

# Work Time



# WORK TIME

## Conflict, Control, and Change

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Cynthia L. Negrey

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# Acknowledgments

Quizzical looks. Blank stares. These were common reactions, from students especially, but also from friends, family, and even a few colleagues, when, upon inquiry, I said the book I'm writing is about work time. The notion wasn't immediately intuitive, but with a bit of explanation – history of the 40-hour workweek, growth of part-time jobs, work–family issues – they got it. Among the students, perhaps, this is just an expression of an immature work life. But, more likely, I think, these reactions are a microcosm of a society in which work time is taken for granted and not a well-developed subject of public discourse. Scratch the surface, however, and everyone has a story, or knows someone else's story: over-worked and stressed out; an undesirable work schedule; stuck in a part-time job; child-care problems; it's better in Europe. These personal troubles are the stuff of everyday conversation. But, ordinarily, people don't think of them more broadly and abstractly as matters of labor market structure, or even as something we might hope to change.

This book originated as a memo and a short working paper. The memo was a review more than a decade ago of an American Sociological Association collection of syllabi in the Sociology of Work in which I pondered: why don't more instructors cover work time in their classes? Preoccupied with the next deadline, I filed the memo away to uncover it several years later while purging old files. The memo contained a list

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of topics on work time that, upon rediscovery, eventually led me on the path that ends here. The working paper, “A New Shorter Full-time Norm,” was written about 10 years ago when, on leave from the University of Louisville, I was a study director at the Institute for Women’s Policy Research in Washington, DC. IWPR member Clara G. Schiffer had a passion for work time and funded my work on the paper, which informed small portions of chapters 3, 4, 5, and 6 herein. I’m grateful to Ms Schiffer and IWPR, especially Heidi Hartmann and Barbara Gault, for providing the resources and time to draft that paper.

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# Introduction

A displaced full-time manufacturing worker works two part-time jobs in retail, earning 50 percent less per hour than his manufacturing wage. Package handlers strike over too many part-time jobs and too few full-time opportunities at UPS. Auto workers, required to work 12- to 14-hour days, often seven days a week, go on strike over excessive hours. An Asian company acquires an American musical instrument manufacturer, lowering wages and mandating overtime. A tech worker works more than 50 hours a week as a contract employee. But he worries about job insecurity and prefers a regular, full-time job. Another contract worker likes the arrangement because of flexibility to work at home. A student works part time and plans to work full time after finishing school. A professor, who worked 50 hours a week his entire career, opts for phased retirement and cuts his work time in half for a few years before exiting the university. A temp worker re-entering the labor force after many years hopes the experience will help her get a regular, full-time job. A single mother withdraws her child from day care because it costs more than she earns, then works nights and weekends when a relative can care for her child. A part-time retail worker's hours return to 25 after having worked 40-hour weeks during the holiday season. A parent laments that he cannot attend his children's school events because his work schedule is inflexible. Meatpacking workers seek accommodations for

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break times for religious observance. Government workers can work four 10-hour days to reduce commutes when gasoline is \$4.00 per gallon. Less than six months later they are required to take periodic unpaid furloughs during the 2008 budget crunch.

These are several examples of choices workers make, or have imposed on them, and ways in which they experience work time in various occupations, organizations, and industries. They are personal experiences, but each is a representation of broader organizational strategies and social issues.

In *The Sociological Imagination*, Mills (1959) argued that personal experiences, or private troubles, are often individual manifestations of public issues. Unemployment is a good example. Although inadequate training, education, or experience can be the cause of an individual's inability to get a job, often unemployment stems from problems in the larger economy – overproduction by industries and companies, for example, or producers' and consumers' inability to obtain credit to do business and make purchases – and individuals experience job loss, financial difficulties, and personal and family stress. Many Americans today experience private troubles associated with work time: they feel overworked, have conflicts between their job and family responsibilities, have too little income and not enough work. It's easy to blame private troubles on oneself: I work too much because I'm too dutiful – I need to “just say no”; I need to manage my time better so I can be effective at my job and less stressed at home; maybe I should get a degree so I can get a better job with better hours and pay.

