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ESSAY

Reweaving Technology and Culture: Rethinking Indian Handlooms through an Anthropological Lens

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Abstract

This essay explores how handloom weaving in India can be understood not just as a traditional craft, but as a dynamic and socially embedded technological practice. Drawing on long-term fieldwork with weaving communities in West Bengal, the author reflects on how earlier studies often treated technology as a force that shaped culture from the outside—overlooking the ways in which people, tools, practices, and institutions co-evolve. By focusing on the lived experiences of weavers and the material culture of the loom, the essay highlights the importance of seeing handloom weaving as part of a broader social world, shaped by innovation and local knowledge. It calls for more inclusive and anthropologically informed approaches to studying technology, particularly in the context of artisanal traditions, and offers a critical reflection on how we understand craft, labour, and change in contemporary India.

Keywords

Handloom Weaving; Indian Craft Traditions; Material Culture; Artisanal Knowledge; Cultural Practices; Anthropology Of Handloom

Introduction

In India, handloom weaving is more than a means of livelihood—it is a living tradition, embedded in social relationships, cultural identities, and everyday practices. It involves the manual production of cloth using non-mechanised looms, typically without electricity. Found across thousands of villages and towns, the handloom sector is both ancient and remarkably

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diverse, comprising a wide range of regional styles, fibre traditions, and patterning techniques. From the jamdanis of Bengal to the ikats of Odisha and the bandhanis of Gujarat, these textiles are often closely tied to caste and community identities, ritual life, and regional aesthetics. Even today, many households across India are engaged in handloom production—making it one of the largest unorganised sectors in the country. At once deeply traditional and economically precarious, the handloom industry embodies a living tension between continuity and change, innovation and marginalisation. Yet, discussions of technology in this domain are often framed in narrowly economic or developmental terms, overlooking the rich anthropological dimensions of craft and its makers. This essay reflects on how we might think differently about technology—not as a separate, external force, but as something that is both shaped by and shaping the lives of those who use it.

In 2004, I did my first fieldwork among the handloom weaving community of Begampur, a small town in West Bengal known for its distinctive cotton sarees woven on pit looms, as part of my M.Sc. dissertation. However, my real journey of exploring the anthropological aspects of technology and the proceedings of technologically mediated artisan communities began in 2008, when I started my doctoral research amongst three different handloom weaving traditions in West Bengal—including sturdy and aesthetically moderate handloom weaving in Dhaniakhali, extra-weft silk balucharis in Bishnupur, and cheap and utilitarian cotton cloth production in Begampur. These sites, each with their own weaving styles, organisational structures, and market linkages, offered a comparative lens to study how artisans engage with tools, systems, and social expectations. Like many early-stage researchers, I was overwhelmed by the vast range of themes in the literature—economic dimensions (e.g. Chatterjee 1987; Haynes 1996; Roy 1999; Sinha et al. 2006), social aspects of production and labour relations (e.g. Roy 1989; De Neve 1999, 2001; Khasnabis and Nag 2002; Haynes 2008), and material and symbolic aspects of cloth weaving (e.g. Washburn 1990; Pink 1999). Even then, it was clear that these themes were deeply intertwined—much like the warp and weft of a handloom itself.

These questions became more focused as I gradually began to gain first-hand, in-depth experience of the techniques, tools, and rhythms involved in making handmade cloth across three regions of West Bengal. The loom—and the very act of weaving—revealed itself not merely as a tool, but as a lens for understanding the world of craft and the lives of craftspeople. I slowly came to realise that handloom weaving can be viewed through multiple, overlapping lenses: the material and technical dimensions of weaving (e.g. Amsden 1932; Roth 1918; Hann and Thomas 2005; Arnold and Espejo 2012; Panneerselvam 2014); the symbolism and structural meaning of looms (Dilley 1987); the acculturation and adaptation of weaving techniques over time (Christou 2004); the transmission of knowledge through generations and everyday practices (Portisch 2010); the interplay between gender and textile-making (Naji 2009; Itagaki 2013); the social and functional roles of hand-woven cloth (Asakitikpi 2007); its style, classification, and ethnic identity (Washburn 1990); and the semiotics of weaving as a social language (Mehta 1992).

