Fulfilling Technology's Promise:
Enforcing the Rights of Women Caught in the Global High-Tech Underclass

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I. INTRODUCTION

In the early 1980s, a disturbing trend emerged in the Malaysian electronics industry. Exhausted by long hours of repetitive, mind-numbing assembly work, Malaysian women working in electronics factories began to experience mysterious hallucinations and seizures.[1] One by one, these horrible visions would spread throughout the assembly lines, sometimes engulfing entire factories.[2] To control this "disease," factory bosses came up with a convenient solution. Manipulating their employees' religious and cultural beliefs, they convinced the women that their bodies were inhabited by demons, and that the hallucinations would end only if they were "exorcised."[3] In this manner, they managed to avoid confronting the more likely causes of this mass hysteria–the rigid, paternalistic work environment, the intense production pressures placed on the women, and the lengthy shifts and potentially hazardous conditions that the women were forced to endure.[4]

This example illustrates some of the ways that gender, religion, and culture can be used to control and exploit women's labor in the high-tech industry. Unfortunately, this is not an isolated situation.[5] Women in the United States are also finding themselves trapped in a growing high-tech underclass comprised mainly of poor women of color.[6] While millions of men and women are able to reap the economic and educational benefits of technology, certain groups of women both overseas and in the United States are confined to dead-end jobs in the electronics industry that adversely affect their health and opportunities.

In the United States, immigrant women from Asia and Latin America have become the employees of choice for the lowest paid electronics assembly jobs.[7] Similarly, electronics companies abroad specifically target

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1. *See* AIHWA ONG, SPIRITS OF RESISTANCE AND CAPITALIST DISCIPLINE: FACTORY WOMEN IN MALAYSIA 204-10 (1987) [hereinafter ONG, SPIRITS OF RESISTANCE].
2. *See* Aihwa Ong, *Global Industries and Malay Peasants in Peninsular Malaysia*, *in* WOMEN, MEN AND THE INTERNATIONAL DIVISION OF LABOR 426, 434-35 (June Nash & Maria Patricia Fernandez-Kelly eds., 1983) [hereinafter Ong, *Global Industries*].
3. *See id.* at 435 (describing how religious leaders were often called in to ritually "cleanse" the factories in response to these episodes).
4. *See* VIVIAN LIN, HEALTH, WOMEN'S WORK, AND INDUSTRIALIZATION: SEMICONDUCTOR WORKERS IN SINGAPORE AND MALAYSIA 5 (1991) [hereinafter LIN, WOMEN'S WORK]; Vivian Lin, *Workers' Health and Safety in Electronics: A Review*, *in* SAFETY AT WORK IN MALAYSIA: AN ANTHOLOGY OF CURRENT RESEARCH 89, 93-96, 98 (Colin Nicholas & Arne Wangel eds., 1991) [hereinafter Lin, *Workers' Health*] (discussing causes of mass hysteria among women factory workers in the Malaysian electronics industry); *see also* Ong, *Global Industries*, *supra* note 2, at 434 (describing earlier cases of mass hysteria in Malaysian factories).
5. *See* VICTOR G. DEVINATZ, HIGH-TECH BETRAYAL: WORKING AND ORGANIZING ON THE SHOP FLOOR 9-10 (1999) (highlighting some of the racial, cultural, and gender stereotypes used to control and subordinate female employees in the high-tech industry, both in the United States and abroad).
6. *See id.*
7. *See* Miranda Ewell & K. Oanh Ha, *High-Tech's Hidden Labor Outside the Eyes of the Law: Silicon Valley Companies Pay Asian Immigrants by the Piece to Assemble Parts at Home*, SAN JOSE MERCURY NEWS, June 27, 1999, at A1 [hereinafter Ewell & Ha, *High-Tech's Hidden Labor*] (de-

young, single, Asian women to fill their factories.[8] Lured by promises of opportunity and wealth, many of these women become trapped in jobs without adequate health and safety protection, at wages far below those of male workers generally and of employees only a few steps above them on the electronics assembly chain.[9] Moreover, due to the global nature of the electronics industry, it is often difficult to determine which nation's laws should be enforced, against whom, and how. Finally, while the reasons electronics companies target these women have been well-documented, basing this practice on racial stereotypes emphasizing docility and nimble fingers,[10] the policy implications and legal consequences of these actions have not been widely studied.[11]

My analysis has two primary goals. First, in analyzing and comparing the experiences of women assembly workers in Malaysia and the United States, this article will explain not only why companies seek out these women, but also how the creation of this workforce has in turn influenced, and become embedded in, state policies. Second, by identifying the common struggles and parallels of two groups of women seemingly worlds apart, this article aims to show that this modern version of a gender-based, immobile industrial underclass can develop anywhere. These labor structures are not confined to developing countries, but can flourish in the most "advanced" industries and most protective legal regimes in the world. This article is not intended to focus simply on the problems these women face, but also to inquire into ways that these jobs and this

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scribing widespread practice in Silicon Valley of paying Asian immigrants by the piece for high-tech assembly).

8. *See* Lin, *Workers' Health*, *supra* note 4, at 92.

9. Female immigrants often are paid less than male workers in similar positions, and females are also concentrated in the lowest paying and lowest skilled electronics jobs. *See* Karen J. Hossfeld, *Their Logic Against Them: Contradictions in Sex, Race, and Class in Silicon Valley*, *in* WOMEN WORKERS AND GLOBAL RESTRUCTURING 149, 155, 167 (Kathryn Ward ed., 1990) [hereinafter Hossfeld, *Their Logic Against Them*]; Tom Abate, *Heavy Load for Silicon Valley Workers: Women, Minorities Face Uphill Battle As They Try to Climb Out of Low-Paying High-Tech Jobs*, S.F. EXAMINER, May 23, 1993, at E1 [hereinafter Abate, *Heavy Load*] (citing Pacific Studies Center study showing that whites held 80% of high-tech management jobs, while minorities held more than 75% of high-tech jobs categorized as manual labor, and that men outnumber women by two to one in higher paying jobs, while women outnumber men in low-paying and low-skilled jobs); Eric Lai & Theresa C. Viloria, *Down & Out in Silicon Valley*, A. MAG., Nov. 30, 1995, at 30 (citing statistics showing that Vietnamese and Filipino immigrant women earn the lowest average salaries in Silicon Valley, and earn less than their male counterparts).

10. The detailed and precise nature of electronics assembly work requires manual dexterity and speed, so employees with "small fast fingers" who will not stir up trouble are preferred. Asian women are often stereotypically assumed to exemplify these qualities. *See* Linda Lim, *Women Workers in Multinational Corporations: The Case of the Electronics Industry in Malaysia and Singapore*, 9 MICH. OCCASIONAL PAPERS IN WOMEN'S STUD. 1, 7 (1978); Abate, *Heavy Load*, *supra* note 9.

11. *See* ELIZABETH GRACE, SHORTCIRCUITING LABOUR: UNIONIZING ELECTRONIC WORKERS IN MALAYSIA 15-17 (1991) (noting that while there is a large body of literature discussing the reasons for electronics companies' preference for female employees, the role of gender in shaping government policy and laws for this industry has been almost completely overlooked).

industry can improve to allow these women to truly benefit from the technology that they help build.

In this context, this article will focus on two groups of women within the high-tech underclass: factory workers in the free trade zones of Malaysia[12] and Asian immigrant assembly workers in the United States. Comparing the Malaysian electronics industry to its U.S. counterpart is instructive because both utilize a significant number of assembly workers, have developed highly stratified workforces in the midst of heterogeneous populations, and have been shaped by similar external economic and social forces. Section II provides historical background on the development of this global electronics assembly line. Sections III and IV explore the roles of gender, race, and law in the subordination of women factory workers in Malaysia and in the formation of a parallel workforce in the United States. Finally, Section V describes the international legal framework that can be used to recognize and enforce the rights of Asian women assembly workers.

II. THE POLITICAL ECONOMY OF THE GLOBAL ELECTRONICS ASSEMBLY LINE

Although both the high-tech and garment industries rely heavily on female and immigrant labor, the garment industry has received much more political and scholarly attention.[13] Moreover, unlike garment industry "sweatshops," electronics firms, especially in the United States, have not had to face widespread public criticism or legal action.[14] Some reasons for this discrepancy include the "clean" public image of the high-tech industry,[15] the more extensive and attractive work facilities that electronics

12. Malaysia is a major assembly and manufacturing site for American electronics companies, and the factory workers in this industry are almost all female. *See* KRISTAL E. ALLEY, AMERICAN MALAYSIAN CHAMBER OF COMMERCE (AMCHAM), MALAYSIAN-AMERICAN ELECTRONICS INDUSTRY ANNUAL SURVEY 1998/1999, 27 (1999); SHA'BAN MUFTAH ISMAIL, WOMEN, ECONOMIC GROWTH & DEVELOPMENT IN MALAYSIA 72 (1997). Furthermore, Malaysian laws predicated on stereotypical roles for women have reduced the rights of women electronics workers. *See* GRACE, *supra* note 11 (discussing employment and "family development" policies in Malaysia that restrict women's opportunities).

13. Assembly workers in the garment industry have recently been the focus of extensive literature and activism. *See, e.g.*, SUSAN TIANO, PATRIARCHY ON THE LINE: LABOR, GENDER AND IDEOLOGY IN THE MEXICAN MAQUILA INDUSTRY (1994) (reviewing women's roles and experiences in Mexican export industries); Laura Ho et al., *(Dis)assembling Rights of Women Workers Along the Global Assembly Line: Human Rights and the Garment Industry*, 31 HARV. C.R.-C.L. L. REV. 383 (discussing the problems facing garment workers and legal remedies).

14. *See* Bruce T. Rubenstein, *For Electronics Industry, Short History is Still History*, CORP. LEGAL TIMES, Mar. 12, 1999, at 14 (discussing the relatively low level of legal action against electronic companies in the past, and arguing that this is about to change).

15. *See* DEVINATZ, *supra* note 5, at xvi, 3 (describing the public image of the high-tech industry as one with clean, safe, and high-paying jobs, in contrast to the reality of low-wage jobs with hazardous conditions).

firms offer, and the higher levels of pay in the electronics industry.[16] However, the situation of workers along the electronics assembly line merits attention because of the hazardous conditions and the underlying and pervasive gender and race ideology that electronics assembly workers must face. To understand the potential and perils of electronics assembly work, it is important to take a brief look at the nature and development of the global electronics industry.

The term "electronics industry" (also called the "high-tech" industry) refers to a wide array of products and their internal components, from computers, calculators, and highly advanced scientific devices to microchips and electronic circuits.[17] This industry is the world's largest and most rapidly expanding industry,[18] and has been described as one of the most "clean" or environmentally conscious and socially progressive industries, both in the United States and abroad.[19] However, this industry also has started to receive greater attention for its negative aspects, such as the toxic chemicals to which workers may be exposed, the long work hours many employees must endure, and the gender and racial stratification of its workforce.[20]

The roots of this now widely dispersed and heterogeneous industry can be traced to the development of the vacuum tube in the early 1900s, which led to the invention of the transistor in 1947.[21] These developments in turn spawned numerous other inventions, such as the microprocessor and integrated circuit, which helped create the global high-tech capital of "Silicon Valley."[22] Shortly after World War II, Silicon Valley

16. *See* TIANO, *supra* note 13, at 26-27 (demarcating some of the important differences between the electronics and garment industries). Electronics firms occupy different positions in the global economy and have very different organizational structures; they have greater links to foreign capital and at first glance appear to have better working conditions than garment factories (with modern facilities and often on-site cafeterias and gyms). Apparel industry jobs tend to be more strenuous, more prone to recruitment abuses, and less likely to have additional amenities in the workplace. *See id.* However, as will be discussed in the following sections, electronics assembly jobs have a misleading appearance. Many chemicals required in electronics assembly processes are highly hazardous and have been linked to several medical problems. *See* discussion *infra* Parts III.D, IV.C.

17. *See* CECILIA NG, TECHNOLOGY AND GENDER 95 (1987); *see also* Leslie Byster & Ted Smith, *High-Tech and Toxic*, F. FOR APPLIED RES. & PUB. POL'Y, Apr. 1, 1999, at 69 ("The highly competitive and innovative electronics industry spans the production of semiconductors, disk drives, circuit boards, consumer electronics, communications devices, and video display equipment.").

18. *See* Byster & Smith, *supra* note 17 (stating that the electronics industry is the world's largest and fastest-growing manufacturing sector, and is becoming increasingly dominant world-wide).

19. *See, e.g.*, Jim Morris, *In Strictest Confidence. . .The Chemical Industry's Secrets/Clean Computer Chips Taking Toll?*, HOUSTON CHRON., Sept. 28, 1998, at A1.

20. *See* Abate, *Heavy Load*, *supra* note 9 (describing the ethnic and gender stratification of the high-tech workforce in Silicon Valley); Rubenstein, *supra* note 14 (describing the potential for lawsuits against the industry by workers exposed to hazardous chemicals and dangerous working conditions).

21. *See* JAN MAZUREK, MAKING MICROCHIPS: POLICY, GLOBALIZATION, AND ECONOMIC RESTRUCTURING IN THE SEMICONDUCTOR INDUSTRY 22 (1999) (describing the precursors to today's computers and electronic components).

22. *See id.* at 22-23; *see also* M. Patricia Fernandez-Kelly, *Labor Force Recomposition and Industrial Restructuring in Electronics: Implications for Free Trade*, 10 HOFSTRA LAB. L.J. 623, 634

began to attract and produce the talent, creativity, and innovation that would in turn produce greater technological development.[23] Some of the world's most powerful and influential companies, such as Hewlett-Packard, were formed in Silicon Valley and have contributed to its exponential growth in high-tech.[24] This area, occupying a 50-mile region from San Francisco to San Jose, has become a much-imitated model for technology-based growth and development,[25] and is the birthplace and corporate headquarters of many of the multinational electronics companies that created the global electronics assembly line.[26]

In the mid-1960s, after an initial period of largely domestic growth and development, these U.S. electronics companies began to search for low-cost, off-shore production locations.[27] This shift occurred at the same time that developing countries in Asia, such as Taiwan and Singapore, were beginning to adopt export-oriented strategies aimed at achieving rapid industrialization.[28] Because work at the assembly stage[29] was easily segmented and out-sourced, and these countries offered cheap labor, low production costs, and government incentives, U.S. companies began to move large portions of their assembly operations to Asia.[30] The first semiconductor company to locate assembly operations overseas was Fairchild Semiconductor in Hong Kong in 1962.[31] In 1972, National Semiconductor opened the first assembly operations in Penang, Malaysia.[32] Meanwhile, most value-added production and high-skill or managerial positions remained in the United States; even today, products assembled abroad are sent to the United States where they are incorporated into the final products, packaged, and sold.[33] In this manner the global electronics assembly line, founded upon a new international division of labor, was born.