An “On the Job Advice” column from *The Indianapolis Star* took this private troubles approach in advising readers to “[w]ork smarter, not harder” and “[s]et aside personal and family time” as professional New Year's resolutions. The writer recommended analyzing the workday to determine where time is being used inefficiently in order to become more productive without working longer. On the personal and family side, she recommended reading a book, watching a movie and dining with one's family, and using vacation days (Phillips 2008). This book is a meditation on these matters and more, but I depart from the private troubles approach by investigating work time as a public issue. What are recent and

longer-term work-time trends? What are the historical, cultural, public policy, and business sources of our current work-time practices? How do US trends and practices compare to other nations? Once the sources of these conventions, and cross-national variations, are understood, what are the possibilities for change to better distribute work time across people, within our daily lives, and throughout our lifetimes?

I became interested in work time as a graduate student in Michigan in the early 1980s. The United States was then in the throes of the deepest recession since the Great Depression, and the industrial Midwest was affected disproportionately because its economy was based on traditional manufacturing industries like automobiles, steel, and machine tools. The twin recessions of 1979 to 1982 foreshadowed structural economic difficulties that persist, particularly job loss associated with global competition and production. With double-digit unemployment in the early 1980s, I became fascinated by the notion of work-time reduction to redistribute jobs and ease unemployment. In my research, I learned that scholars, policymakers, labor activists, and other critical thinkers touted this idea in the 1930s and 1960s.

While I was curious about work time and unemployment, I became aware that part-time and temporary jobs in the US were increasing at a rate faster than full-time employment. This trend was setting up a structural condition whereby there would not be enough full-time jobs for everyone who wanted them. Some workers would be forced into and become stuck in part-time or temporary jobs. Knowing that part-time and temporary jobs generally pay less than full-time jobs, a growing percentage of the American workforce would be condemned to working poverty.

Yet there was another factor in this complex web of work time. Some workers, especially women, want part-time jobs to integrate employment and family care. Since the 1980s, other forms of employment have emerged to help parents reconcile jobs with family life, such as job sharing, compressed workweeks, and flexible scheduling. These changes contributed to the emergence of employer-provided work-family benefits at some workplaces and a large scholarship on work-life issues in sociology, business, psychology, family studies, and other fields.

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The recent Great Recession, the deepest since the Great Depression, re-created many of the conditions of the deep twin recessions of 1979 to 1982, although the twin recessions were centered in manufacturing and the Great Recession was centered in housing and finance, now in a more globally integrated, technology-mediated economy. US unemployment nationwide was near 10 percent in October 2009, the highest it had been since 1983. The Great Recession exerted downward pressure on hours, but average weekly hours among non-supervisory workers in private nonagricultural industries have actually been declining since 1965 – about five hours to under 34 in 2007, before the Great Recession (US Department of Labor, Bureau of Labor Statistics, Table B-47, Hours and Earnings in Private Nonagricultural Industries, 1960–2008). Part-time and temporary work remain integral features of the labor market and organizational strategies of flexibility, and workers continue to juggle employment and family care in more or less satisfactory ways. Many public-sector workers have been required to take unpaid furloughs as an alternative to layoffs as governments and schools cope with tighter budgets. UPS pilots averted 300 layoffs by volunteering for enough unpaid time off to save the company \$90 million through 2011, and mechanics there considered early retirement, job sharing, reduced hours, or other cost-cutting measures (Howington 2009). Renewed discussion of short-time compensation, which provides prorated unemployment benefits to workers whose hours have been cut to avoid layoffs and is an important part of the social safety net in Germany, France, and a number of other European countries, emerged among policy experts in the US as the Great Recession pushed well into its second year. Short-time compensation is available in only 17 US states and is little used in the majority of them (Abraham and Houseman 2009).