Understandably, my curiosity was drawn to a handful of studies that were either undertaken by anthropologists or grounded in an anthropological perspective (e.g. Schneider 1986, 1987; Nash 1993; Venkatesan 2009). Yet to my surprise, even in these works, technology—while often a central theme—rarely received sustained analytical attention in its own right. The technical aspects of craft were frequently mentioned but seldom explored in depth. At the time, I could not fully grasp the reasons for this omission. But as I began submitting manuscripts to leading peer-reviewed journals, reviewers' critical feedback unexpectedly brought me back to a question I had left behind: how to write about handloom technology in a way that recognised it as socially embedded, rather than merely technical. This became an opportunity to rethink how one might produce an anthropologically informed account of a technological system, one that situated tools and techniques within the everyday lives, choices, and meanings of those who use them.

Clearly, I had my work cut out for me. Beyond revisiting earlier studies—whether anthropological accounts that touched on technology or broader research into technological systems—I needed to find a

more fitting way to think about handloom weaving as a form of technological practice. This led me into the interdisciplinary field of Science and Technology Studies (STS), where scholars from anthropology, economics, and cultural studies come together to explore how science and technology are shaped by society—and vice versa (Rohracher 2015: 200). Reading through this literature affirmed an early observation of mine: that many past studies, especially in the Indian context, tend to treat technology as a fixed, external force—one that drives social change but is rarely shaped by it. Over time, however, new approaches have challenged this view. Frameworks such as sociotechnical systems, social construction of technology, and actor-network theory offer ways to rethink how we study tools, techniques, and material practices. More recent scholarship thus moves beyond viewing technology as either a neutral instrument or a determining force—offering instead a view of technology as part of a relational system involving people, objects, meanings, and institutions. While I will briefly outline these shifts in the next sections, my larger aim is to return to Indian handloom weaving with fresh eyes: to ask how we might understand its technologies not as isolated or outdated, but as deeply embedded in social life, and worthy of close, anthropological attention.

Technology in Human Society: Between Determinism and Possibility

What do we mean when we talk about "technology"? Definitions vary, but most fall into two broad categories: the material tools and systems we use to achieve particular ends, and the knowledge, skills, and procedures involved in their creation and use (Spier 1970; Lemonnier 1989). From the most complex machines to the most ordinary of daily tasks—gathering food, weaving cloth, building shelter—technology is deeply embedded in human life. As Schiffer (2004) notes, our relationship to technology is not occasional or peripheral, it is constant and foundational. Yet, when scholars have tried to understand this relationship, two dominant perspectives have emerged. The first is technological determinism—the idea that technological change drives social change. In this view, technology acts as an autonomous force that shapes institutions, economies, and cultural life. Marx's ([1847] 1963) oft-cited image of the hand mill producing feudal lords and the steam mill industrial capitalists captures this perspective well. More recently, Rafael (2013: 321) summarises this view as the belief that "the essential institutional forms of society are dictated by the requirements of operating a technological system of some given degree of complexity." In contrast, the second perspective—technological possibilism—pushes back against the idea that technology holds such power over social forms. Scholars in this tradition argue that while technology may set certain parameters or limits, societies remain free to evolve along their own historical and cultural paths. As Boas (1940: 266–67) observed, similar technologies can coexist with vastly different social structures. In this view, technology is not a determining force, but a set of tools embedded within broader human choices, values, and traditions.

Part of the enduring appeal of technological determinism—particularly in mid-20th century Western thought—was its apparent clarity. As Winner (1986) famously observed, a kind of "sleepwalking" view of technology became common: technology was treated as an unstoppable force, advancing along its own logic and reshaping societies in its path. Many foundational studies reflect this mindset. Works by White (1949, 1959), Wittfogel (1957), Ogburn (1950), and Sahlins and Service (1960) offered sweeping accounts in which technology appeared as the central driver of all cultural and institutional change. Some, like Bhatt (1980), Wad (1984), and Anthony (2000), focused on the effects of Western technologies in non-Western settings—often portraying these societies as passive recipients rather than as active participants in technological change. These approaches, while influential, tended to overlook a critical point: technology is not an independent or neutral entity. As Pinch and Bijker (1984) and Pfaffenberger (1988, 1992) argued, such frameworks often erase the role of human decision-making and cultural context—treating machines and tools as if they operate outside of politics, values, or history. When human agency is acknowledged, it is sometimes "fetishized," reduced to a simplistic binary of acceptance or resistance rather than seen as complex and negotiated.

