and other components defined by high variation and flexibility. This allows multiple users and organizations to plug into and modify the platform to different ends. Specific levels of the platform architecture might be centrally owned (e.g., the data centers). But it also allows myriad different players to build atop the core infrastructure. This new infrastructural regime, because of is ubiquity and malleability, has changed competitive conditions across disparate industries.

As established in the dissertation's introduction, I use the remaking of the corporate computing industry as a case of contemporary industrial transformation. In the same vein, one could study platform-driven restructuring of other industries using the same three-pronged frame of fixed capital, competitive strategy, and workplace analysis. Banking, retail, television and music, and journalism are all examples of sectors that are in the midst of major changes. Both in India and globally, the point that platform studies makes holds: contemporary digital platforms represent 21st century infrastructures (Plantin et. al., 2018). This means that value-creating actions of firms across the spectrum are compelled to reorganize around the terms of this infrastructural regime.

In this dissertation, I argue that new market conditions have intensified an autophagic imperative at an organizational and industrial level. Market players are incentivized to seek new opportunities *at the cost* of protecting existing advantages. An obvious question my analysis might provoke is, whether corporate cannibalization as a mode of transformation is new (or simply undertheorized in existing literatures). While there are cases of autophagic experiments in the past, I suggest that there are two ways to show a historical rupture. First, cannibalization has only recently been elevated to the status of a vital and necessary strategy of renewal in management circles. Second, for the first time we see companies implementing autophagic change in *anticipation* of a crisis, rather than in a loss-making context. I expand on these two points below.

Comparing diversification with autophagic moves is helpful. Diversification (i.e., expanding into other markets without disrupting the existing one), emerged as a dominant competitive strategy in the Post-Fordist era. This produced large, horizontally integrated conglomerations. In contrast to diversification, we need to closely comb through business history to identify examples of autophagic practices, where expansion was necessarily predicated upon the obsolescence of a firm's dominant profit model.

Let us take the example of Intel. Intel enjoyed a monopoly in the market for memory chips. In the mid-1980s, the company made the difficult decision to cannibalize its memory chip business – the very source of its monopolistic dominance. Andrew Grove, CEO from 1987-1998, writes (1996),

> As the first mover, we had practically 100 percent share of the memory chip market segment (84). Then, in the early eighties, the Japanese memory producers appeared on the scene. Things started to feel different now (85). Business slowed down. It seemed that nobody wanted to buy chips anymore. Our order backlog evaporated like spring snow. We had been losing money on memory for quite some time, while trying to compete with the Japanese producers' high-quality, low-price, mass-produced parts. The need for a different memory strategy, one that would stop the hemorrhage, was growing urgent (88). It was a grim and frustrating year. We had lost our bearings (89).

At this point, Grove decided it was time to get out of the business of memory chip production altogether, and enter the market of microprocessors. His account of the turmoil and organizational chaos that ensued is fascinating (Grove 1996). While the resistance from the managers, the layoffs, the sheer organizational shock that the decision triggered is important to analysis of autophagy, I want to draw attention to a different point.

Intel began cannibalizing itself in the 1990s only *after* it began losing money. What we are seeing today are firms cannibalizing before profits begin to dip and before losses are made. It is fundamentally a preemptive strategy. As I showed using two graphs (on p. 86), this is certainly true with the Indian IT companies. It is also true with other players. Microsoft's new CEO actively sidelined Windows to make an aggressive entry into the market for cloud infrastructure, without being in a crisis situation.

There other recent examples outside the domain of corporate computing. Netflix, having challenged the rental model of Blockbuster though a mail-order system chose to dismantle this model at its peak, in favor of a streaming model. In 2011, the company had 15 million DVD subscribers, four years later it had just 5 million. It killed the mail order business model deliberately and proactively. Similarly, Apple had made it a habit to release radically new products that directly compete with their own highly successful product lines. For instance, when revenue from the iPod was still high and growing, the company released the iPhone which neutered the demand for the iPod. Next, it released the Macbook Air despite the danger of shrinking revenues from the iPad. One corporate consultant writes,

> Companies have discovered it is no longer an option to simply pursue a conservative strategy of trying to protect and extend existing products. It can only delay decline. One must develop the next growth engine before the core business begins to show signs of maturity. And the best rule of thumb is perhaps to follow

in Mr Jobs' footsteps and impose cannibalisation as a guiding principle to manage product life cycle.[24]

In terms of what is historically new or distinct, I suggest that autophagic action is being elevated as a central element of corporate strategy. Few academics have been embraced as enthusiastically by the global corporate sector as Joseph Schumpeter. Traditionally the term ‘creative destruction’ has been confined to Schumpeterian and Marxian analyses, but now it is widely employed by corporate elites across sectors.