In 2011, jobless recovery – economic growth with high unemployment – continues for the foreseeable future. The recessions of 1991 and 2001 also ended initially in jobless recoveries. There was jobless recovery in the mid-1930s, too. But the 1930s crisis was met in part with a legislative reduction of work time to 40 hours per week in the form of the Fair Labor Standards Act of 1938. Legislative adjustment of work time is not on the agenda in this crisis period, to date, in the US. Some European countries have raised the retire-

ment age to reduce retirement spending and offset public debt crises.

Beyond unemployment and non-standard jobs, why a book about work *time*? In the developed economies, most people work for pay, and work schedules structure time. Work schedules are largely determined by occupations, and because occupations differ, schedules vary. These variations influence how people experience time and, even, whom we have opportunities to know. Unpaid work and leisure routines may (or may not) differ from paid work routines. In developing countries, cultural change occurs as more of the population transitions to routines of market work. In these respects, the study of work time is timeless.

This book is a broad overview of the evolution and current state of work time, primarily in the US, which bears some similarities to other nations, but there are important differences too. It addresses specific questions. How many hours do we work? When do we work? How regularly do we work? Who determines how time is spent and measured? How do we experience work time? What differences do social class, gender, and age make? How do electronic technologies affect work time? How does work time in the US compare to other countries? Cross-national comparison is particularly meaningful because Americans work among the most hours in the world, and the US is among the least generous developed countries regarding vacation time and public policies that support employed parents. The basic argument is that, like all time in human society (Bluedorn 2002), work time is socially constructed – through cultural norms, public policy, within organizations, and via negotiations in households and workplaces. Today's legal standard workweek of 40 hours in the US is the product of workers' struggles, organizational changes, and legislative reforms over the course of the nineteenth and early twentieth centuries. Because work time is unevenly distributed, it shapes opportunities across social classes, genders, and age groups. For example, the American working class, like that of other developed economies, has feminized since the 1930s due to increasing numbers of women becoming employed after World War II at all occupational levels. As a consequence of deindustrialization in recent decades, workers, especially men, have been displaced from manufacturing jobs into low-level white-collar and

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service occupations. Men's and women's lives have converged, particularly in that they both work outside the home; men contribute more to household work and family care than in the past; and their total work time (paid and unpaid) is similar. Yet gender-typed differences in work and family care persist (Cobble 2007), as do work-life tensions.

Unlike the US, some European countries have used public policy to devise a "pro-social" workweek, while others, like the US, have few regulations and tend to let employers control work time. But even in the US a new class politics is evident, the product of women's activism in the labor movement – particularly within public- and service-sector unions – which has been a platform for demanding paid family leave, more affordable child care, and paid sick leave (Firestein and Dones 2007; Hartmann and Lovell 2009; Nussbaum 2007). Business competition, budget pressures in the public sector, and workers' desires for quality time and adequate compensation will continue to make work time a timeless subject.

History, culture, public policy, organization, and the household are necessary contexts for understanding work time. Chapter 1 begins by examining the work routines of hunter-gatherers to think critically about work time and necessity at the most basic level. The transition from church time to clock time in fourteenth-century Europe foregrounds an examination of commodified time in industrial capitalism. While a clock-oriented industrial time sense persists and has generalized outside factories, today we live in a service society in which most work occurs outside factories. Our individual experiences of time may be sufficiently diverse because of occupational and organizational differentiation that, beyond the universal clock, a single collective time sense may not exist. In some occupations, a task-oriented time sense prevails. Ideologies about and experiences of work time are also embedded in the gender division of labor. Therefore, a theoretical exploration of gender and work time complements the class-oriented analysis of commodified time.

Chapter 2 resurrects workers' and social reformers' activism and legislative efforts that reduced the statutory workweek, ultimately to 40 hours, in the US. This history is not widely appreciated, and there is a tendency to assume 40 hours is a "natural" length of the workweek. Even more



obscure, the 40-hour week was the outcome of an ever so close, almost successful, but failed effort to establish a 30-hour week to create jobs after high unemployment of long duration in the Great Depression.