Current economic trends, such as increasing liberalization of global capital flows, and the intensifying market pressures on companies to adopt decentralized production systems, are reinforcing the growth of this

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(1993) (stating that the development of the integrated circuit marked the birth of the modern electronics industry).

23. *See* Alex Soojung-Kim Pang, Book Review, *Creative Destruction: Will Fast Money Dull Silicon Valley's Edge?*, L.A. TIMES, Oct. 31, 1999, at 1.
24. *See id.*
25. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 151.
26. *See* MAZUREK, *supra* note 21, at 23. Examples of these companies include Fairchild Semiconductor and Intel Corporation. *See id.*
27. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 152.
28. *See* LIN, WOMEN'S WORK, *supra* note 4, at 5.
29. This work can include soldering parts together, putting pieces in tiny slots, and cleaning parts with chemical solvents. *See* Miranda Ewell & K. Oanh Ha, *Asian Immigrants Build Circuit Boards at Home in San Jose, Calif.*, SAN JOSE MERCURY NEWS, June 27, 1999.
30. *See* LIN, WOMEN'S WORK, *supra* note 4, at 5.
31. *See id.*
32. *See id.*
33. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 152.

global assembly line.[34] While electronics firms benefit from increased flexibility in production and decentralized responsibility, [35] foreign governments derive much desired foreign investment and advanced technology from such direct foreign involvement.[36] To take advantage of the ostensible benefits of the electronics industry, more and more countries are developing export processing zones (EPZs) in order to attract foreign companies.[37] EPZs can take the form of free trade zones, maquiladoras, special economic zones, or technology parks; essentially, they are all defined geographic zones organized around a common goal, which is to attract foreign companies through a package of business and social incentives.[38] While this spread of technology has created many positive benefits for developing countries, it has also exacerbated existing social and political tensions.[39] The following sections will examine the consequences of these developments on women's work, both in their country of origin and in a country that forms a link in the global production chain.

III. WOMEN IN THE MALAYSIAN ELECTRONICS INDUSTRY

In many ways the electronics assembly system in Malaysia, and the role of women within it, provides a microcosmic setting for exploring the roles of gender and race in the global electronics industry. The electronics industry has been in Malaysia almost since the beginning of the industry's shift overseas, and has had time to mature and develop along with the country itself.[40] In fact, this growth and development has been so successful that today Malaysia is the world's largest exporter of electronic

34. *See* INTERNATIONAL LABOUR ORGANIZATION (ILO), LABOUR AND SOCIAL ISSUES RELATING TO EXPORT PROCESSING ZONES 3, 14 (1998); *see also* Fernandez-Kelly, *supra* note 22, at 634-35 (explaining that increasing competition from emerging economic blocs, in tandem with the removal of trade barriers, is likely to create even greater competitive pressures in the future in the electronics industry).

35. *See* ILO, *supra* note 34, at 3, 14.

36. *See id.*

37. *See* Karen F. Travis, *Women in Global Production and Worker Rights Provisions in U.S. Trade Laws*, 17 YALE J. INT'L L. 173, 189-190 (1992) (noting that the creation of EPZs in developing countries is becoming a growing global phenomenon, and citing studies showing that while less than ten countries had created EPZs in 1970, more than fifty countries had established such zones by 1986).

38. *See* ILO, *supra* note 34, at 3, 14.

39. *See* Maria L. Ontiveros, *A Vision of Global Capitalism That Puts Women and People of Color At the Center*, 3 J. SMALL & EMERGING BUS. L. 27, (1999) at 31-34 (explaining how transnational companies, including electronics and apparel companies, have exported the "triumph of market values over human values" to developing countries where women and workers of color are being exploited for their labor and dehumanized), *and* at 34 (describing how companies, unions, and governments are deliberately manipulating existing factors such as patriarchy, racism, and colonialism to define employment conditions).

40. Malaysia has been a major exporter of electronics products for the past two decades. *See* ISMAIL, *supra* note 12, at 72 (citing Fong Chan Onn, *Industrialization in Malaysia: Role of Small and Medium Scale Industries, in* THE MALAYSIAN ECONOMY IN TRANSITION 71 (Ambrin Buang ed., 1990)).

chips.[41] The same stereotypes, economic forces, and policy issues that have shaped links along the assembly line elsewhere are present in Malaysia.[42] In addition, the heterogeneous population of Malaysia makes it more comparable to the United States than other countries with growing high-tech sectors. For these reasons, the Malaysian electronics assembly experience can provide important lessons and historical perspectives for countries at various stages of development.

Malaysia is a multicultural nation with a workforce that has historically been divided along racial lines.[43] Malaysia has a current population of about 22.23 million, of which 5.52 million are ethnic Chinese, 1.56 million are Indian, and 12.84 million are "Bumiputra" (translated as "sons of the soil," this category encompasses the ethnic Malay people).[44] Historically, people of Chinese origin held much of the country's capital and wealth, while the people of Indian origin occupied a middle status, and people of Malay origin held the least wealth and education.[45] This hierarchy, along with a gender hierarchy, is replicated in the electronics industry. People of Chinese origin are by far the largest group of managers and professionals (69%; 52% male and 17% female).[46] People of Indian and Malay origin are concentrated in the lower ranks: Indians make up 13% and people of Malay origin comprise 70% of skilled and semi-skilled labor (Indian and Malay women comprise 12.5% and 61% of the Indian and Malay totals, respectively).[47]

For the past three decades, the electronics industry has helped drive economic growth in Malaysia.[48] Today, Malaysia is a rapidly developing country which aims to achieve full "developed-nation status," or the level of development attained by the most advanced countries, by the year

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41. *See* Michael Yeoh, *Preface*, *in* PENANG INTO THE 21ST CENTURY (Asian Strategy & Leadership Institute, 1995) (stating that Malaysia is currently the world's largest exporter of electronic chips because of the success of the electronics industry in the state of Penang).
42. *See* Travis, *supra* note 37, at 189-94 (describing common characteristics of EPZs such as employers' preferences for young female workers, low wage rates, gender-based wage differentials, and government restrictions on bargaining rights, and noting that these characteristics are present in Malaysian EPZs as well).
43. *See* GRACE, *supra* note 11, at 6-7.
44. *See* AMCHAM, 1999 MALAYSIAN BUSINESS 6 (1998).
45. *See, e.g.*, GRACE, *supra* note 11, at 6-7 (describing the hierarchical social and political structure of Malaysian society); *see also* RAJA ROHANA RAJA MAMAT, THE ROLE AND STATUS OF MALAY WOMEN IN MALAYSIA: SOCIAL AND LEGAL PERSPECTIVES 10-11 (1991) (noting that the historical and continuing socio-economic differences between Chinese, Indians, and Malays are among the most significant features of Malaysian society, that the Malays have always lagged behind the Chinese in these areas, and that this has led to social and political partisanship in Malaysia).
46. *See* ALLEY, *supra* note 12, at 27 (providing the numerical data that the author used to compute the above percentages).
47. *See id.*
48. *See* ISMAIL, *supra* note 12, at 72 (citing Fong Chan Onn, *Industrialization in Malaysia: Role of Small and Medium Scale Industries*, *in* THE MALAYSIAN ECONOMY IN TRANSITION 71 (Ambrin Buang ed., 1990)).

2020.[49] Since the 1960s, Malaysia has followed the "East Asian" model of development based on technological innovation and government intervention in the economy.[50] A key element of the government's economic policies has included Five-Year Plans for growth and development.[51] The government has encouraged foreign investment,[52] but has also retained a high level of discretionary authority over investment, often restricting foreign equity and requiring foreign firms to enter into joint ventures with local partners.[53] By 1997, the United States was Malaysia's largest trading partner and ranked first in foreign direct investment (FDI) in Malaysia.[54]

In the early 1970s, Malaysia adopted a program of export-led industrialization, and began to create "free trade zones" to entice foreign investment.[55] These efforts have been extremely successful in making Malaysia "a favored locale" for multinational companies in the electronic, apparel, and food industries.[56]

A. Penang—Asia's "Silicon Island"

The current centerpiece of Malaysian high-tech development is the idyllic island of Penang in Western Malaysia. Penang is often called "Silicon Island," reflecting both its aims and origins.[57] Since the 1970s, Penang's transformation from an agricultural and service-based economy to a primarily manufacturing-based economy has been fueled by foreign investment.[58]

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49. *See id.* at 43-46 (discussing the goals of Malaysia's "Vision 2020" plan); AMCHAM, *supra* note 44, at 17-18 (describing Malaysia's "Vision 2020" plan of development focusing on the Multimedia Super Corridor (MSC)).
50. *See* MALAYSIAN SCIENCE AND TECH. INFO. CENTRE (MASTIC), 1994 NATIONAL SURVEY OF INNOVATION IN INDUSTRY 64 (1996).
51. *See* Shamsulbahriah Ku Ahmad, *Stratification and Occupational Gender Segmentation in the Labour Force*, *in* READINGS ON WOMEN AND DEVELOPMENT IN MALAYSIA 53, 66-67 (Jamilah Ariffin ed., 1994).
52. *See* Shankaran Nambiar, *Fostering Technology Transfer: The Case of the Electronics and Electrical Industry in Malaysia*, *in* POLITICAL ECONOMY OF DEVELOPMENT IN MALAYSIA 238 (B.N. Ghosh & Muhammad Syujri Salleh eds., 1999) (stating that the purpose of Malaysia's industrial strategies since the 1960s has been to attract foreign direct investment).
53. *See* AMCHAM, *supra* note 44, at 32-33 (noting that the Malaysian government retains considerable discretionary authority over individual investments and has used this authority to demand that foreign firms enter into joint ventures with domestic companies); *see also* Nambiar, *supra* note 52, at 239-242 (describing how the Malaysian government has restricted technology transfers from foreign companies, and listing the various forms that such technology transfers may take, such as joint venture agreements, technical assistance agreements, turnkey agreements, and license and patent agreements).
54. *See* AMCHAM, *supra* note 44, at 16.
55. *See* ONG, SPIRITS OF RESISTANCE, *supra* note 1, at 143-45.
56. *See id.* at 145.
57. *See* Joseph Chin & Lee Min Keong, *Silicon Island*, ASIA INC., Sept. 1999, at 17.
58. *See id.* at 17-19. As a sign of the maturity of Penang's electronics industry, among Association of South East Asian member countries, Malaysian wages are now the second-highest, below only Singapore's wage levels. *See id.* at 19.

Electronics companies make up by far the largest employers in Penang, employing 200,000 people, a little over sixty percent of the island's workforce.[59] As of 1998, there were 152 electronics companies in Penang, manufacturing computers, microchips, data storage products, wireless communication products, automotive electronic parts, and other electronic parts used in the manufacturing and assembly centers.[60] Japanese, U.S., and Taiwanese companies are the biggest investors in the electronics industry in Penang, followed by various European companies.[61] In 1998, there were 62 Japanese companies in Penang, 36 U.S. companies, and 68 Taiwanese companies.[62] Penang contains two Free Industrial Zones (FIZs), which are centralized zones for export-oriented industries, six industrial parks, and licensed manufacturing warehouses.[63] Most electronics companies are located in the Bayan Lepas Free Trade Zone, where nearly 55,000 people worked in 1998.[64]

Penang seeks to follow the success of developed countries in the electronics industry, but as Malaysian wages rise, it faces increased competition from countries such as China, the Philippines, and Thailand.[65] To keep companies in Penang and encourage further investment, the government has been promoting the idea of the "integrated manufacturing center" (IMC), where companies locate their entire chain of operations for a particular product in Penang.[66] The Malaysian government is also trying to encourage companies to bring in additional value-added operations such as wafer fabrication plants.[67] If this occurs, the Malaysian electronics industry would more closely resemble the U.S. electronics industry in that it would contain all stages of the electronics assembly line, including product design and development, rather than just the assembly operations now in Malaysia.

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59. *See Silicon Island*, ASIA INC., Sept. 1999, pull-out section.
60. *See id.*
61. *See id.*
62. *See id.* While Taiwanese companies have the most factories in Penang, American companies employ more workers and are more technology intensive. *See also* Ibrahim Saad, *Industrial Development Strategy*, *in* PENANG INTO THE 21ST CENTURY, *supra* note 41 at 37-38 (noting that in 1993, American companies in Penang had over 44,000 employees, while Taiwanese firms had less than 19,000).
63. *See Silicon Island*, *supra* note 59.
64. *See id.* (figure included in a table of "Penang's Industrial Spread," 1998).
65. *See* Chin & Keong, *supra* note 57, at 19; *see also* Koh Tsu Koon, *The Penang Strategic Development Plan*, *in* PENANG INTO THE 21ST CENTURY, *supra* note 41, at 1, 4 (citing the threat of increasing competition the new market economies in China, Indo-China, and Europe pose to Penang).
66. *See* P.Y. Lai, *Value-added Manufacturing: A New Paradigm*, *in* PENANG INTO THE 21ST CENTURY, *supra* note 41, at 51-52 (explaining how Integrated Manufacturing Centres (IMCs), which contain companies at all stages of the manufacturing process from product design to manufacturing to sales, will help provide the high-tech industry in Penang with the competitive edge it needs); *see also* Chin & Keong, *supra* note 57, at 19.
67. *See* AMCHAM, *supra* note 44, at 17.

While these figures provide the traditional starting point for analyses of the Malaysian economy, they overlook the highly significant and transformative role that women have played in the development of Malaysia's electronic infrastructure. Their stories form an integral part of Penang's history and future.