In anthropology, this narrow framing of technology—as something external to society—has had some curious consequences. While many classic studies explored how people use tools in everyday life, especially in relation to subsistence or livelihood (Geertz 1972; Nash 1979; Godoy 1985), relatively few treated technology as a subject in its own right. Instead, earlier anthropological work often took the form of inventories or catalogues: lists of tools, techniques, and materials used by different communities. These accounts documented what people did but seldom explored how or why these practices carried social, cultural, or symbolic meaning (Ingold 1997: 107). In some cases, such records took on a tone of nostalgia, offering tributes to fading traditions rather than analytical insights into how technical systems were embedded in social life.

Despite these limitations, some anthropologists have long attempted to move beyond catalogues and causality—to think about technology as something cultural, embodied, and meaningful. A more culturally grounded approach began to emerge through the work of French anthropologists and material culture scholars (e.g. Creswell 1972; Digard 1979; Lemonnier 1976, 1983, 1989; Gosselain 1992; Ingold 1997). These researchers reframed tools and techniques not as neutral instruments, but as practices situated within local systems of knowledge, belief, and interaction. Gilbert Gille (1978), for example, proposed that any technique involves the interplay of five interdependent elements: matter, energy, artefacts, gestures, and specific knowledge. These are not isolated components but parts of a larger system in which physical action, cultural meaning, and learned skill come together. However, as Lemonnier (1992) later observed, this approach, while conceptually rich, often remained underdeveloped in practice. Researchers struggled to analyse how the physical and functional dimensions of technology interacted or how these interactions could be understood in contextually specific ways.

These two perspectives—each in its own way—have shaped how technology has been treated in the social sciences, including in anthropology. Determinism, particularly in its earlier formulations, rendered technology as a kind of external agent—something that acted upon society, rather than something created and negotiated within it. Possibilism offered an important corrective—but at times went too far in treating technology as merely neutral or incidental. As I turned to the study of Indian handloom weaving, I found both frameworks limiting. The determinist approach tended to overlook the agency of craftspeople, while the possibilist one underplayed the material constraints and histories embedded in tools and techniques. What seemed missing was an approach that acknowledged the mutual shaping of technology and society—recognising that tools, practices, and knowledge systems evolve within social worlds, even as they help shape those worlds in turn. This conceptual gap helped set the stage for new approaches in the 1980s and 1990s—especially those emerging from Science and Technology Studies (STS)—that offered more concrete ways to study technology as socially embedded, relational, and negotiated. In the next section, I turn to three key perspectives that have proven especially influential in this shift: the sociotechnical systems view, the idea of technology as socially constructed, and the actor-network approach.

Socio-Technical System, Social Construction of Technology and Actor-Network-Theory

Around the same time, alternative approaches for studying how people interact with technology—particularly within organisations and work environments—began to emerge. One of the most influential among these is the Socio-Technical Systems (STS) perspective, which emphasises the interdependence of social and technical elements within any system. This approach pays close attention to the "complexity surrounding the interaction [of] technical and social dimensions," and examines "to what extent they shape, fit, and complement one another—moreover, how all of these together determine the functioning of the entire system" (Cresswell, Worth & Sheikh 2010: 2). Rather than viewing technology as a standalone tool or an external force, STS scholars argue that social and technical components are co-constructed. Studies from

this perspective explore how technologies are embedded within institutional structures, power dynamics, and everyday practices. They are particularly attuned to how technological development is shaped by social, cultural, economic, and political contexts—and how, in turn, technology may reconfigure these very structures (Ninan 2008).

The Social Construction of Technology (SCOT) perspective (e.g. Pinch & Bijker 1987; Russell 1986; Bijker 1993, 1995; Winner 1993; Fulk 1993; Klein & Kleinman 2002) is another alternative approach that gained prominence during the 1980s. It emerged as a direct challenge to technological determinism, aiming to show that technological systems do not evolve in isolation, but are shaped by social, political, and cultural forces. The goal was not to deny that technology has effects on society, but rather to reject the notion that technology develops independently, according to an inherent scientific or technical logic (Humphrey 2005). SCOT has been especially influential among scholars examining the social dimensions of technology and innovation (e.g. Humphrey 2005; Johnson & Wetmore 2009; Ramos & Berry 2005; Olsen & Engen 2007; Elle et al. 2010). This perspective offers a coherent methodological framework for understanding how both scientific facts and technological artefacts are constructed through social processes (Prell 2009; Baron & Gomez 2016: 132). It directs attention not to whether a technology "works" objectively, but to how it comes to be perceived as useful, legitimate, or necessary within particular contexts. As scholars such as Burns et al. (2016), Burr (2015), and Leonardi and Barley (2010) argue, technologies are taken up not because of their inherent efficiency or superiority, but because they are seen to fulfil specific human goals. Or, as Sasvári (2012: 8) puts it, SCOT "pinpoints that technology (and natural scientific developments) are basically shaped by social processes." The strength of SCOT lies in its rejection of grand, universal theories, allowing researchers to produce rich, situated accounts of how technologies are developed, contested, and stabilised (Prell 2009). However, it has also been criticised for focusing too narrowly on agency—often privileging human actors at the expense of larger structural dynamics such as class, institutions, or political economy (Klein and Kleinman 2002; Russell 1986; Winner 1993). Moreover, its tendency to assume a clear separation between humans and non-humans has raised further concerns. As Baron and Gomez (2016: 130) note, SCOT relies heavily on an "ontology of separateness," which assumes that humans act upon technologies, rather than being co-constituted with them.