Since then, the 40-hour workweek has become a rigid legal norm in the US, but changes in the labor market and occupational structure have affected the distribution of work time across workers. Growth in long-hours professional and managerial jobs has accompanied growth in non-standard short-hours jobs, creating a bifurcated distribution of work time. These trends, along with annual hours, are examined in chapter 3, as are increases in recent decades in part-time, temporary, and contract employment. Such “non-standard” work is laden with contradiction in that it can be a source of flexibility and control of time for workers, but control is offset by low wages and few if any benefits. Nor are all workers satisfied with their work hours.

Gender is woven throughout. Historically, protective labor legislation for women (and children) was used by activists as an “entering wedge” to gain limits on work time for all workers. Non-standard work today is distributed unevenly across women and men, and there are gender differences among those who work long or short workweeks, and in work-hours preferences. However, gender relations are most pronounced in chapter 4, where work–family integration is discussed. There I examine the gender division of labor in the household: how this division of labor contributes to a widespread sense of time scarcity; and adaptations of individuals, households, businesses, and public policy to foster work–family integration. Chapter 4 also introduces the notion of work–life, which focuses less on employed parents and more on a broad array of workers’ experiences of integrating and managing the boundary between work and the rest of life.

European countries are far ahead of the US in enacting public policies that reconcile work–family, albeit imperfectly. Some practices reinforce gender inequity, whereas others deliberately encourage gender equity. These European cases, covered extensively in the scholarly literature, provide valuable lessons for the US. Chapter 5 takes a global perspective, situating European policy within European work-time regimes

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more generally and contrasting their shorter workweeks to the long weeks in developing countries.

Chapter 6 looks ahead in considering the electronic frontier of work time, as well as contradictory strategies to customize work time in employees' and employers' interests. I encourage bold critical thought about work time on a number of fronts: current sluggish job growth, work-life integration, and long-term environmental sustainability. Alternative fuels and technologies and "green" consumer practices are essential components of a new "green" economy. Should work time be part of that vision too?

Conflict, control, and change are analytic themes with multiple meanings. Conflict over work time occurs in different areas: between employers and workers (e.g., how much, when, and how intensely to work); couples in their homes when juggling the demands of paid work and family care; and organizational practices, societal work-time trends, and extant public policies. Control refers to employers' efforts to control workers' time and productivity on the job; workers' desires to control their time to control their lives; and public policies that aid or undermine employers' efforts and workers' desires. Change refers to the historical evolution of work-time conventions, present trends, future trajectories, and unpredictable ruptures that may result from unanticipated events.

In every area of scholarship, a time comes when it is fruitful to abstract from the minutiae of individual studies for purposes of broad examination. That is the main goal of this book. The work-time literature in the social sciences has grown in the past 30 years, much of it focused on work-family or work-life integration and labor market trends. Organization specialists are turning their attention to temporal structures within organizations. Scholars' attention to work time expresses not only their personal interests, motivations, and expertise, but also reflects broader social concerns. Yet rarely are these literatures brought under a single umbrella to inform each other or situated in the long historical trajectory of work time and reform activism. I hope my attempt at integration will be useful as more researchers pursue work time as an area of study and instructors cover it in their courses. And I hope all of us together can stimulate widespread discussion of the time of work in our lives.

# 1

## From Field to Factory and Beyond

As human societies developed from pre-industrialism to industrialism and beyond, work sites expanded from fields, homes, and monasteries to shops, factories, classrooms, offices, laboratories, and more. Work routines and hours changed, too, as work sites, products, and services became more diverse. Ideologies and conventions regarding work time have changed as well. Here we trace macro-level changes in work time from hunter-gatherers to pre-industrial agricultural society, capitalist industrial society, and today's service and information economy. Along the way we observe changes in how societies think about time, particularly in relationship to nature and the development of the clock, the association of time with money, and time as a gendered resource.