B. The Development of a Gender-Based Labor Force

As in other free trade zones,[68] women have formed the backbone of the labor force since the beginning of Penang's development.[69] At one point, women workers comprised nearly eighty percent of the workforce in Penang's electronic industry.[70] By the mid-1980s this proportion declined to roughly two-thirds of the total workforce as the percentage of low-level jobs dropped in proportion to the number of highly skilled or managerial positions, which are mainly held by men.[71] The continuing stratification of the labor force along gender lines is evident. In 1998, a survey of sixteen large multinational electronics companies in Penang showed that 77% of the jobs described as managerial, professional, supervisory, or technical were held by men, whereas women held 87% of the lower ranked clerical, general, skilled, and semi-skilled jobs.[72] Assembly workers fall into the semi-skilled labor category.[73]

The development of this highly divided labor force can be traced to the views shared by both multinational companies and the Malaysian government on race and gender.[74] The reasons why multinational companies have specifically targeted certain groups of worker can be roughly divided

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68. *See* ILO, *supra* note 34, at 20-21 (reporting that women make up the majority of workers in EPZs around the world; for example, in 1995, women workers comprised 80% of the employees in the free trade zones of Guatemala and Nicaragua).
69. *See* Lim, *supra* note 10, at 6-8 (stating that women have constituted a significant part of the Malaysian electronics industry's labor force since electronics companies first began to locate in Malaysia).
70. *See* Travis, *supra* note 37, at 190.
71. *See* Shanti Diariam, New Technologies and the Future of Women's Work in Asia 7 (1994) (unpublished report from the workshop New Technologies and the Future of Women's Work in Asia) (on file with author). Positions requiring higher education levels are usually offered to recent male graduates, while women assembly workers or operators are usually not given a chance to upgrade their skills and apply for these higher-level jobs. *See id.*; Jamilah Ariffin, *Economic Development and Women in the Manufacturing Sector*, *in* READINGS ON WOMEN AND DEVELOPMENT IN MALAYSIA, *supra* note 51, at 205, 210 [hereinafter Ariffin, *Economic Development*] (noting that by the 1970s at least 75% of employees in the Malaysian electronics industry were women).
72. *See* ALLEY, *supra* note 12, at 27 (providing the numerical data that the author used to compute the above percentages).
73. *See id.*; *see also* Ong, *Global Industries*, *supra* note 2, at 429-30 (illustrating the types of semi-skilled jobs available to Malaysian women in EPZs, including electronics assembly work).
74. *See* DEVINATZ, *supra* note 5, at 9-10 (describing multinational electronics companies' preferences for non-white women assembly workers based on sexual stereotypes of women as more patient and dexterous workers who can be paid less than men). *See also* GRACE, *supra* note 11, at 15 (noting the large amount of literature on the electronics industries' preference for female workers).

into three categories: physical stereotypes, social stereotypes, and economic positions.[75] In each category, gender and racial images are employed to create the image of the "ideal" assembly worker as a young, single, and meek Asian female.[76]

Employers have maintained that the highly precise nature of electronics assembly required workers with "nimble fingers, agile hands and keen eyesight."[77] Women, as evidenced by their skill at tasks like knitting and needlework, were ideal candidates for such labor. Adding a layer of racial imagery, it was felt that Asian women had "the smallest hands in the world."[78] Thus, the "fast-fingered Malaysian" became a competitive advantage for electronics firms.[79]

In addition to their physical qualifications, Asian women were thought to have the ideal social background for electronics assembly jobs.[80] The painstaking and tedious nature of assembly jobs requires employees with patience who would obey the demands of their supervisors and work accurately and efficiently for long periods of time.[81] As one employer put it, "[y]ou cannot expect a man to do very fine work for eight hours. . . . Our work is designed for females . . . if we employ men, within one or two months they'd run away . . . . Girls [sic] under thirty are easier to train and easier to adapt to the job function."[82] Asian women were supposed to be accustomed to life in a traditional patriarchal atmosphere and would have already learned to be respectful of authority.[83] Young Malay women from villages were considered more likely to have these qualities and were lured to factories with promises of work, adventure, company benefits, and cash incentives.[84] In this manner, employers' perceptions about the patriarchal structures and the role of women in

75. *See* LIN, WOMEN'S WORK, *supra* note 4, at 7 (examining, in selected countries, the concentration of women workers in the electronics industry).
76. *See* Lim, *supra* note 10, at 7; DEVINATZ, *supra* note 5, at 9-10.
77. LIN, WOMEN'S WORK, *supra* note 4, at 7.
78. Lim, *supra* note 10, at 7 (explaining that small hands are thought to be an advantage for assembly workers, whose jobs require manual dexterity and involve delicate, precise operations with extremely small electronics components).
79. *Id.*
80. *See* Cynthia H. Enloe, *Women Textile Workers in the Militarization of Southeast Asia*, *in* WOMEN, MEN, AND THE INTERNATIONAL DIVISION OF LABOR, *supra* note 2, at 407, 412-13 (discussing the supposed docility of Asian women as an attractive factor for multinational garment and electronic manufacturers and noting that this stereotype reflected the belief that the influence of patriarchal cultures made Asian women obedient to both their parents and factory managers).
81. *See* ONG, SPIRITS OF RESISTANCE, *supra* note 1, at 152.
82. *Id.* (quoting an engineer on corporate policy, from the author's survey of comments from corporate personnel in Malaysian electronics factories).
83. *See* LIN, WOMEN'S WORK, *supra* note 4, at 7 (examining the concentration, in selected countries, of women workers in electronics).
84. *See* Lim, *supra* note 10, at 13.

Asian families and societies enhanced the attractiveness of Asian women as the prime labor source for electronics companies.[85]

A third advantage of employing women was their economic position.[86] From the 1970s through the mid-1980s, while wages in Malaysia were already lower than wages in the U.S. or Europe, women's wages were even lower than men's, and their position in the labor force more precarious.[87] Women were also supposed to be temporary workers, who would leave outside employment when they married or had children.[88] In essence, they were perfect candidates for an industry that needed intense work for short periods of time, and required a flexible labor force that could easily be expanded or contracted.

Such a manipulation of physical, social, and economic characteristics to define and seek out the ideal assembly worker has been replicated around the world.[89] However, what is significant about this occurrence in Malaysia is the way in which the formation of this gender-based labor force in turn influenced, and ultimately became an integral part of, government policy.[90] In fact, it was the Malaysian government that issued the following lines in a now infamous investment brochure:

> The manual dexterity of the oriental female is famous the world over. Her hands are small and she works fast with extreme care . . . . Who, therefore, could be better qualified by nature and inheritance, to contribute to the efficiency of a bench-assembly production line than the oriental girl? No need for a Zero Defects program here! By nature, they "quality control" themselves.[91]

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85. *See* Enloe, *supra* note 80, at 412-13; Lim, *supra* note 10, at 12-14 (demonstrating how managers of multinational corporations often viewed Asian women as docile and subservient to patriarchal authority, stereotypes which supported their belief that Asian women would make ideal employees).

86. *See* Enloe, *supra* note 80, at 412-13 (describing how multinational manufacturing companies have been able to tap into women as a cheap and available source of labor).

87. *See* LIN, WOMEN'S WORK, *supra* note 4, at 6-7. Lin also cites statistics showing that in 1980, Malaysian electronics workers were paid in U.S. dollars an average of 42 cents an hour, as compared to $6.96 an hour in the U.S., and that in 1985, average wages were 75 cents in Malaysia and $12.59 in the United States. *See id.* at 7 (Table 1.2). Women were, and still are, also seen as temporary or supplemental workers who did not need to be paid as well, nor given the same advancement opportunities as men. *See id.* at 8. *See generally* Diariam, *supra* note 71, at 2-3 (noting that women in the electronics industry tend to enter the market unskilled, are more likely to face employment risks, and receive lower wages than men).

88. *See* Lim, *supra* note 10, at 11-12.

89. *See* Enloe, *supra* note 80, at 412-13 (describing how women have been similarly targeted as a cheap and malleable workforce by multinational manufacturing companies in the Philippines, South Korea, Taiwan, Hong Kong, and Singapore).

90. *See* GRACE, *supra* note 11, at 15-16 (explaining ways that gender biases influenced government policies concerning the Malaysian electronics industry; for example, when foreign companies' preference for female labor became apparent, the government passed laws or removed restrictions which had the effect of making female labor more accessible to the companies).

91. Lim, *supra* note 10, at 7. The brochure quoted by Lim was issued abroad by the Malaysian government to entice multinational electronic companies to locate in Malaysia.

The following section analyzes the ways in which gender and race can become embedded in the very laws that are supposed to protect and enhance workers' rights.

C. Gender, Race, and Law in Malaysian Government Policy

Clearly, the qualities of Malaysia's female labor force were not the only factors involved in attracting foreign investment. Nevertheless, this labor force became an important part of a government-designed package for foreign investment that included tax incentives, increased bureaucratic efficiency, and fewer restraints on capital and profits.[92] Foreign companies demanded well-trained and docile labor, and this is what the government began to provide.

Moreover, the government did not feel the need to accord to women electronics workers the "respect, status and material well-being commensurate with the industry's indispensability to economic policy" because of the pervading gender ideology of women as secondary and temporary workers.[93] Rather than protect its female workers, the government itself began to manipulate and exploit the gendered nature of the electronics labor force.[94] In this manner, the Malaysian government and legal system began to perpetuate the conditions that made women an attractive low-cost labor force.[95]

Government industrial relations and labor legislation deliberately favored the needs of multinational companies over workers.[96] The government did not set a minimum wage, nor did it try to rectify the considerable wage gap between men and women.[97] In order to appease foreign companies' demands for round-the-clock labor, the government ex-

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92. *See* ONG, SPIRITS OF RESISTANCE, *supra* note 1, at 146; *see also* Jean Larson Pyle & Leslie Dawson, *The Impact of Multinational Technological Transfer on Female Workforces in Asia*, 25 COLUM. J. WORLD BUS. 40, 42 (1990) (citing a researcher who concluded that Asian governments have viewed the female labor supply as their principal resource for industrial development).

93. GRACE, *supra* note 11, at 15-16.

94. *See* Lance Compa, *International Labor Standards and Instruments of Recourse For Working Women*, 17 YALE J. INT'L L. 151, 159-161 (1992) (illustrating the ways in which female workers are exploited in the electronics industry, and explaining how even in the face of international criticism the Malaysian government refused to enhance worker protections, maintaining that it had a right to put the preferences of the electronics industry above worker protection); *see also* Jamilah Ariffin, *Women Workers in the Manufacturing Industries*, *in* MALAYSIAN WOMEN: PROBLEMS AND ISSUES 49, 52 (Evelyn Hong ed., 1983) [hereinafter Ariffin, *Women Workers*] (noting that the Malaysian government relaxed or failed to enforce regulations regarding women workers in order to protect the interests of foreign investors).

95. *See* Ariffin, *Women Workers*, *supra* note 94, at 52, 55 (providing examples of cases where the government made it even easier for foreign companies to exploit low-cost female workers; for instance, it allowed firms to send recruiting agents to rural areas, thus encouraging women to migrate to cities, where they then enlarged the pool of low-cost labor available to electronics companies).

96. *See* ONG, SPIRITS OF RESISTANCE, *supra* note 1, at 146-47.

97. *See id.* at 147.

empted electronics companies from laws that forbade employing women to work at night.[98] Also, the government did not enforce many existing labor laws, including those regulating shift work.[99] As young, single women were thought to be the best workers, companies manipulated laws which were designed to protect pregnant workers, to discourage married women from applying for jobs.[100] In addition, the government enacted labor laws, or selectively applied existing ones, to effectively prohibit the formation of most unions in electronics factories, limiting an important means to recognize the employee's rights.[101] In these ways, the government helped Malaysian women become the efficient, low-cost, and available workforce that foreign investors sought.

The effects of this gendered and racial ideology, in both business and government, continues to have important consequences today. In analyzing policies affecting women electronics workers, or in designing strategies to overcome their problems, these underlying constructions of gender and race cannot be ignored. The next section will discuss the current problems facing women electronics assembly workers in Malaysia, and explore the most recent manifestations and consequences of this ideology of gender and race in the electronics industry.

D. Current Issues Facing Women Assembly Workers in the Malaysian Electronics Industry

Rapid industrialization and technological advances have tended to exacerbate, rather than improve, the stratification of labor in the Malaysian electronics industry. Increasing globalization has made Malaysian workers more vulnerable to capital flight, market dynamics, and ever-growing cost pressures.[102] The competitive threat from other countries seeking to benefit from the high-tech industry is rising.[103]

Several economic and technological trends in particular have increased the vulnerability of assembly workers in Malaysia. In line with the increasing decentralization of multinational firms,[104] more and more elec-

98. *See* GRACE, *supra* note 11, at 16.
99. *See* Diariam, *supra* note 71, at 3.
100. *See* ONG, SPIRITS OF RESISTANCE, *supra* note 1, at 147-48.
101. *See* GRACE, *supra* note 11, at 22-25; ONG, SPIRITS OF RESISTANCE, *supra* note 1, at 148.
102. *See* Lai, *supra* note 66, at 52-53 (describing current and projected increases in Malaysian wage rates which, combined with the emergence of lower cost economies in Vietnam, China, and India, threaten to make Malaysia a less-attractive location for labor-intensive manufacturing industries); *see also* Chin & Keong, *supra* note 57, at 19 (citing the growing competition that Penang's electronics industry is facing from countries like China with lower labor costs, at the same time that the costs of production are rising in Penang). *See generally* ILO, *supra* note 34, at 14-15 (describing how the pressures of globalization and a corresponding rise in international competition are forcing multinational companies to become increasingly decentralized and ready to move or expand according to market changes).
103. *See generally* ILO, *supra* note 34, at 3 (noting that more and more countries are seeking to attract foreign investment and are trying to expand their export processing zones).
104. *See id.*

tronics companies are subcontracting work to smaller firms.[105] As seen in the apparel industry, this allows companies to shift responsibility and liability for employment conditions and practices.[106] Moreover, in Malaysia, smaller, national firms are not subject to the higher employment, health, and safety standards that multinational companies have to meet, leading to reduced protection for these employees.[107] Workers in smaller firms are paid less,[108] and smaller firms can more easily exploit legal loopholes. For example, it has been reported that in some cases small firms have shut down after nearly five years of operation, and then reopened in order to evade the national laws which allow the formation of unions after the first five years of a firm's existence.[109]

Also, due to market pressures, electronics companies are increasingly relying on temporary or "casual" workers rather than full-time, salaried employees.[110] Temporary workers are severely disadvantaged as compared to full-time workers in the kinds of benefits they receive.[111] "Casual" workers are mostly women who do piece work or other home-based assembly work.[112] They lack the protection of the Malaysian Employment Act and social security laws, and may be working in inadequate environments lacking proper lighting or work conditions.[113] Due to the nature of their employment contracts, they are often the first to find themselves unemployed during market downturns.[114] The traditional image of women as secondary earners allows companies and governments to justify the lack of benefits and security they receive.[115]

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105. *See* Fernandez-Kelly, *supra* note 22, at 650 (calling subcontracting "the backbone of the electronics industry," and noting that more than half of the electronics companies in her study relied heavily on various forms of domestic and international subcontracting); *see also* Diariam, *supra* note 71, at 2 (noting the increase in the number of electronics firms subcontracting work in Malaysia).