In response to these limitations, some Science and Technology Studies (STS) scholars began to shift away from SCOT and toward a different theoretical framework—Actor-Network Theory (ANT)—which attempted to overcome the dualisms of structure/agency, human/non-human, and society/technology. Actor-Network Theory (ANT) developed in the 1990s as a response to some of the limitations of SCOT, particularly its tendency to privilege human agency while downplaying the role of non-human entities. One of the central figures in this theoretical shift was Bruno Latour, whose work (1996) helped establish ANT as a major framework within Science and Technology Studies. At its core, ANT seeks to analyse the "associations between natural, human and technological entities" (Baron & Gomez 2016: 129). It challenges the assumption that only humans can act meaningfully in shaping technology. Instead, ANT posits that both human and non-human actors—including tools, machines, documents, and even scientific facts—can exert influence within a network. These entities are understood not in isolation but through the roles they play in relation to one another. Within ANT, scholars have tended to emphasise two key dimensions. One strand focuses on "networks" as systems of practice, in which technologies and material artefacts are entangled with social behaviours, routines, and institutional structures. The other places stronger emphasis on the symmetry between human and non-human actors, arguing that agency is distributed across the network rather than residing solely in individuals or institutions. What sets ANT apart from SCOT is its attention to inanimate entities and their effects on social processes. ANT scholars argue that technologies are not passive objects acted upon by people, but active participants that can help shape outcomes, constrain choices, or enable new forms of action—even if they lack intention in a human sense (Prout 1996; Berg 1999; Cresswell, Worth & Sheikh 2010). In this way, ANT expands the analytic field, offering a way

to track how innovations become stabilised—or fail to—through the ongoing interaction of multiple heterogeneous actors. Both strands of ANT share a core commitment: to show that the success or failure of a technological system depends on how well human and non-human elements align within a functioning network. Rather than treating technologies as standalone artefacts, ANT reveals them as emergent outcomes of dynamic and often fragile sociotechnical relations.

Reweaving Context: Why Indian Handlooms Need an Anthropological Lens

If we turn our attention back to the Indian handloom sector, we find a richly textured world where craft, labour, culture, and identity intersect in complex ways. The lives of these skilled artisans—and the woven objects they produce—have long captured the interest of scholars across multiple disciplines. Historians and economic historiographers (e.g. Thorner 1962; Bagchi 1976; Specker 1988; Krishnamurty 1989; Harnetty 1991; Roy 1999; Clingingsmith & Williamson 2008), for example, have studied the "deindustrialisation" of Indian handlooms, analysing the sector's decline under colonialism and its struggle in the postcolonial economy. Cultural historians (e.g. Barnes 2005; Wild & Wild 2005; Ray 2005; Riello & Roy 2009), working from the premise that textiles have long circulated as global commodities, have explored how cloth production and consumption reflected changing meanings of status, wealth, and identity—particularly around the Indian Ocean trade networks. Meanwhile, scholars examining the post-independence period have engaged with a range of issues shaping the handloom sector in modern India. These include questions of production (Kundu 1980), marketing challenges (Goswami 1985; Banerjee 1995), and broader concerns around state-led development and policy (Jain 1980, 1985; Saha 1982; Abdul 1996; Mukund & Syamasundari 1998; Roy 1998).