The social sciences are compelling because they provide tools for systematic study of social institutions and practices and allow us to gain knowledge that very frequently challenges conventional wisdom (Berger 1963). Work time in hunter-gatherer societies is a good example. It's a common (mis)perception that humans worked longer and harder as pre-industrial hunter-gatherers, horticulturalists, pastoralists, and agriculturalists. It's customary to think of modern technology as labor saving, and assume, wrongly perhaps, that pre-industrial humans surely must have worked constantly without the technologies we take for granted today. Modern technologies have indeed allowed us to produce more with

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less, but instead of achieving some admittedly indeterminate level of comfort and balancing work and rest, we use technologies to produce more and more – and, in the aggregate, we work long hours.

Hunter-gatherers are poor by modern standards, yet Sahlins (1972: 10–12) saw material plenty in their absolute poverty. In the non-subsistence sphere beyond the basic necessities of food and water, wants are generally easily satisfied. Homespun products of stone, bone, wood, and skin are easily acquired, available in abundance, and shared by all. Their nomadic existence discourages acquisition of material goods: they can move only that which they can carry. Wealth is an encumbrance. In this sense, the notion of human scarcity is a bourgeois construction of the market economy. Few in the developed world today would want to live off the land in the mode of hunter-gatherers or return to agrarian subsistence, but the affluent among us could surely do with less (economic conditions at the time of this writing are forcing many to do just that) and perhaps work fewer hours. Let's hold that thought and return to it in chapter 6.

### Original Affluence?

How long and hard did hunter-gatherers work for the necessities of life? Broad generalizations about work time in subsistence societies are difficult to make due to small sampling frames, small numbers, and cultural differences of societies studied and different research methods. Gershuny (2000: 61) acknowledges the contributions of anthropological and historical interpretations of time in hunting and gathering (and medieval) societies, but challenges their validity because our knowledge might be based on relatively successful societies that left records or survived long enough to be studied. But were they exceptional in this regard and thus atypical?

Sahlins (1972: 14) argued “a good case can be made that hunters and gatherers work less than we do; and, rather than a continuous travail, the food quest is intermittent, leisure abundant, and there is a greater amount of sleep in the daytime per capita per year than in any other condition of

society.” Evidence from McCarthy and McArthur’s study during the 1948 American-Australian Scientific Expedition to Arnhem Land (Mountford 1960 as cited by Sahlins 1972: 15–19) is that the average time per person per day devoted to the appropriation and preparation of food (including weaponry repair) was four or five hours, stopping when they procured enough for the time being, leaving time to spare. Nor did they maximize the available labor and disposable resources. Economic activity was not physically demanding; they worked to exhaustion rarely. Yet their dietary intake was adequate by standards of the National Research Council of America at 2,160 calories per day per capita (over a four-day period of observation) and 2,130 calories (over 11 days) at two sites, Fish Creek and Hemple Bay. These were free-ranging native Australians, living outside mission or other settlements during the period of study, although this was not necessarily their permanent or ordinary circumstance.

Fish Creek was an inland camp in western Arnhem Land, consisting of nine adults (six men and three women). It was studied at the end of the dry season, when the supply of vegetation was low. Kangaroo hunting was rewarding, although the animals became increasingly wary under steady stalking, according to the researchers. In inland hunting, as at Fish Creek, one day’s work may yield two days’ sustenance. Fish Creek generated enough surplus that it supported a virtually full-time 35-to-40-year-old craftsman. Much of the group’s spare time was passed in rest and sleep, averaging 3 hours 15 minutes of daytime rest and sleep among both men and women during 14 days of observation.