106. *See* Ho et al., *supra* note 13, at 391.

107. *See generally* FEDERAL DEP'T OF TOWN AND COUNTRY PLANNING MINISTRY OF HOUS. & LOCAL GOV'T MALAYSIA AND UNIVERSITI PUTRA MALAYSIA, ENVIRONMENTAL GUIDELINES FOR THE MULTIMEDIA SUPER CORRIDOR (MSC): INVESTOR'S GUIDE 2 (undated) (describing how foreign corporations will be held to "world-class" standards, such as U.S., European or Japanese standards, while Malaysian firms will be subject to Malaysian standards).

108. *See* Diariam, *supra* note 71, at 2.

109. *See id.* at 3.

110. *See id.* at 2-3.

111. *See generally id.* at 2-3.

112. *See id.* at 5-6.

113. *See id.* at 6.

114. *See* Ariffin, *Economic Development*, *supra* note 51, at 212 (discussing the sharply fluctuating demands of the electronics industry in Malaysia for cheap, disposable labor, and how female workers are preferred for these jobs where they are promptly laid off when the market declines).

115. *See* GRACE, *supra* note 11, at 16 (describing how the perception of women as secondary or temporary workers allows the government to justify the lack of protection of their jobs or work conditions); Ariffin, *Economic Development*, *supra* note 51, at 212 (stating that in electronics companies, "[t]he management's view and assumption that women workers are secondary income earners provide rationality for their policy of paying lower wages to women workers and retrenching them during periods of slack market demand for their products"). *See generally Working Without a Net: Women and the Asian Financial Crisis*, GENDER MATTERS Q. (USAID

For women working as regular employees in established electronics firms, employment laws are frequently violated.[116] Not only are labor laws, such as those regulating maximum overtime, frequently disregarded and unenforced,[117] but companies can even obtain exemptions or waivers from the government from certain provisions of labor laws.[118]

Another important problem is the lack of advancement opportunities for women employees despite increasing numbers of high level positions. As career track and more highly skilled jobs open up, they are primarily filled by men.[119] Female assembly workers have little opportunity to enhance their skills and receive promotions.[120]

Perhaps the most pressing problem that these women face is in the area of health and safety. Although Malaysia passed a comprehensive Occupational Health and Safety Act in 1994,[121] the government is already facing charges that it is not being adequately followed or enforced.[122] While U.S. and Japanese companies appear to have strong health and

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Office of Women in Development, GenderReach Project, Washington, D.C.), Jan. 2000, at 6 (stating that in countries following the "Asian Model of Development," including Malaysia, "[w]omen are the last hired, the first fired, and the least likely to qualify for benefits offered by their employers or provided by their governments").

116. *See* Tan Pek Leng, *Women Factory Workers and the Law*, *in* MALAYSIAN WOMEN: PROBLEMS AND ISSUES, *supra* note 94, at 64-65 (describing the eagerness of the Malaysian government and legal system to misinterpret and disregard the law in order to promote the interests of foreign investors at the expense of female electronics workers).

117. *See* Amarjit Kaur, *An Historical Analysis of Women's Economic Participation in Development*, *in* READINGS ON WOMEN AND DEVELOPMENT IN MALAYSIA, *supra* note 51, at 3, 18 (discussing the lack of enforcement of Malaysian labor laws). *See* Leng, *Women Factory Workers and the Law*, *in* MALAYSIAN WOMEN: PROBLEMS AND ISSUES, *supra* note 94, at 64, 73-74 (listing instances of particularly egregious violations of Malaysian labor laws by electronics companies, such as forcing employees to work overtime against their will, and retaliating against those who refuse to work overtime; mislabeling overtime work as "overlap" shifts so companies would not have to pay overtime rates or conform to laws regulating maximum overtime; and forcing workers to take leave days during company shutdowns), and at 73 (noting that the government stood by idly while these violations occurred).

118. *See* Diariam, *supra* note 71, at 3; *see also* GRACE, *supra* note 11, at 14-15 (explaining how the Malaysian government has prevented workers in the electronics industry from unionizing by inconsistently applying labor laws for the benefit of companies).

119. *See* Diariam *supra* note 71, at 7.

120. *See id.*

121. For the full text of the act, see National Institute of Occupational Safety and Health (NIOSH) (Malay.), *Occupational Safety and Health Act 1994* (visited Jan. 28, 2000) <http://www2.jaring.my/niosh/law/act/osh_act.htm>.

122. *See* A. Kathirasen, *Flexibility Vital to Promote Conducive Occupational Environment*, NEW STRAITS TIMES, Aug. 8, 1998, at 2. The article describes a 1998 dispute between electronics workers and their employers, in which the employees charged that they were being forced to stand for over eight hours a day, straining their health and possibly violating the Occupational Safety and Health Act. *See id.* However, when the workers complained to the government, the Department of Occupational Safety and Health (DOSH) sided with the companies and excluded workers from their inquiry, generating criticism from affected workers, their representatives, and workers' organizations about the government's willingness to adequately enforce the law. *See id.* Anecdotal evidence also suggests that the government lacks the will and resources to effectively enforce the law. *See also* MASTIC, *supra* note 50, at 65 (1996) (describing the "manpower" (sic) shortage in all sectors that may hinder the government's productivity goals).

safety practices, it is unclear what level of monitoring is involved and what measures, if any, smaller Malaysian subcontractors follow.[123]

The health issues that assembly workers face are numerous. During the course of their work, they are exposed to many hazardous solvents and chemicals, which have reportedly caused respiratory illnesses, skin problems, and eyesight degeneration.[124] Exposure to these chemicals has also been linked to reproductive problems such as miscarriage.[125] Moreover, many of the effects of these chemicals on humans are unknown.[126] The particular demands of shift work and long work hours have also been connected to various stress-related illnesses, and problems related to non-ergonomically designed assembly lines.[127] These hazards make electronics assembly work a highly dangerous job in need of strict regulation.

In view of the severe health and safety risks, economic conditions, and hurdles to legal protection that Malaysian female assembly workers face, the task of identifying legal remedies and protections takes on added urgency. To this end, the experiences of women in other countries who occupy similar positions along the electronics assembly chain must also be recognized. The next section will analyze female electronics assembly workers in the United States and examine the emergence of a parallel workforce worlds away from Malaysia.

IV. WOMEN ELECTRONICS ASSEMBLY WORKERS IN THE UNITED STATES

Women assembly workers in the United States are also subject to a subordinating ideology predicated on gender and race. Their experiences

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123. *See* Ariffin, *Economic Development*, *supra* note 51, at 217 (describing the need for monitoring and research in the electronics industry). See, for example, *AMD Environmental, Health and Safety Report 1997* (visited Jan. 28, 2000) <http://www.amd.com/about/ about.html> [hereinafter *AMD*], for a statement by a U.S. company maintaining that the company follows the same environmental and safety standards abroad as in the United States.

124. *See* Khoo Hoon Eng, *Hazards Faced by Women at Work*, *in* MALAYSIAN WOMEN: PROBLEMS AND ISSUES, *supra* note 94, at 80, 82-83 (describing how the industrial and organic solvents used in the electronics industry, such as isopropyl alcohol and chloroform, can cause dermatitis, headaches, nausea, weakness, and perhaps even cancer, along with other symptoms and explaining that hand soldering work often required in electronics assembly may expose workers to poisonous fumes from metals like cadmium or zinc).

125. *See* LIN, WOMEN'S WORK, *supra* note 4, at 16; Marc Schenker, Epidemiologic Study of Reproductive and Other Health Effects Among Workers Employed in the Manufacture of Semiconductors, Final Report to the Semiconductor Industry Association, 1992 (on file with author).

126. *See* Byster & Smith, *supra* note 17 (noting that toxicity information is unavailable for more than half of the chemical substances used in the electronics industry); *see also* Judy Mann, *A Hard Look at the Health of Working Women*, WASH. POST, Sept. 18, 1998, at D20 (quoting Sheila Hoar Zahm of the National Cancer Institute, who notes that in new industries, such as the semiconductor industry, there are no studies yet available on the effects on women of exposure to workplace carcinogens).

127. *See* LIN, WOMEN'S WORK, *supra* note 4, at 10 (citing studies by Grossman (1978), Lim (1978), Woon (1982), and Paglaban (1978)), *and* at 15 (discussing the repetitious and detailed manual work required on electronics assembly lines that can lead to ergonomic problems).

mirror those of Malaysian women situated in similar racial and gender systems, providing a revealing look at the way women in the United States can also be trapped in the high-tech underclass.

Currently in Silicon Valley women are thought to comprise between eighty and ninety percent of the workforce in low-skilled assembly jobs, and are greatly underrepresented in management positions.[128] While in many ways these numbers reflect the status of women in the American workforce as a whole, the composition of the electronics industry is also significant because of the large numbers of immigrants who have entered this industry, particularly in Silicon Valley.[129] Many of these immigrants have been able to parlay their previous education or skills into high-paying and high-status jobs.[130] Others, however, have become trapped in jobs similar in nature, prospects, and hazards to assembly lines in the countries they left behind.[131] In an area fueled by the wealth of high technology, these jobs are part of high-tech's "hidden" labor[132] that most Americans never see.

Today, Silicon Valley contains several hundred electronics assembly houses, which constitute the largest concentration of assembly houses in the United States.[133] The workers of choice on these assembly lines are immigrants. In addition, "[i]mmigrant women constitute about seventy percent of the entry-level labor force in Silicon Valley."[134] Still others work at home, doing contract-based piecework.[135] "I call them Vietnamese mother-in-laws, people who can't get into the general workforce,"

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128. *See* DEVINATZ, *supra* note 5, at 9 (citing studies estimating that "approximately 83 percent of all professional workers and technicians employed in Silicon Valley semiconductor companies are Anglo-American males" and studies estimating that the lowest skilled production jobs are composed of 80-90% women).

129. *See* Tom Abate, *Laboring in the Silicon Jungle Activists Charge High-Tech Industry With Exploiting Mainly Immigrant, Female Employees*, S.F. EXAMINER, Apr. 25, 1993, at E1 [hereinafter Abate, *Laboring in the Silicon Jungle*] (quoting a researcher who states that immigrant women constitute about 70% of the entry-level labor force in Silicon Valley); Ken McLaughlin & Ariana Eunjung Cha, *Power: Politics and the Workplace Divisions: Segregation Trends Emerge in High-Tech Industry, Experts Say*, SAN JOSE MERCURY NEWS, Apr. 16, 1999, at 1A (suggesting that large numbers of immigrants have entered the high-tech industry in California).

130. *See* McLaughlin & Cha, *supra* note 129 (citing a survey showing that 10% of the CEOs of Silicon Valley's top 150 companies are Asian, and the white-collar workforce in Silicon Valley is 31% Asian, although citizens and immigrants of Asian ancestry have been lumped together); *see also* Paul Ong & Tania Azores, *Asian Immigrants in Los Angeles: Diversity and Divisions*, *in* THE NEW ASIAN IMMIGRATION IN LOS ANGELES AND GLOBAL RESTRUCTURING 100, 111 (Paul Ong et al. eds., 1994) (describing how many highly skilled Asian immigrants, especially those entering the United States after 1965, have been able to find high-level managerial or professional jobs commensurate with their skills in the United States).

131. *See generally* Eric Lai & Theresa C. Viloria, *supra* note 9, at 32 (describing how Vietnamese and Filipino immigrants came to dominate the lowest-paying and most dangerous high-tech jobs in Silicon Valley). They note that "Vietnamese and Filipino women working in electronics and high-tech jobs earn the lowest average salaries in [Silicon] Valley." *Id.*

132. Ewell & Ha, *High-Tech's Hidden Labor*, *supra* note 7 (describing predominantly Asian immigrant piecework home assembly workers as a "hidden" labor force).

133. *See id.*

134. *See* Abate, *Laboring in the Silicon Jungle*, *supra* note 129 (quoting Karen Hossfeld).

135. *See* Ewell & Ha, *High-Tech's Hidden Labor*, *supra* note 7.

says one employer, describing his home-based employees.[136] The origins of this hidden workforce lie again in the economic and political forces that have shaped the current structure of the electronics industry.

A. The Development of A Divided Workforce

Although, as noted earlier, the electronics industry began to shift much of its production work overseas in the 1960s, a significant portion of this work was kept close to home. Faced with intense competition, electronics companies needed a quick and convenient source of labor for short-term projects or prototypes, so some assembly jobs remained in Silicon Valley to fill this role.[137] As the electronics industry expanded, the percentage of these assembly jobs in the industry declined drastically, but the actual number of these jobs has remained relatively constant, leaving a significant number of women in the United States doing production work that "closely resembles the same 'low-tech' labor done by their 'sisters' overseas."[138]

This "low-tech" labor force is highly stratified along racial and gender lines. Women and minorities are concentrated in the jobs with the least opportunities and benefits, while white males hold most of the high-level jobs.[139] Immigrant women are preferred over immigrant men for the lowest level jobs.[140] The most common countries of origin are Mexico, Vietnam, the Philippines, and Korea, though immigrants from many developing countries are represented.[141] Also, while electronics assembly

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136. *Id.*

137. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 153; Ewell & Ha, *High-Tech's Hidden Labor*, *supra* note 7.

138. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 153. As discussed below, male immigrant employees generally have greater career prospects, are paid more, and are promoted more than female immigrant employees. *See id.* at 167-68; Naomi Katz & David S. Kemnitzer, *Women and Work in Silicon Valley*, *in* MY TROUBLES ARE GOING TO HAVE TROUBLE WITH ME 209, 210 (Karen Brodkin Sacks & Dorothy Remy eds., 1984) (noting that immigrant women make up most of the low-level production workers in the Silicon Valley electronics industry).

139. *See* DEVINATZ, *supra* note 5, at 9 (noting that the jobs in Silicon Valley are largely segregated by race and gender; white men occupy more than 80% of the managerial and technical positions with the greatest power and incomes, while nonwhite men, mostly immigrants, occupy the middle rung of this wage structure, and minority women, again mostly immigrants, occupy most of the least skilled and lowest paid jobs); *see also* Karen J. Hossfeld, *Hiring Immigrant Women: Silicon Valley's "Simple Formula,"* *in* WOMEN OF COLOR IN U.S. SOCIETY 65, 72 (Maxine Baca Zinn & Bonnie Thornton Dill eds., 1994) [hereinafter Hossfeld, *Hiring Immigrant Women*] (describing the proportion and distribution of racial minorities in the electronics industry).

140. *See* Hossfeld, *Hiring Immigrant Women*, *supra* note 139, at 74 (reporting that employers in her study indicated that they preferred immigrant women over immigrant men for assembly work, due to the beliefs that women could afford to work for less pay and that their physical characteristics, such as smaller size, made them better suited to assembly work than men).

141. *See id.* at 66; Sucheta Nazumdar, *General Introduction: A Woman-Centered Perspective on Asian American History*, *in* MAKING WAVES: AN ANTHOLOGY OF WRITINGS BY AND ABOUT ASIAN AMERICAN WOMEN 1, 19 (Asian Women United of Cal. ed., 1989) (noting that about half of the women electronics workers in Silicon Valley are Filipinas, Vietnamese, Koreans, and South Asians).

workers in Malaysia are predominantly young and single,[142] Silicon Valley assembly workers have historically included large numbers of married women across a wider age range.[143]

The reasons behind these characteristics are quite telling and reveal much about the status and structure of assembly work in the economy of Silicon Valley. The preference for immigrants, for example, is a reflection of the low status of many immigrants in the U.S. economy, much like the female labor force in Malaysia. Because of their precarious financial positions, their lack of knowledge about wage rates and U.S. labor protections, and the comparison of their present wages to the lower ones in their homelands, immigrants are often willing to accept lower wages, allowing electronics companies to keep wages and benefits low.[144]

Stereotypes also play a large role. Electronics companies claim that immigrants are the only ones willing to take assembly jobs, but studies have shown that white American applicants are often deliberately discouraged from taking such jobs.[145] Hiring personnel claim that most men and white women are not suited for tedious assembly line work, and encourage such applicants to apply for management or professional positions.[146] Companies also use language barriers to control immigrant employees.[147] Managers also believe that immigrants unfamiliar with the English language and the American legal system will be less familiar with occupational health and safety laws, and will be less likely to organize or

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142. *See* ONG, SPIRITS OF RESISTANCE, *supra* note 1, at 148.

143. *See* Susan S. Green, *Silicon Valley's Women Workers: A Theoretical Analysis of Sex-Segregation in the Electronics Industry Labor Market, in* WOMEN, MEN, AND THE INTERNATIONAL DIVISION OF LABOR, *supra* note 2, at 273.

144. *See* Rebecca Villones, *Women in the Silicon Valley, in* MAKING WAVES: AN ANTHOLOGY OF WRITINGS BY AND ABOUT ASIAN AMERICAN WOMEN, *supra* note 141, at 172, 173; *see also* Ewell & Ha, *High Tech's Hidden Labor*, *supra* note 7 (stating that immigrants are often unaware of the protections offered by U.S. laws and prevailing wage rates, and thus are sometimes "grateful" for such work).

145. *See* Hossfeld, *Hiring Immigrant Women*, *supra* note 139, at 77 (describing the author's experience as a white, North American woman applying for assembly jobs, reporting that she was repeatedly told by personnel directors that the work would not suit her because she was "an American"); *see also id.* (relating that another white, North American researcher faced similar reactions when she applied for assembly jobs).

146. *See id.* The author describes the experiences of White North American women and men who applied for assembly jobs who were told that they were better suited to professional positions. When she applied, the author was told that assembly work would not suit her and that she would be much happier at a professional job, because she was an American. *See id.* Also, female students with foreign accents who called to inquire about entry-level positions at production plants were told that there might be jobs available three times more often than male students with Anglo accents. *See id.*

147. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 173-74 (noting that electronics companies have been known to separate workers who speak the same language to minimize socializing and solidarity). Other companies employ language as a method of control by hiring supervisors who speak the same language as assembly workers, thus reinforcing the supervisors' power over the workers. *See* McLaughlin & Cha, *supra* note 129 (quoting a Vietnamese émigré who runs an assembly contract firm, "I speak Vietnamese and my workers speak Vietnamese. I have control. . . . [i]f I also hired Hispanics, it would be very difficult to control them").

protest.[148] Employers thus not only spend less on wages for immigrant workers, but are also able to exert greater control over them.[149]

Among these immigrant workers, women are preferred for some of the same reasons that companies seek out Malaysian women. As in Malaysia, employers in the United States can capitalize on the secondary status of women and immigrants in the American workforce.[150] While immigrants in general accept lower pay, immigrant women also fit employers' notions of women as a flexible, reserve source of labor who can justifiably be paid lower wages or be hired only "temporarily."[151] The declining supply of unmarried women workers in the United States has forced employers since the 1970s to hire married women and women with children,[152] while in Malaysia the number of unmarried women workers is increasing.[153] These trends are exacerbated by the highly competitive nature of the electronics industry which drives employers to seek out the cheapest and most flexible labor.[154] Immigrant women, in other words, are a cheap and expendable workforce, suited to the demands of the industry.[155]

Unfortunately, like their counterparts in Malaysia, employers in the United States often view Asian immigrant women through the lens of racial prejudice. The stereotypes of "nimble fingers" and passive personalities operate in the United States as well,[156] though perhaps not as blatantly. Stereotypes of Asian women are employed in ways that devalue the work and lifestyles of the workers. For instance, a study by Karen Hossfeld showed that white managers consistently referred to Asian work-

148. *See* Hossfeld, *Hiring Immigrant Women*, *supra* note 139, at 78 (describing how immigrants often have little experience with organizing, and are also seen as "unlikely to 'make waves' against any part of the American system for fear of jeopardizing their welcome").

149. *See* Villones, *supra* note 144, at 173 (noting that employers often pay immigrants lower wages); *see also* McLaughlin & Cha, *supra* note 129 (describing ways electronics employers exert control over their employees).

150. *See* Green, *supra* note 143, at 281-86 (discussing possible explanations for the predominately female workforce in the electronics industry).

151. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 163.

152. *See* Green, *supra* note 143, at 287.

153. *See* Tiun Ling Ta & Marsitah Mohd Radzi, DEMOGRAPHY AND THE DEVELOPMENT OF PENANG ISLAND: SURVEY ON FAMILY, WOMEN AND WORK 28 (1994) (noting that more and more Malaysian women are choosing to work and postpone marriage); *see also* MAMAT, *supra* note 45, at 37 (noting that the rate of participation and numbers of women in the labor force in Malaysia are increasing).

154. *See* Fernandez-Kelly, *supra* note 22, at 634-635 (describing the increasingly competitive nature of the electronics industry, and the ability of electronics companies to relocate in search of cheaper labor).

155. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 157; *see also* Fernandez-Kelly, *supra* note 22, at 665 (reporting findings that electronics companies are increasingly tapping into a labor force of immigrant and minority women).

156. *See* Green, *supra* note 143, at 292; Hossfeld, *Hiring Immigrant Women*, *supra* note 139, at 74 (citing managers and employers who stated that immigrant women are particularly suited to tiring and detailed electronics assembly work because of their patience, coordination, and small size).

ers as "girls," while non-Asian workers were "women."[157] One manager explained,

> Asian women are more subservient than American females: if I refer to them as 'girls' it's because to me, they act like girls: They only speak when spoken to, do exactly as they are told, and so forth. So I play into it—I treat them firmly like a father figure . . . .[158]

Such "docility" and fear of reprisals appears attractive to employers in an industry where unions and activism have been shunned.[159]

Through such stereotyping, images of Asian immigrant women are molded into an American version of the ideal employee. Perhaps even more disturbing is the way these images of Asian immigrant women have become twisted and adopted into corporate and government policy, thus intensifying the denial of their rights. These processes will be discussed below.

B. Gender and Race in Law and Corporate Policy

At the corporate level, images of Asian immigrant women have allowed employers and managers to create manipulative strategies to control the women.[160] Managers have used perceptions of the worker's femininity against them.[161] For example, employers have been known to characterize union action or assertiveness as inappropriately unfeminine behavior.[162] Also, employers are able to call the precise and detailed work involved in electronics assembly "unskilled" work because they are able to successfully equate it with skills that these women are already supposed to have—assembly work is compared to "following a recipe" or knitting, and the tolerance for tedious work that assembly workers need to have is something that Asian women are assumed to have as an ingrained skill.[163] Asian immigrant women are supposedly "suited" by temperament and economic position for the jobs that are perceived to be too low-paid and boring for white native-born women.[164] Once a task is classified as un-

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157. *See* Edward Jang-Woo Park, Asian Americans in Silicon Valley: Race and Ethnicity in the Post-industrial Economy 118 (1992) (unpublished Ph.D. dissertation, University of California, Berkeley) (on file with the U.C. Berkeley Library).
158. *Id.*
159. *See* Villones, *supra* note 144, at 173-74; *see also* Park, *supra* note 157, at 122 (stating that the image of Asian women as docile and silent "has made them indispensable in an industry that is constantly worried about workers organizing").
160. *See* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 156-57.
161. *See id.* at 158-62.
162. *See id.* at 161.
163. *See* Katz & Kemnitzer, *supra* note 138, at 210.
164. *See* Hossfeld, *Hiring Immigrant Women*, *supra* note 139, at 77. There is also evidence that employers do not distinguish between Asian American and Asian immigrant women, often perceiving both as "foreign." *See id.* at 78.

skilled, the workers who do it can be paid less than they would for comparable "skilled" work.

Other tactics devalue these tasks as women's work, and operate to deny Asian immigrant women opportunities for advancement or skill acquisition. Most assembly jobs are viewed by employers, and often employees, as "temporary" or supplemental jobs, though they often do not turn out to be.[165] The devaluation of immigrant women's work itself seems to underlie employers' view of assembly work as temporary. As one electronics factory owner stated, "Let's face it, when you have to expand and contract all the time, you need people who are more expendable. When I lay off immigrant housewives, people don't get as upset as if you were laying off regular [sic] workers."[166]

Even when assembly jobs become long-term positions,[167] these images allow employers to reduce the opportunities available to immigrant women. By portraying assembly work as temporary and as women's work, employers can justify the lack of training and advancement opportunities that assembly workers receive.[168] Male workers are promoted faster, and men, especially white men, are often hired to supervise the very female workers who will then have to train them, underscoring the fact that female assembly workers could have just as easily been trained to be supervisors.[169] One employee described the limiting stereotypes at work:

> Most managers automatically feel that the assembly job is the highest aspiration Asian American women have. When [managers] see a white women [sic] as an assembler, they feel that she looks out of place—she should be in the office. When they see an Asian American man, they feel he looks out of place—he should be an engineer. But for Asian American women—it seems logical she should only be an assembler. This perception contributes to limiting the mobility of Asian American women in the industry.[170]

Thus, by assuming that Asian immigrant women are best "suited" to assembly line jobs, employers reinforce racial and gender stereotypes and limit these women's opportunities by making the lowest-level jobs the only jobs that are available to them.[171]

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165. *See* Katz & Kemnitzer, *supra* note 138, at 211; *see also* Hossfeld, *Their Logic Against Them*, *supra* note 9, at 163 (pointing out that nearly 80% of the female assembly workers in her study were the primary wage earners in their families).
166. Hossfeld, *Hiring Immigrant Women*, *supra* note 139, at 78.
167. *See* Lai & Viloria, *supra* note 9, at 32-33 (giving examples of Vietnamese and Filipina women immigrants who have worked on the electronics assembly lines in Silicon Valley for decades).
168. *See id.*
169. *See* Katz & Kemnitzer, *supra* note 138, at 211.
170. Park, *supra* note 157, at 122 (quoting a Korean American supervisor in the electronics industry). The terminology used here suggests that similar stereotypes operate against Asian American women as well as Asian immigrant women.
171. *See* Hossfeld, *Hiring Immigrant Women*, *supra* note 139, at 79.

Not only are Asian women's race and gender used to control and deny privileges to them as workers, but the precarious position of many undocumented immigrant women in the legal system is also manipulated to further marginalize their position in the electronics industry. Most undocumented workers labor at the margins of the Silicon Valley assembly line.[172] Both legal and undocumented immigrants have been employed by the electronics industry to assemble transistors, circuitry, or other electronic devices at home, a system called piecework or "home work."[173] This type of "home work" has been traditionally associated with women's work and the devaluation associated with this characterization.[174] The extent of this work by undocumented workers is unknown, though the majority are said to be Asian immigrants.[175] The undocumented workers often keep silent in the face of abuses, and are not able to benefit from U.S. laws in many situations.[176] For example, sending piecework to the homes of immigrants allows companies to evade overtime and minimum wage laws, since no one is monitoring who is working and for how long.[177] Also, there is no one to monitor health and safety, or provide safety precautions, even though dangerous chemicals may be required.[178] Finally, home workers do not get the benefits that salaried factory workers do.[179] These violations are a concern for legal immigrants who do such home work as well.

C. Current Issues Affecting the Rights of Electronics Assembly Workers

In addition to the concerns undocumented workers face, other recent developments effectively reduce assembly workers' rights and legal recourses. One is the industry's increasing reliance on subcontractors and contract workers.[180] Women are favored as temporary contract workers, and, as such, usually do not get the medical or other benefits that regular

172. *See* Miranda Ewell & K. Oanh Ha, *High-Tech Firms Reap Benefits of Products' Home Assembly*, SAN JOSE MERCURY NEWS, June 28, 1999, at A1 [hereinafter Ewell & Ha, *High-Tech Firms*].