One interviewee told me, ‘I do think the IT industry is a bit paranoid. They are offering cloud services because they are paranoid. Everyone has grown up reading Andrew Grove.’ He felt that while technologies are changing, there is no need to panic just yet. The point is the intersection of ‘paranoia’ and technological change produces autophagic action that preemptive.

Sociologically, this is highly significant. It means that actors are willing to swiftly disrupt their own markets in order to grab emerging markets. Moreover, they are willing to do this before their revenues even enter a path of decline. The dominant rationale is: Decline is inevitable. Therefore, it is best to preempt and accelerate it. A top-manager at an Indian IT company said to me,

> The mantra we use is ‘rapid failure.’ Think big. Come up with twenty ideas. Start small. Fail quickly or scale rapidly. This is a very different approach, right? You never [would] tell your business head to fail quickly! But now we say, look buddy in three months you fail or show me your business plan to scale rapidly. Rapid failure is a virtue.

[24] Yu, Howard, ‘Apple's woes show wisdom of self-cannibalisation,’ 30 April, 2016, The Straits Times. https://www.straitstimes.com/opinion/apples-woes-show-wisdom-of-self-cannibalisation.

The acceleration of decline in the interest of seeking out new growth engines is a unique business strategy that needs to be examined in discursive and material terms. Typically, this strategy and rhetoric is associated with startup sectors. Incentivized by venture capital, contemporary startups are notorious for being loss-making. Grabbing market-share is a much more immediate goal than being profitable. This logic seems to be percolating, with large public companies across the technology industry adopting or at least expressing this strategic ideal. This orientation generates a highly volatile environment that accelerates market-making. An executive manager of a top IT firm in India told me,

> Previously you could wait ten years before you had to shift to a new service line. Now you have three years. In three years, you have to re-skill your entire workforce, introduce new technologies and take care of the old stuff. Volatility of service lines is very high.

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In India, debates about the future of the sector rage on. Questions pertaining to the renewal of business models on the one hand, and questions about the future of work, labor, and employment in the sector on the other, are fairly distinct. The large firms of the industry might very well succeed in their attempts to reestablish a place in the value chain of corporate computing. But perhaps this will occur with a smaller, less labor-intensive work regime. Or maybe, the task of transitioning legacy systems and client data to a cloud environment will demand increased rates of hiring. Meanwhile, the nature of work, the skills needed, and the structure of labor process will probably undergo significant changes.[25]

[25] In terms of the structure of work, firms have been following the ‘waterfall’ model for the last few decades. Under the waterfall model, customers provide their requirements, after which the project unfolds in a linear fashion, with design, development, testing, integration, and maintenance occurring sequentially. During fieldwork, I found that some companies were adopting a different model of project execution referred to as ‘agile.’ The agile framework decomposes this sequence of steps. In the interest of speed, these steps now occur iteratively and simultaneously. Small teams of engineers work simultaneously, in

On the side of revenue growth and profit rates, there is nothing to suggest that the sector will collapse. Consider a recent development. During the Covid-19 pandemic, demand for IT services shot up. Client corporations in the west had to rapidly reconfigure their IT systems and also advance cloud-based models of IT delivery, in order to enable large-scale remote working during the pandemic. IT service providers in India were tasked with the job of equipping organizations with the infrastructure needed to allow employees to work from home. The editorial of a national newspaper in India recently stated,

> If the Y2K bug helped Indian information technology services companies catapult to the global stage, the disruption caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is giving them an opportunity to move into the next phase of growth.[26]

I quote this to convey just how unstable and unpredictable the competitive terrain is. At present, making grand statements about the future of the sector is ill-advised. Who could have known that a global economic slowdown that wrought havoc in virtually every capitalist industry, is a welcome opportunity for revenue generation for India's IT firms? Therefore, this dissertation makes no effort to arrive at a declarative statement about the decline of labor or the inevitable demise of this industry. The objective is quite different: to trace and theorize the processes and mechanisms of structural change.

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continuous contact with the client, and follow principles of continuous integration and continuous deployment. Instead of middle managers auditing the project periodically in a top-down manner, teams are involved in continuous self-evaluation. In light of these shifts, it makes more sense to investigate the restructuring of work and the threat to middle management, rather than the elimination of work per se.

[26] Editorial, 'Pandemic positives for the IT sector,' 21 September, 2020, The Hindu Business Line. https://www.thehindubusinessline.com/opinion/editorial/pandemic-positives-for-the-it-sector/article32662034.ece

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