Hemple Bay was a coastal occupation on Groote Eylandt, with eight adults (four men and four women) and five children. Vegetation was plentiful; fishing was variable, but on the whole good by comparison with other coastal camps visited by the expedition. Fishing perhaps produces smaller if steadier returns than hunting, enjoying somewhat longer and more regular efforts. Providing for children may also account for more time obtaining food at Hemple Bay. The use of metal tools or the reduction of local pressure on food resources by depopulation may have raised productivity above aboriginal levels, although the two groups observed may have been less skilled than their ancestors.

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Sahlins (1972) concluded that the work habits in the two camps in Arnhem Land were similar to those of other hunter-gatherers. Among the Dobe Bushmen, for example, who occupied an area of Botswana where !Kung Bushmen had been living for at least 100 years, a day's work was about six hours, and they worked at food procurement about two and a half days per week. Thus, the workweek there was approximately 15 hours, or an average of 2 hours 9 minutes per day. An intensive four-week study of the Dobe Bushmen had been conducted in July and August 1964, during a period of transition from more to less favorable seasons of the year. The camp was populated by 41 people, about the average size of such settlements. The Dobe Bushmen encountered an abundance of vegetation, particularly the energy-rich mangetti nut, and metal had been available since the late nineteenth century. The ratio of food producers to the general population was estimated to be 2:3, but the food producers were estimated to work only 36 percent of the time (Sahlins 1972: 20–1). The daily per capita subsistence yield was 2,140 calories. Because subsistence work required a relatively small amount of time, the majority of the Dobe Bushmen's time was spent resting or visiting other camps (Sahlins 1972: 23). Similar evidence of the “characteristic paleolithic rhythm of a day or two on, a day or two off” (Sahlins 1972: 23) exists for nineteenth-century Australian aboriginal tribes as well as the African Hadza at the mid-twentieth century. The Hadza men were said to be more concerned “with games of chance than with chances of game” and, despite being surrounded by cultivators, chose not to take up agriculture themselves, preferring to preserve their leisure (Sahlins 1972: 27).

Trust in the abundance of nature's resources rather than despair at the inadequacy of human means created “lazy travelers” (Smyth 1878: 125, as cited by Sahlins 1972: 29) whose nomadic lifestyle was only in part a flight from starvation. Sahlins's sympathetic account of hunter-gatherers sees their wanderings not as anxious, but more like “a picnic on the Thames” (1972: 29–30). Their intermittent work rhythm created an objectively low standard of living with few possessions, but they were not poor per se. Gender inequity of work time did exist, however. Because plant cultivation tended to be more reliable than hunting, and women did the

gathering, women worked more regularly than men and provided more of the food supply (Sahlins 1972: 35, 37).

More recently, scholars have challenged Sahlins's notions of original affluence and leisurely work routines. These studies show wide variation in work hours and in some cases more hours than Sahlins's original affluence would suggest. These differences might be due to cultural factors or differences in research methods. Hill et al. (1985), for example, counted almost seven hours per day of food acquisition on normal activity days among mission-resident northern Ache men in Eastern Paraguay, based on observation of nine foraging trips of 5–15 days over a six-month period from October 1981 to April 1982 – a considerably longer sampling frame than the seven days and 14 days of the McCarthy and McArthur studies. Ache men spent most of their time searching for or in pursuit of game, with little variation from day to day or man to man. There was more variation in “miscellaneous work,” especially tool manufacture and repair, cleaning camp, and building huts. The Ache worked more hours than any of 14 horticultural societies in Hame's survey, cited by Hill et al., and more hours than four other hunter-gatherer societies for which Hill et al. had quantitative data. The Ache, however, consumed more calories per day per capita and more protein, and weighed more than any other group in their height range (Hill et al. 1985: 45).

Hali men in rural Papua New Guinea spent 2.79 hours and Hali women 4.5 hours per day on subsistence activity, in line with Sahlins's evidence. Hali women's hours were longer than men's because they lived with their children separately from their husbands and were responsible for providing for their children. Women farmed and reared pigs; men cultivated sweet potatoes but only for themselves (Umezaki et al. 2002).