173. *See* Katz & Kemnitzer, *supra* note 138, at 213.

174. *See* EILEEN BORIS, HOME TO WORK: MOTHERHOOD AND THE POLITICS OF INDUSTRIAL HOMEWORK IN THE UNITED STATES 1-2 (1994).

175. *See* Ewell & Ha, *High-Tech Firms*, *supra* note 172.

176. *See id; see also* Hiroshi Motomura, *Federalism, International Human Rights, and Immigration Exceptionalism*, 70 U. COLO. L. REV. 1361, 1385-92 (describing some of the very limited constitutional rights that undocumented immigrants have in comparison to citizens or documented immigrants).

177. *See* Ewell & Ha, *High-Tech's Hidden Labor*, *supra* note 7.

178. *See id.* Note that a 1980 government investigation revealed that many Silicon Valley electronics companies have discontinued "home work." *See id.*

179. *See id.*

180. *See* CHRIS BENNER ET AL., WALKING THE LIFELONG TIGHTROPE: NEGOTIATING WORK IN THE NEW ECONOMY at iii-iv (1999) (describing the growing trend of technology companies in California using contract or temporary workers for whom they are far less likely to provide health care, pension, or other benefits).

workers do.[181] Also, if the experience of Malaysian women offers any examples, it is that the use of subcontractors can allow a company to shift responsibility and liability for its actions, no small fear in an industry known for its use of toxic chemicals.

Further, in an industry that changes as rapidly as the electronics industry, it is difficult for government regulators to enforce current laws, and even more difficult for them to modify existing regulations to cover ever-changing processes. In other words, the pace of technological innovation is so rapid that traditional regulatory methods, such as those of government administrative agencies or legislative bodies, simply cannot keep up.[182] Thus, environmental and health laws may not provide adequate protection for many assembly workers. Indeed, many of the problems that assembly workers face can be traced to these inadequate protections.[183]

Like women in Malaysia, some of the most pressing problems that assembly workers in Silicon Valley face are related to health and safety. In some ways, work in U.S. factories may be even more hazardous because of the more chemical-intensive processes in use.[184] Assembly workers may be exposed to dangerous organic solvents, such as xylene and methylene chloride, as well as other chemicals which may cause neurological, vision, or reproductive damage.[185]

Immigrant women in the factories of Silicon Valley echo the same complaints that Malaysian assembly workers describe. For example, the women complain of noise pollution, eye strain, and injuries from repetitive motions.[186] They also cite respiratory and allergy problems from exposure to chemicals and fumes.[187] Workers are sometimes not told what chemicals they are working with, making self-protection measures diffi-

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181. *See* Ewell & Ha, *High-Tech's Hidden Labor*, *supra* note 7; *see also* BENNER ET AL., *supra* note 180.

182. For example, the Occupational Safety and Health Administration (OSHA) has admitted that its regulations are inadequate to protect workers in the semiconductor industry from dangerous chemicals. Among other problems, most of OSHA's regulations were designed over thirty years ago, nearly a decade before the semiconductor industry began its rapid growth, and long before the processes in use today were invented. *See* Smith & Schmit, *supra* note 126.

183. *See* Byster & Smith, *supra* note 17 (explaining the difficulty of instituting effective health and safety measures because of the rapid technological changes in the electronics industry, and how this inadequacy leaves many workers unprotected from the risks of exposure to hazardous chemicals, gases, and metal fumes).

184. *See* Judy Mann, supra note 126, at D20; *see also* Byster & Smith, *supra* note 17 (describing the chemicals that electronics industry employees may be exposed to in the workplace).

185. *See* Donna Mergler et al., *Visual Dysfunction Among Former Microelectronics Assembly Workers*, 46 ARCHIVES OF ENVTL. HEALTH 326, 326 (1991); Byster & Smith, *supra* note 17 (listing the various materials to which electronics workers may be exposed and some of the health problems that have been linked to those materials).

186. *See* Sonja Kim & Helen Kim, *AIWA San Jose Members Step Up Environmental Health and Safety Project*, AIWA NEWS (Asian Immigrant Women Advoc., Oakland/San Jose, Cal.), Nov. 1996, at 2, 2-3 (findings from surveys of women participating in AIWA's Environmental Health and Safety Project).

187. *See id.*

cult, and are often not able to prove that their illnesses are work-related because doctors do not have experience in assessing the effects of the chemicals they have been exposed to.[188] Recent studies have also shown that women working in some types of electronics factories have a higher risk of miscarriage.[189]

However, unlike women in Malaysia, assembly workers in the United States have access to a more comprehensive and more readily enforced body of legal protection. These provisions, along with the relevant Malaysian legal structure, will be discussed in the following section.

V. AN INTERNATIONAL LEGAL FRAMEWORK FOR RECOGNIZING THE RIGHTS OF WOMEN ON THE GLOBAL HIGH-TECH ASSEMBLY LINE

The previous sections have surveyed the origins, development, and maintenance of the stratified assembly workforces that have developed in the United States and in Malaysia. This section will expand on those analyses. Part A will examine the Malaysian and U.S. regulatory systems intended to protect the rights of assembly workers and compare their strengths and weaknesses. Part B will explore and evaluate the international legal remedies available, including public and private international law and strategies such as voluntary initiatives. Starting with domestic law is illustrative because comparisons between these systems reveal the relative weaknesses of each country's labor and health and safety regulations.

A. Domestic Laws

1. Malaysian Laws

In Malaysia, perhaps the biggest legal and regulatory hurdle is enforcement. The Malaysian government is trying to balance rapid economic development with the task of building a legal structure to accommodate these changes, and does not have the resources to enforce all laws or punish most violations.[190]

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188. *See Peer Health Promoter Network*, AIWA NEWS (Asian Immigrant Women Advoc., Oakland/San Jose, Cal.), Sept. 1998, at 4, 4 (noting some of the problems that the women in the AIWA Peer Health Promoter Network have reported); *see also* Byster & Smith, *supra* note 17 (noting that electronics companies often withhold information on the chemicals and materials in use for proprietary reasons, and also that the health effects of many chemicals in commercial use in the industry are unknown).

189. *See* Schenker, *supra* note 125, at ix (describing the risk of miscarriage for women working in semiconductor fabrication plants).

190. *See* MASTIC, *supra* note 50, at 65 (1996) (explaining how the rapid growth of the Malaysian economy has contributed to a shortage of "manpower" in all sectors).

The primary law setting out the rights of workers in Malaysia is the Employment Act of 1955 (with subsequent amendments).[191] Of great significance to women assembly workers is the fact that there is no provision mandating equal pay for equal work, so under this Act, it would not be unlawful for an employer to pay female employees less than male employees doing the same job.[192] Moreover, there is no minimum wage law for the manufacturing sector,[193] and the role of unions is greatly circumscribed.[194] Unions may be disallowed for the first five years of a company's operations, and trade unions are not allowed to be affiliated with national unions.[195] Furthermore, the government has waived many of the Employment Act's provisions for electronics companies, and many of the remaining provisions are not enforced.[196] Also, since many assembly workers, like home-based or contract workers, are not covered by the Act, it is of limited use for the protection of women assembly workers.[197]

In the area of health and safety, Malaysia passed an Occupational Safety and Health Act in 1994.[198] The Act is intended to provide a "legislative framework to promote, stimulate and encourage high standards of safety and health at work," and supersedes existing laws pertaining to health and safety.[199] Since the Act is relatively recent, many of the provisions have not yet been implemented, and enforcement is a problem.[200] However, because it is relatively comprehensive on paper,[201] the Act does have great future potential.

Even with these laws on the books, there are formidable barriers towards recognizing and enforcing the rights of assembly workers. Activists recognize a reluctance among women workers to complain, as well as a

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191. The full text of the Act is available at: <http://natlex.ilo.org/txt/E55MYS01.htm>.

192. *See* MAMAT, *supra* note 45, at 47 (noting that there is no provision in the Act making it illegal for employers to pay women employees less than men doing the same type of work, so the principle of equal pay for equal work has not been legally adopted in Malaysia).

193. *See* ILO, *supra* note 34, at 26.

194. *See id.* (noting Malaysian trade unions "may not negotiate on matters relating to promotion, transfer, recruitment, retrenchment, dismissal, reinstatement, and allocation of duties").

195. *See id.*

196. *See* Kaur, *supra* note 117, at 3 (noting that weak enforcement of Malaysian labor laws facilitates the exploitation of women workers by multinational companies); Diariam, *supra* note 71 (noting that the Minister of Human Resources has the power to exempt firms from complying with provisions of the labor laws).

197. *See* Diariam, *supra* note 71.

198. *See* NIOSH, *supra* note 121.

199. *See* NIOSH, *Contents of Occupational Safety and Health Act* (visited Mar. 31, 2000) <http://www2.jaring.my/niosh/law/act/act_ind.htm>.

200. *See* Diariam, *supra* note 71.

201. It is at least as comprehensive as European and U.S. occupational health and safety laws, since it was modeled after them. *See* NIOSH, *supra* note 121. It remains to be seen, however, how effective it will be in practice. *See, e.g.*, Kathirasen, *supra* note 122, at 2 (reporting a recent incident where company compliance with and government enforcement of the Act faced criticism).

lack of acknowledgment of the potential hazards of assembly work.[202] Moreover, many workers are not aware of their rights or how to enforce them.[203] In addition, workers and non-governmental organizations (NGOs) do not have access to data or information about safety and health problems in the factories.[204] There are no public disclosure mechanisms, and any disclosure of chemicals used is usually accomplished through voluntary corporate action.[205] European, Japanese, and U.S. companies maintain that they voluntarily exceed local regulations in applying the same standards in Malaysia as those required in their own countries.[206]

Consequently, in Malaysia, the primary means of enforcing the rights of women assembly workers is through educational campaigns by NGOs[207] and government departments or ad-hoc protests and complaints, which are highly important strategies since public awareness is very low.[208] Again, it is difficult for the groups themselves to obtain the necessary information, and they are constrained by a lack of resources.[209] Thus, while the Malaysian electronics industry is rapidly approaching the world's highest technological standards, its legal standards and enforcement levels lag far behind.

2. U.S. Laws

The situation in the United States is very different, though still inadequate in certain areas. Assembly workers in Silicon Valley can turn to a comprehensive system of federal, state, and administrative regulations. These include the California Injury and Illness Prevention Program, CAL/OSHA standards, the Hazard Communication Standard, and a variety

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202. *See* Davaki Arumugam, *Persatuan Sahabat Wanita Selangor*, *in* NEW TECHNOLOGIES AND THE FUTURE OF WOMEN'S WORK IN ASIA: WORKSHOP REPORT 38, 38-39 (Cecilia Ng Choon Sim & Anne Munro Kua eds., 1995) (describing employers' lack of desire to recognize potential health risks).

203. *See id.* at 39 (describing the necessity of educating women about their rights and about the ways they can control the effects of technology); Kaur, *supra* note 117, at 19; *see also* Leng, *supra* note 116, at 68-69 ("[M]ost workers [in the Malaysian electronics industry] are not informed of the labour laws. Often, they do not even realize that their rights have been violated. Even given that they know they have been wronged and want to lodge a complain[sic], they have no idea how to go about it.").

204. *See* Arumugam, *supra* note 202, at 39.

205. *See id.*

206. *See, e.g.*, *AMD*, *supra* note 123, at 1 (indicating in its annual report that U.S. semiconductor company AMD uses "Best Practices" standards in the U.S. and abroad).

207. *See, e.g.*, SAHABAT ALAM MALAYSIA (SAM), *Preface* to HAZARDOUS INDUSTRIES AND WORKERS HEALTH: PROCEEDINGS OF THE NATIONAL SEMINAL ON WORKERS HEALTH AND SAFETY PROBLEMS IN MALAYSIA (1986) (suggesting that public interest organizations such as SAM can play a role in encouraging health and safety for workers).

208. *See* Ismail, *supra* note 12, at 120-121; *see also* GRACE, *supra* note 11, at 20-21 (describing a protest carried out by laid off electronic factory workers in the Bayan Lepas Free Trade Zone during 1985 and 1986 when workers conducted a 32-day picket along with sit-ins to protest their treatment and draw attention to their plight); Leng, *supra* note 116, at 68-69 (discussing electronics industry workers' frequent lack of awareness of their legal rights).

209. *See* Arumugam, *supra* note 202, at 39.

of state and federal laws governing wages, hours, and other occupational health and safety issues.