Historians are undoubtedly right to highlight the decline of Indian handlooms during the colonial period, and even earlier. Likewise, scholars analysing the post-independence landscape have correctly observed that competition within the textile industry has intensified—particularly with the liberalisation of trade following the end of the Multi-Fibre Agreement (MFA) (Mehta 1953; Jain 1983; Goswami 1990a, 1990b; Mishra 1993; Srinivasulu 1996). This shift brought with it widening inequality, persistent poverty, and large-scale job losses in the handloom sector (Roy 1993; Murshed 2004: 312). Yet these historiographic and policy-focused accounts leave important questions unanswered. Why, for instance, has India experienced a greater continuity in handloom cloth production and commerce than almost any other region in Asia? Why have handloom weavers continued to participate—often adaptively and strategically—in a "mixed" textile economy, incorporating both artisanal and mechanised modes of production across the nineteenth, twentieth, and even twenty-first centuries (Wendt 2009: 196)?

Part of the answer may lie in the conceptual limits of many of these studies, which often treat technology in deterministic terms. Much like the early "technological determinist" frameworks, these accounts tend to view technological change as an autonomous force—one to which communities must passively adapt. This perspective risks missing the everyday strategies, innovations, and negotiations through which artisans actively shape their technological environments. The same kind of approach is visible in much of the post-independence scholarship on Indian handlooms. These studies, too, struggle to account for the socio-technical complexity of the sector—particularly the ways in which artisans have responded to shifting economic and political conditions. As a result, they often fail to recognise how technological discourse in the textile industry is deeply entangled with broader processes: the restructuring of trade policy, the growing dependence on export markets for craft goods (Liebl & Roy 2003; Chatterjee 2015), and the gradual withdrawal of protectionist measures once extended to handlooms (Jain 1980, 1985). Moreover, a persistent belief that "real innovation" happens only in industrial factories (Godin 2016; Mamidipudi and Bijker 2018) has made it difficult for many scholars to recognise the social construction of handloom technology

itself. These studies often overlook what theorists like Ingold (1997) have long argued: that technical practices are not isolated or purely material but are part of sociotechnical ensembles—networks of people, tools, techniques, values, and meanings. In this view, every technical action is socially embedded, subject to contextual interpretation, and shaped by local histories, identities, and power relations.

Unfortunately, this persistent inability to recognise the full spectrum of relationships shaping craft production—beyond just producers and traders—remains common in much of the scholarship on contemporary Indian handlooms. As Venkatesan (2009: 38) argues, the "craft world" is made up not only of artisans, but also politicians, bureaucrats, museum curators, academics, civil society organisations, and other authoritative actors, all of whom negotiate with and influence one another. Yet this broader sociotechnical network is often overlooked. As a result, Indian handlooms are frequently portrayed as a "traditional" activity in terminal decline, where weavers are cast as resistant to change, clinging to obsolete methods in an effort to preserve the past (Mamidipudi, Syamasundari & Bijker 2012; Godin 2016; Mamidipudi & Bijker 2018). This image persists despite ample evidence of sustained innovation by craftspeople who operate at the margins of entrenched financial, social, and epistemic hierarchies (Mamidipudi 2019: 241).

What is needed, then, is a fundamental shift in perspective—one that understands handloom weaving technologies not as isolated tools or fading traditions, but as outcomes of complex social processes. These technologies emerge from, and are continually shaped by, the economic, cultural, and professional interests of diverse social actors. These technologies are not just tools but deeply embedded in webs of social interaction and institutional power (Prout 1996). We must also attend to how various components—technologies (e.g. spinning wheels, looms, warping drums, even computers), practices (e.g. designing, dyeing, sizing, programming), formal institutions (e.g. cooperatives, NGOs, government bodies), informal structures (e.g. households, kinship networks, villages, caste groups), and social actors (e.g. weavers, dyers, designers, customers)—together form what Mamidipudi (2019: 243) describes as a "sociotechnical ensemble." These components form interdependent systems shaped by shared histories, social meanings, and institutional frameworks. Technologies of weaving—alongside the practices and institutions that sustain them—emerge from these layered interactions, rather than existing as discrete or static entities. The systems in which they operate are held together by ongoing negotiations between labour and knowledge, innovation and constraint, tradition and adaptation. These relationships are continually negotiated, contested, and redefined through the actions, values, and interests of diverse actors (Pinch & Bijker 1984; Pfaffenberger 1992: 498). To understand handloom technology, then, is not simply to document tools and techniques, but to study how they are constructed, maintained, and transformed within a broader ecology of social life (Ingold 1997). Reframing handloom weaving in these terms allows us to move beyond narratives of decline and instead recognise it as a site of dynamic, situated innovation.

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