A review of 15 studies of agrarian household economies published from 1939 to 1978 (Minge-Klevana 1980) showed men's total (“outside” and “inside”) work hours ranged from 3.9 among the Kayapo to 11.1 in Muhero. Women's total ranged from 4.9 hours among the Kayapo to 13.65 in Medieres.

Subsistence routines provide a baseline against which to compare modern work time. Subsistence work was more

strictly gender differentiated and governed by natural and seasonal rhythms. Nature, season, and gender are still factors, but modern humans contend with the clock. How the clock became so important requires we visit the Middle Ages and the emergence of capitalism.

## Medieval Church Time, Modern Clock Time

Work and time are essential aspects of social structure and function, and control of time, and power over time, are essential components in the functioning of societies (Le Goff 1980: xii–xiii; Harvey 1985: 7). The transition from church time to clock time in the Middle Ages provides compelling evidence for this thesis. Changes in labor time and the conditions of intellectual and economic production accompanied the secularization of human activity (Le Goff 1980: 30).

Christianity is frequently judged to have fundamentally transformed the notion of time. Medieval clerics regarded time in light of biblical texts and Christian tradition: time begins with God and is dominated by Him. Divine action is so naturally connected with time that time cannot pose a separate and distinct problem; it is rather the necessary and natural condition of every divine act. For the early Christians, eternity was not opposed to time; nor was it the absence of time, but merely the extension of time to infinity. The appearance of Christ gave time a historic dimension or center, and the concept of salvation transformed the sense of time's end. During the twelfth century, however, the traditional framework of Christian thought on time was shaken, by merchants who experienced a connection between time and space that undermined the Church's concept of time (Le Goff 1980: 30–4).

The invention of the mechanical clock in medieval Europe was comparable in social and economic significance to movable type, which eventually turned Europe from a weak, peripheral outpost of Mediterranean civilization into a hegemonic aggressor (Landes 1983: 6, 12; Bluedorn 2002: 9–11). Interest in time measurement led to the invention of the clock,



not the other way around, motivated in part by setting prayer times to specific hours of the day and religious concern for punctuality among monks. Benedictine monks in the sixth century had first introduced fixed and pre-set times for each of their activities, a practice revolutionary in its time (Whipp et al. 2002: 13; Zerubavel 1981). Monasteries were the largest productive enterprises of medieval Europe, and the new monastic Orders of the eleventh and twelfth centuries enforced higher standards of punctuality. The purpose of such rationalized conduct was to overcome the natural state; it trained monks objectively as workers in the service of God. Gradually, this concern for rational action and proper timekeeping diffused to the countryside and marketplace until, by the end of the fourteenth century, it became a duty, an integral part of Protestant righteous conduct (Weber 1958; Whipp et al. 2002: 13). New sources of demand for clocks emerged outside the monasteries, especially among the ambitious urban bourgeoisie (Landes 1983: 58–71).

Like the peasants, the merchants were at first subjected to seasonal cycles and unpredictability of the weather. They sought to control this natural order through prayer and superstitious practice. Once merchants organized commercial networks, however, time became an object of measurement. Duration of travel, price inflation or deflation in the course of a commercial transaction, fluctuations in the commercial price of silver, and their workers' labor time all required merchants' attention and became the object of increasingly explicit regulation. Historical documents such as account sheets, travel diaries, manuals of commercial practice, and letters of exchange all show how important the exact measurement of time was becoming to the orderly conduct of business. The material reality of merchants' business superimposed a new, measurable, predictable time on that of the eternally renewed, unpredictable natural environment (Le Goff 1980: 35).

Prior to clocks, bells were used to chime the hours of commercial transactions and work hours, such as in 1355 when the royal governor of Artois authorized the people of Aire-sur-la-Lys, a center of textile trade, to build a belfry whose bells would chime for the aforementioned purposes. As clocks were erected opposite church bell towers, they came to