The cornerstone of workers' rights and protection in California is the Injury and Illness Prevention Program (IIPP), implemented in 1991.[210] Under the California Occupational Safety and Health Act of 1973, every employer has a legal obligation to provide and maintain a safe and healthful workplace.[211] The IIPP expands this obligation for employers like electronics companies who deal with hazardous substances, requiring such employers to design and maintain a written and effective Injury and Illness Prevention Program.[212] Under this program, employers must provide health and safety training to employees, inform them of hazardous situations, act promptly to rectify problems, and keep adequate records of hazardous substances and problems.[213]

CAL/OSHA standards are intended to provide another level of protection.[214] These standards implement at the state level the provisions of the federal Hazard Communication Standard (HAZCOM).[215] Adopted in 1983, HAZCOM requires chemical manufacturers and employers who use dangerous chemicals to assess their hazards and disclose this information to their employees and/or customers through the use of warning labels, information sheets, and other methods.[216] CAL/OSHA provisions regulate worker's exposure levels to dangerous chemicals,[217] and cover other standards related to work environments such as ventilation[218] and temperature.[219]

To enforce these standards, OSHA's compliance officers can inspect workplaces and issue citations and fines for violations of these standards.[220] While this appears to be an effective system, it is often rendered ineffective because of the small numbers of chemicals and hazards that OSHA has identified as needing such regulation.[221] For electronics companies, especially semiconductor manufacturers, this problem is particularly

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210. *See* CAL. CODE REGS. tit. viii, § 3203 (1995) (effective 1991).
211. *See* CAL. LAB. CODES § 6300, 6307 (West 1929) (authorizing health and safety standards and giving the state Division of Occupational Safety and Health the power to enforce them).
212. *See* CAL. CODE REGS. tit. viii, § 3203(a) (1995); *see also* CAL/OSHA CONSULTATION SERVICE, GUIDE TO DEVELOPING YOUR WORKPLACE INJURY AND ILLNESS PREVENTION PROGRAM, ABOUT THIS GUIDE (1998).
213. *See* CAL. CODE REGS. tit. viii, §3203 (a)(2), (3) and (6) (1995).
214. *See* CAL. CODE REGS. tit. viii (1990).
215. *See* 29 C.F.R. § 1910.1200 (1999).
216. *See* 29 C.F.R. § 1910.200 (b); *see also* CAL. CODE REGS. tit. viii, § 339 (outlining hazardous chemicals regulated in California in the Hazardous Substances List).
217. *See* CAL. CODE REGS. tit. viii, § 3463 (1990) (outlining regulations for hazardous atmospheres and substances).
218. *See* CAL. CODE REGS. tit. viii, § 1230 (1999) (outlining temperature, illumination, sanitation, and ventilation).
219. *See id.*
220. *See* MARK A. ROTHSTEIN, OCCUPATIONAL SAFETY AND HEALTH LAW 8-10 (2d ed. 1983).
221. *See* JOHN M. MENDELOFF, THE DILEMMA OF TOXIC SUBSTANCE REGULATION: HOW OVERREGULATIONS CAUSE UNDERREGULATIONS AT OSHA 2, 7 (1988).

acute because of the high rate of technological change in their manufacturing processes.[222] New processes supplant old ones before there is adequate time to study the effects of exposure to the chemicals used in the old ones, and with workers exposed to so many processes and chemicals during their careers it is difficult to isolate the effects of any one of them.[223] In effect, OSHA's regulatory system, further constrained by the rate of bureaucratic change, lags so far behind the current practices of semiconductor companies that OSHA itself has admitted that its standards are inadequate to regulate semiconductor companies.[224] This situation has left a critical accountability gap.

For immigrant assembly workers, these provisions have not been sufficient to guarantee their rights or protect their health and safety. Workers have complained of inadequate ventilation or malfunctioning systems, forcing them to inhale chemical fumes.[225] Others have said that they were never told what chemicals they were using or what their effects were.[226] Their complaints do not appear to be unfounded; it has been reported that about ten percent of chipmaking plants inspected since 1992 provided inadequate training, and that nearly one-third of Silicon Valley firms inspected were cited for shortfalls in meeting health and safety standards.[227] However, it has been difficult for women suffering from exposure-related problems to prove that their symptoms were work related, which means they cannot receive worker's compensation.[228] Activists and labor organizations are trying to improve this situation by conducting training programs and disseminating health, safety, and legal information to assembly workers, empowering them to monitor work conditions.[229]

Companies must also comply with applicable federal environmental regulations that protect workers in industries where hazardous substances are used. The Environmental Protection Agency (EPA) implements the Toxic Release Inventory (TRI)[230] which essentially implements "right-to-know" provisions for the public about companies' use of chemicals.[231] Manufacturing firms must report to the EPA what chemicals they are releasing, as well as the amounts and types of releases, and the EPA com-

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222. *See* MAZUREK, *supra* note 21, at 201.
223. *See* Rubenstein, *supra* note 14, at 4.
224. *See* Smith & Schmit, *supra* note 126.
225. *See* Kim & Kim, *supra* note 186.
226. *See* International Campaign for Responsible Technology, *Global Semiconductor Health Hazards Exposed* (visited Jan. 25, 2000) <http://www.svtc.org/natsem/press.htm>.
227. *See* Julie Schmit, *Dirty Secrets, Exposing the Dark Side of a 'Clean' Industry*, USA TODAY, Jan. 12, 1998, at B1 (citing OSHA and fire department records).
228. *See Peer Health Promoter Network*, *supra* note 188.
229. *See id*; *see also A Successful Collaboration, Immigrant Women Trained to Become Peer Trainers*, AIWA NEWS (Asian Immigrant Women Advoc., Oakland/San Jose, Cal.), June 1999, at 3, 3.
230. TRI was created in 1986 under the Emergency Planning and Community Right to Know Act (EPCRA), §313. *See* MAZUREK, *supra* note 21, at 58.
231. *See id.*

piles this data into an annual national report and a computer database.[232] Environmental organizations, communities, and the media have used this easily accessible information to exert legal and political pressure on companies, and to publicize potentially dangerous corporate practices.[233]

However, while TRI is a very valuable instrument, the set of chemicals covered is not nearly comprehensive enough to adequately regulate the conduct of microchip manufacturers.[234] Environmentalists have estimated that nearly ninety-five percent of all toxic chemicals released by corporations have escaped reporting, and that company non-compliance rates are very high, possibly up to thirty percent.[235] Many toxic chemicals are simply not covered under TRI, including many of those used by semiconductor companies.[236] Also, since TRI standards only apply in the United States, companies can easily escape their provisions by locating manufacturing operations in other countries (although the U.S. government has mandated its application in certain isolated international contexts, such as U.S. companies operating maquiladoras in Mexico).[237]

This analysis demonstrates that there are important gaps in the current domestic legal regimes for the protection of assembly workers. Workers in Malaysia have minimal legal protection, and must rely on the self-policing and initiatives of electronics companies for protection. In the United States, even a comprehensive system of health and safety laws falls short in an industry where rapid changes outpace regulators. In this light, it is important to assess the potential applicability of international norms and standards.

B. International Framework

It is important to recognize that inadequate legal and safety protections are a global problem for the electronics industry. Women assembly workers in all countries, not just developing countries, are at risk from exposure to hazardous chemicals and little-understood processes. Domestic laws, as discussed in Part A, may be inadequate to ameliorate the negative impacts of technology on all aspects of women's lives, including their roles as mothers, homemakers, agricultural laborers, and as paid

232. *See id.* at 58-59.

233. *See* Sidney M. Wolf, *Fear and Loathing About the Public Right to Know: The Surprising Success of the Emergency Planning and Community Right-to-Know Act*, 11 J. LAND USE & ENVTL. L. 217, 281 (1996) ("[T]he TRI has spawned extensive grassroots agitation, numerous governmental and environmental organization reports, significant regulatory and legislative actions, major industry initiatives, and wider public consciousness about massive toxic releases and the need to reduce them. The TRI confirms the observation that more information on an important public issue tends to lead to public pressure which can lead to reform."). Commentators have described these significant results as "regulation by information" or "regulation by embarrassment." *Id.*

234. *See* MAZUREK, *supra* note 21, at 59.

235. *See* Wolf, *supra* note 233, at 267.

236. *See* MAZUREK, *supra* note 21, at 59.

237. *See id.*

workers outside the home.[238] Public international law, such as United Nations (U.N.) and International Labour Organization (ILO) treaties, and the international application of domestic legal remedies and trade laws can help fill these gaps.

1. Private Law

Because corporations are non-state, private actors in the international arena, workers and activists could restrain corporate actions abroad through private international law remedies.[239] These include U.S. laws applied in an international context, or U.S. trade laws amended to include labor standard conditions.[240] For example, some U.S. laws, such as Title VII of the Civil Rights Act, may apply to U.S. corporations overseas,[241] although as noted above, the environmental and health laws usually do not. Injured persons may also try to impose liability on a U.S. corporation for the actions of its overseas subsidiary by piercing the corporate veil,[242] though the plaintiffs must meet applicable jurisdictional and standing rules.[243]

U.S. trade laws could also be linked to workers' rights conditions and thus be used as a mechanism to enforce assembly workers' rights globally.[244] For example, Section 301 of the Trade Act of 1974,[245] which facilitates the enforcement of U.S. rights under bilateral and multilateral trade agreements, could potentially be used to enforce workers' rights in other countries, though this has not yet been done.[246] Linking trade to rights has been successful in some cases where the United States has re-

238. *See* Gouri Choudhury, *Action India*, *in* NEW TECHNOLOGIES AND THE FUTURE WORK OF WOMEN'S WORK IN ASIA, *supra* note 202, at 17 (describing a feminist view of technology which in assessing the impact of technology considers all of these aspects of a woman's life).

239. Private international law relates to international economic and commercial law, and conflicts and cooperation among national legal systems. *See* Mark Janis, AN INTRODUCTION TO INTERNATIONAL LAW 2 (3d ed. 1998). The laws which govern the foreign transactions of individuals and corporations are classified as private international law. *See id.*

240. *See id. See generally* Travis, *supra* note 37 (describing how U.S. trade laws can be linked to labor standards).

241. *See* 42 U.S.C. § 2000e(f) (added in 1991, extending Title VII's protections to U.S. citizens working abroad); *see also* Ho et al., *supra* note 13, at 395-96 (discussing the extraterritorial application of Title VII's antidiscrimination provisions).

242. Piercing the corporate veil refers to the process of imposing liability for corporate activity on a subsidiary, parent corporation, or person other than the offending entity itself.

243. *See* Hargrave v. Fireboard, 710 F.2d 1154, 1159 (5th Cir. 1983) (discussing jurisdictional standards for foreign corporations).

244. *See generally* Travis, *supra* note 37 (describing how U.S. trade laws could be linked to workers' rights conditions that would benefit women in EPZs).

245. 19 U.S.C. §§ 2411-2420 (1988).

246. *See* Travis, *supra* note 37, at 187. Section 301 requires mandatory retaliation against a foreign government which is found to have violated a trade agreement or if "an act, policy or practice of a foreign country is unjustifiable and burdens or restricts United States commerce." *Id.* (citing 19 U.S.C. § 2411(a)(1)(B)(ii) (1988)). Travis notes that while in some ways the worker rights language in Section 301 offers more flexibility than that in other U.S. trade statutes, it also sets a higher threshold for petitioners, and so far no worker rights petitions have been filed under § 301. *See id.*

moved preferential trading status for countries with labor rights violations.[247]

Also, some private action strategies used to increase worker protection in the garment industry, such as trade sanctions or boycotts, may be applicable to the electronics industry as well.[248] Such efforts can also place pressure on national governments to implement international environmental or labor standards.[249] All of the above strategies, if promulgated and enforced, would provide ways to ensure either that U.S. corporations follow the same standards abroad as they do domestically, or that women assembly workers abroad could enforce labor standards through international mechanisms when they are unable to do so domestically.[250]

2. Public Law

Public international law, covering the legal relations of states, includes the body of international human rights treaties including U.N. and ILO treaties. [251] Many of these documents were written with a holistic view of human rights[252] and women's rights in mind, and thus include far-reaching provisions mandating protection for women workers in all spheres of life that go beyond the scope of most domestic laws. [253]

Several international conventions are directly applicable to the rights of women assembly workers. If implemented, they could offer these women greater protection than U.S. and Malaysian laws. For example, the U.N. Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) seeks the "full development and advancement

247. *See* Compa, *supra* note 94, at 164 (giving examples of past situations where the U.S. has removed trade preferences in response to labor violations, for example in the case of Paraguay and the Generalized System of Preferences (GSP)). However, Malaysia also provides an example where the linking of U.S. trade to labor violations abroad proved unsuccessful. *See id.* at 160 (describing how human rights activists unsuccessfully sought to use labor rights provisions in international trade laws to apply economic sanctions against Malaysia because of its restrictions on collective bargaining in the electronics sector).

248. *See id.*

249. *See* JANIS, *supra* note 239, at 233 (noting that the efforts of private advocacy groups to mobilize public opinion has been a key factor in encouraging national governments to respond to international environmental law standards).

250. *See generally* Travis, *supra* note 37 (describing mechanisms under U.S. trade laws that could be used to improve the situation of women workers abroad).

251. *See* JANIS, *supra* note 239, at 2, 204-06 (noting that international public law may be described as concerning the legal relations of states). The ILO is the principal international standard-setting body for labor rights. *See* Compa, *supra* note 94, at 152.

252. *See* Joy Gordon, *The Concept of Human Rights: The History and Meaning of Its Politicization*, 23 BROOK. J. INT'L L. 689, 720 (1998) (describing the broad conception of human rights in the U.N. Declaration that seeks to identify and include all dimensions of human life).

253. *See* Andrew Byrnes & Jane Connors, *Enforcing the Human Rights of Women: A Complaints Procedure For the Women's Convention?*, 21 BROOK. J. INT'L L. 679, 682-84 (1996); *see also* Lisa A. Crooms, *Indivisible Rights and Intersectional Identities Or, "What Do Human Rights Have To Do With the Race Convention?,"* 40 How. L.J. 619, 636-37 (1997) (noting that international human rights instruments, such as the United Nations Charter and the Universal Declaration of Human Rights, recognize many economic, social and cultural rights that are denied under U.S. law).

of women" and mandates equal pay, benefits, and treatment for work of equal value.[254] The Beijing Platform for Action, adopted at the 1995 U.N. Fourth World Conference on Women also mandates safeguards and provisions for basic workers' rights.[255] Though these documents are not legally binding,[256] fully implementing the principles they advocate would arguably mean that assembly workers would be paid wages equal to those in similar jobs dominated by men, and that they would not be subjected to paternalistic controls on the factory floor. Women's health and safety rights could also be covered by provisions relating to reproduction and environmental safety. One example is the International Covenant on Economic, Social, and Cultural Rights,[257] a U.N. treaty which contains several articles describing the rights of people to freely dispose of their natural resources,[258] and have the highest possible standards of physical and mental health.[259]

Other documents are particularly relevant to the Malaysian situation. Implementation and enforcement of ILO conventions in Malaysia would help ensure that assembly workers have the freedom to organize unions and bargain collectively.[260] For instance, implementing and enforcing the provisions of the ILO Convention on Collective Bargaining would mean that the government would have to allow collective bargaining for all workers.[261] Malaysia has also acceded to the Copenhagen Declaration and Programme of Action, which seeks a commitment to ILO conventions.[262] The Jakarta Declaration for the Advancement of Women in Asia and Pacific, which mandates that equal access to jobs and skill de-

254. Convention on the Elimination of All Forms of Discrimination Against Women, Dec. 18, 1979, art. 3, 11(d), 1249 U.N.T.S. 20378 [hereinafter CEDAW] (entered into force Sept. 3, 1981).

255. *See Report on the Fourth World Conference on Women*, U.N. Fourth World Conference on Women, U.N. Doc. A/Conf. 177/20 (1995).

256. *See* Ho et al., *supra* note 11, at 412.

257. International Covenant of Economic, Social, and Culture Rights, Dec. 16, 1966, 993 U.N.T.S. 14531 [hereinafter ICESCR] (entered into force Jan. 3, 1976).

258. *See id.* at art. 1(2).

259. *See id.* at art. 12.

260. *See* Ho et al., *supra* note 11, at 396. Recognition, implementation, and enforcement of ILO treaties in Malaysia is extremely important, as workers and activists have previously tried to enforce collective bargaining rights in Malaysia based on the fact that Malaysia ratified ILO Convention no. 98 on the Right to Organize and Collective Bargaining. However, though complaints were filed in the late 1970s and early 1980s with the ILO, and the ILO supported the workers' right to organize, the Malaysian government did not heed these demands. At that point, there was little the ILO could do to enforce collective bargaining rights in Malaysia. *See* Arne Wangel, *The ILO and Protection of Trade Union Rights: The Electronics Industry in Malaysia, in* TRADE UNIONS AND THE NEW INDUSTRIALISATION OF THE THIRD WORLD 296-99 (Roger Southall ed., 1988). The prospects for the future are brighter, however, since the ILO is developing enforcement mechanisms. *See also infra* note 265.

261. ILO Convention Concerning the Promotion of Collective Bargaining, June 19, 1981, art. 5, C154 (entered into force Aug. 11, 1983); *see also* Convention Concerning the Application of the Principle of the Right to Organize and Bargain Collectively, July 1, 1949, 96 U.N.T.S. 1341 (entered into force July 18, 1951).

262. *See* Diariam, *supra* note 71, at 9-10.

velopment be provided equally to women workers,[263] is also applicable in Malaysia.[264]

Incorporating these provisions into Malaysian law would help alleviate the current dead-end nature of assembly jobs for Malaysian women. However, unless such incorporation into national laws is accompanied by sufficient enforcement mechanisms, the utility of the provisions is limited solely to providing guidelines for action.[265] In the absence of legal enforcement mechanisms, workers, activists, and corporations have begun to press for voluntary corporate action to recognize and enforce the rights of assembly workers on a global level.[266]

3. Voluntary Initiatives and Standard-Setting

In an industry where it is difficult to design and apply legal standards, voluntary corporate initiatives could also play an important role in regulating health and safety.[267] The adoption of corporate codes of conduct represents one method of voluntary corporate action that has gained prominence in the garment and footwear industries,[268] and could be instrumental in the electronics industry as well. Joint industry-corporate initiatives are another area of voluntary corporate action with the potential for improving health and safety standards.[269]

Corporate codes of conduct can be divided into two major groups: external codes, created by multilateral or private organizations for corporations to sign onto; and internal codes, which are those created by the

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263. *See Jakarta Declaration and Plan of Action for the Advancement of Women in Asia and the Pacific Adopted by the Second Asian and Pacific Ministerial Conference on Women in Development*, U.N. Commission on the Status of Women, 39th Sess., Prov. Agenda Item 3, at IV(B)(5), U.N. Doc. E/CN.6/1995/5/Add. 1 (1995).

264. *See* Diariam, *supra* note 71, at 10.

265. *See supra* note 260 (discussing the lack of enforcement of ILO provisions in Malaysia). Note, however, that the U.N. General Assembly adopted an Optional Protocol to the CEDAW Convention in December 1999 which provides for enforcement mechanisms. As of this writing, neither the United States nor Malaysia has signed it. *See Optional Protocol* (visited Feb. 9, 2000) <http://www.un.org/womenwatch/daw/cedaw/protocol/index.html>. In addition, the ILO is developing enforcement mechanisms for international labor standards. *See Standards and Fundamental Principles and Rights at Work* (visited Feb. 9, 2000) <http://www.ilo.org/public/english/standards/index.htm>.

266. *See* Compa, *supra* note 94, at 155, 164-171 (noting the lack of enforcement mechanisms in international labor laws, and listing other options for recognizing worker's rights, such as voluntary corporate action); *see also* Ho et al., *supra* note 13, at 401-03 (discussing development of voluntary codes of conduct in the garment industry).

267. The potential for voluntary initiatives is growing in light of the fact that the electronics industry has itself begun to reduce its use of toxins. *See* Byster & Smith, *supra* note 17 (noting a reduction in the use of toxins in electronics production).

268. *See* Ho et al., *supra* note 12, at 401 (describing various voluntary codes of conduct implemented in the garment industry and some of their effects).

269. *See* MAZUREK, *supra* note 21, at 153 (describing the EPA's "Common Sense Initiative" in the electronics industry, in which the EPA brought together representatives of industry, local and state government, and labor and environmental justice agencies). This initiative was intended to encourage prevention of pollution and the development of innovative technologies and standards. This idea appears promising, though it has not been as successful as hoped. *See id.*

corporation itself.[270] Several electronics companies have recently designed internal codes of conduct.[271] While these codes are an important first step, in contrast to more developed codes in the garment industry that have been effective in limiting some types of human rights abuses, the above codes appear to be rather vague and lack enforcement and external monitoring mechanisms.[272] In light of the strides that have been made in the garment industry, internal corporate codes of conduct could be an effective tool to enforce workers' rights in the electronics industry.

In the area of external codes, there are several international environmental codes of conduct and standards that are applicable. The one most widely used by electronics companies is an environmental initiative promulgated by the International Organization for Standardization (ISO).[273] This initiative, ISO 14000, is a set of voluntary standards for environmental management practices drafted by industry, government, and environmental organizations.[274] This system is intended to provide uniform, world-wide environmental standards across industries, and ISO certification assures that the certified organization has complied with its standards in its management and procedures.[275] However, a commitment to ISO 14000 standards is not a commitment to specific performance standards; instead, ISO standards focus on achieving continual improvement.[276] Thus, ISO 14000 has been criticized for granting an "easy A to companies . . . even if they have low environmental performance standards."[277] However, hopes are high that ISO 14000 will become an important and key qualification for companies in the global electronics market.[278]

Other relevant codes of conduct have been designed by the U.N. and ILO. One set of model guidelines has been developed by the United Na-

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270. *See* Lance A. Compa & Tashia Hinchliffe Darricarrère, *Private Labor Rights Enforcement Through Corporate Codes of Conduct*, *in* HUMAN RIGHTS, LABOR RIGHTS AND INTERNATIONAL TRADE 183-187 (Lance A. Compa & Stephen F. Diamond eds., 1996).

271. Motorola is one company that has designed such codes. *See The Journey to a Sustainable World, Environmental, Health and Safety Results for 1998* (visited Feb. 24, 2000) <http://www.motorola.com/EHS/aboutmotehs/1998EHSReport.pdf>; *see also* AMD, *supra* note 123 (describing AMD's standards).

272. For example, Levi Strauss has developed a code of conduct with a detailed monitoring and enforcement system. In 1992, code of conduct auditors inspected working conditions in a supplier's garment factory in Saipan, and when they discovered inhumane conditions in these factories, Levi Strauss canceled its contract with these suppliers. *See* Compa & Darricarrère, *supra* note 270, at 189-90.

273. *See* MAZUREK, *supra* note 21, at 124. Motorola, among others, has achieved ISO 14000 certification. *See The Journey to a Sustainable World*, *supra* note 271.

274. *See* DAVID HUNTER ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY 1398 (1998).

275. *See id.*

276. *See* MAZUREK, *supra* note 21, at 125.

277. Harris Gleckman & Riva Krut, *Neither International nor Standard: The Limits of ISO 14000 as an Instrument of Global Corporate Environmental Management*, GREENER MGMT. INT'L (Apr. 1996), *in* INTERNATIONAL ENVIRONMENTAL LAW AND POLICY, *supra* note 274, at 1403 (magazine cited as GLOBAL MGMT. INT'L).

278. *See* MAZUREK, *supra* note 21, at 125.

tions Environmental Programme (UNEP).[279] These guidelines emphasize that communication with the public, involvement of the public and NGOs, and evaluation of results are integral to the success of codes of conduct.[280] If such provisions are adopted into corporate codes, workers and activists would have an important means of effecting change by communicating with companies. The ILO has developed a code pertaining to labor rights. This code, the Tripartite Declaration of Principles Concerning Multinational Enterprises and Social Policy, covers labor practices for multinational companies.[281] Unfortunately, though it contains a complaint procedure, it lacks effective enforcement mechanisms.[282]

On an industry-wide level, there are several important standard-setting initiatives that have the potential to bring about increased corporate accountability for electronics companies. These include government-industry initiatives, such as the Common Sense Initiative put forth by the Environmental Protection Agency (EPA), and community-industry initiatives, such as the Silicon Principles drafted by the Silicon Valley Toxic Coalition (SVTC).

The EPA developed the Common Sense Initiative to make environmental regulations in eight industries, including the electronics industry, "cleaner, cheaper, and smarter."[283] Under this program, an electronics industry environmental sub-group was formed in 1994 to encourage collaborative efforts towards environmental protection.[284] The purpose of this initiative was to bring industry representatives, environmentalists, scientists, and NGO activists together to try to reach consensus on environmental, health and safety issues.[285] Unfortunately, the first proposal they considered (an EPA proposal to study cancer and birth defects among 100,000 California electronics industry workers) was abandoned because industry members and workers' advocates could not come to an agreement on methodology.[286] Such situations may be avoided in the future if the EPA moves towards a less strict definition of consensus, as it has indicated it might.[287] With its emphasis on stakeholder collaboration, incentives, and flexibility, the Common Sense Initiative could prove to be more effective than traditional regulatory methods described in Section IV.[288]

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279. *See* UNEP TECHNICAL REPORT NO. 40, VOLUNTARY INDUSTRY CODES OF CONDUCT FOR THE ENVIRONMENT (1998).
280. *See* Compa & Darricarrère, *supra* note 270, at 184-85.
281. *See id.*
282. *See id.*
283. MAZUREK, *supra* note 21, at 153.
284. *See id.*
285. *See* Rubenstein, *supra* note 14, at 4.
286. *See No Cancer Study*, USA TODAY, Jan. 16, 1998, at 1B.
287. *See* MAZUREK, *supra* note 21, at 157.
288. *See id.* at 153.

Community and environmental groups are also designing model guidelines for the electronics industry. The Silicon Valley Toxics Coalition, a California-based community group lobbying for worker safety and environmental efforts, has drafted a model code of conduct for high-tech companies called the Silicon Principles.[289] The Silicon Principles contain guidelines intended to increase accountability for chemicals use and environmental damage, promote monitoring programs, and increase transparency and community participation in health and environmental efforts.[290] Also, the principles contain provisions supporting the enforcement of equal standards in the United States and abroad, and equal standards for suppliers and sub-contractors.[291] These principles will need to be adopted and implemented by companies to be effective. However, even as existing guidelines, they play an important role in raising public awareness of health, safety, and labor issues in the electronics industry, since currently public knowledge and consciousness regarding these issues are low.[292]

These types of voluntary initiatives are only one part of an overall recognition and enforcement strategy, but they have great potential for the future. Any attempt to enforce the rights of assembly workers must take a multidimensional approach, applying domestic laws where possible and attempting to fill the remaining gaps through international legal or voluntary mechanisms. The above survey is intended to point out the directions that such an approach might take, as well as identify areas where greater enforcement or accountability mechanisms are needed.

VI. CONCLUSION

Under the current structures of domestic law in both Malaysia and the United States, the fundamental rights of women electronics assembly workers remain unfulfilled. Both government and industry in Malaysia and the United States have manipulated gender and race issues, and created similarly stratified workforces where Asian women are relegated to the lowest positions. The economic and social positions of these women, combined with the hazards of their jobs, threaten their health, safety, and opportunities. There are some legal remedies available to women electronics assembly workers but they are largely inadequate. Domestic laws, if sufficiently enforced and focused on the hazards female assembly workers face, are often inadequate because of the global nature of the industry,

289. *See The Silicon Principles* (last modified Nov. 4, 1997) <http://www.igc.org/svtc/siprinc.htm>.

290. *See id.*

291. *See Shareholder Resolution* (last modified Oct. 5, 1998) <http://www.igc.org/svtc/natsem/shresol.htm>.

292. *See* UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, CONSTRUCTIVE ENGAGEMENT RESOURCE GUIDE: PRACTICAL ADVICE FOR DIALOGUE AMONG FACILITIES, WORKERS, COMMUNITIES, AND REGULATORS 16 (1999) (noting that, "[f]or the most part, the public does not see the computer and electronics industry as a major source of environmental concern").

which requires transnational action. Also, it is difficult for domestic legal regimes to keep pace with technological developments. Invoking restrictive provisions of international trade laws may be a useful method of addressing the disparities in enforcement and protection between the legal systems in different countries.

Public international law provides an additional recourse for women to meet the challenges posed by the electronics industry. With their emphasis on the recognition of rights in all realms, including home, work, and family, international treaties can help fill the gaps in the current system. When they are signed and ratified, they provide additional support and pressure for government action to enhance workers' rights. Whether the current gaps in the recognition and enforcement of women assembly workers' rights are filled by voluntary or mandatory actions, by governments or corporations, it is important to consider all of the needs and aspirations of women assembly workers in the electronics industry.

In analyzing the same industry in different cultures, this article aimed to show how gender and race have been manipulated in the electronics industry to control women and deny them benefits or opportunities that could have been available. Women in both countries describe similar dangerous working conditions, health problems, and a lack of advancement opportunities. Their prospects for improvement are also limited by the inadequacies of the current domestic and international legal systems. These problems cannot be ignored, and the electronics industry should be held accountable for its role in creating them. With public awareness of these problems increasing, this industry is poised at a critical point in its history. Electronics companies can continue to expand current opportunities for constructive dialogue with workers, activists, and regulators, or they can ignore these issues until legal action is brought against them. As the experience of the garment industry shows, constructive engagement and pre-emptive voluntary corporate actions can help ameliorate rights violations before damaging public condemnation and lawsuits begin. The electronics industry has just begun to initiate voluntary actions and acknowledge problems, and should heed this warning for the future:

> The electronics industry is in an analogous position to Tobacco back in the 1960s . . . . Huge damage awards would wreak havoc in what could become this country's most important economic sector if it stays healthy. It has the opportunity to face up to potential problems squarely now, or ignore it and hope it goes away.[293]

293. Rubenstein, *supra* note 14, at 4.