

Margaret Tan Ai Hua

Asia-Pacific Science, Technology and Society Network Conference. Brisbane, Queensland, Australia, 23-25 Nov. 2009.

Promises and Threats: iN2015 Masterplan to Pervasive Computing in Singapore

“Architecture does not simply *enclose* but rather it *produces* space”

(Ryan Bishop, John Phillips and Wei-Wei Yeo *Beyond Description:*

Singapore Space Historicity 5).

“Everywhere what is liberated has been liberated so that it can enter a state of pure circulation, so that it can go into orbit.” (Jean Baudrillard *The*

Transparency of Evil: Essays on Extreme Phenomena 4).

In May 2005, the Infocomm Development Authority of Singapore (IDA) set up a steering committee to spearhead the development of Singapore’s ten-year masterplan called “Intelligent Nation 2015” (iN2015). The vision here, according to the IDA website, is to harness the latest “intelligent” technologies to turn Singapore into an “intelligent nation, a global city, powered by infocomm” where “every single person and business in Singapore will find the world - and everyday life – transformed by technology.” In short, the iN2015 Masterplan claims to give every individual “seamless access to intelligent technology – and with it – the capability to take charge” and the “new freedom to connect, innovate, personalise and create” (“About iN2015 Masterplan”). To achieve this ambitious plan, the steering committee has proposed several strategies that require IDA to work closely with various government agencies, “key” industry and business players as well as the public. The aim is to develop a globally competitive information communication industry and an equally competitive information communication-savvy workforce; encourage the sophisticated and innovative use of the latest technologies; and crucially, to establish “an ultra-high speed,

pervasive, intelligent and trusted” wired and wireless infrastructure (“Innovation, Integration” 8-11).

In *Beyond Description: Singapore Space Historicity*, Bishop, Phillips and Yeo argue that architecture is not a benign entity and/or activity; it vitally produces space – space not only in the literal but also in the figurative sense - spaces of thinking, interaction and dwelling that are inseparable from technologies of speed, including information technologies and telecommunications (1-16). This chapter is interested in critically analysing the architecture of the iN2015 Masterplan, vis-à-vis pervasive computing. By focusing on what Bishop, Phillips and Yeo propose as the “unbuilt” spaces (or what is invisible) rather than what’s there empirically, this chapter is hence interested in contemplating exactly who or what is being empowered or liberated by the iN2015 Masterplan and the nature of this empowerment and liberation. It seeks to unpack the complex structure of this progressive and dispersed technological installation and its discourse, where pervasive computing’s promise of freedom, control and empowerment is presupposed on its aesthetics of digitalisation, surveillance and control. And where the operations of the market are not simply prioritized but rather become instruments of social control, leading to particular technological embodiments - ones that entail active and innovative usage of the technologies, which in turn feedback and fuel the technical, capitalist and, I argue, military systems. In other words, this chapter will connect the paradoxical relationship between the promises and threats of pervasive computing to the kinds of subjectivities produced and exalted by the overlapping interests of Singapore’s technological economy and military. Key to this critique of the architecture of the iN2015 Masterplan is the idea of reversibility - how and to what extent the positive effects of pervasive computing are exactly due to the negative effects of the same technology and the grounding gestures that make this paradox invisible.

The Visible and Invisible: Pervasive Computing Architecture in Singapore

The role played by information technologies and telecommunications is fundamental to the operations and success of any global urban city. In Singapore, the government as the main architect, and adopting the Enlightenment ideology of equating technology with “progress,” has always seen these technologies as key to the city’s accelerated economic development. The iN2015 Masterplan is the most current of a series of national information technology (IT) plans, which continues the well-coordinated efforts of the Singapore government to align the deployment of information technologies and telecommunications to the needs of the economy and society.¹ Hence, in Singapore, some of these technologies already form a prominent feature in most people’s daily lives, from education to transport, work and leisure. With the iN2015 Masterplan, however, the spread of the technologies will not only be escalated, but also the very patterns and structures of the technologies will be intensified, with pervasive computing playing an eminent role. For example, the iN2015 Masterplan had set targets of 90% home broadband usage and 100% computer ownership in homes with school-going children (“About iN2015”) but as of February 2009, Singapore’s household broadband penetration rate has reached 99.9% ahead of the 2015 target. This puts Singapore ahead of the rest of the world as the most wired nation while mobile penetration rate reached 131%. Currently, and as part of the iN2015 Masterplan, the broadband network is being upgraded with a high-speed fibre-optic network, allowing speeds of 1 gigabyte per second or higher, which is expected island-wide by 2012.² Meanwhile, the S\$100 million “Wireless@SG” network completed ahead of schedule with more than 7,500 hotspots and 1.3 million subscribers, allows subscribers “always-on” and free (until 2013) wireless broadband

¹ For a list of past national IT plans, see “Innovation, Integration” 33-34.

² See Tan “S’pore is Most Wired Nation,” Lee “Developing World-Class Enterprises” and Chua “All Set to Speed Down Internet Highway.”

connections to the Internet in most public spaces across Singapore.³ Finally, yet importantly, human-computer interaction, sensor technologies, ubiquitous network connectivity, and media management have been singled out for research and development, as part of the iN2015 focus on digital media and entertainment (“Innovation, Integration” 67).

Pervasive computing is a vision of future applications of information technologies and telecommunications, highly miniaturized and embedded into everyday objects, environment and even the human body, to allow wireless and seamless identification and connectivity. This technological vision is also known as ubiquitous computing and ambient intelligence.⁴ The particularities of pervasive computing include ubiquity and invisibility (Weiser 94-104), and particularly for wearable computing, operational and interactional constancy (“always-on”) as well as artificial intelligence in terms of context-awareness and augmentation (Billinghurst and Starner 57-64; Mann 2123-2151). In summary, pervasive computing is capable of providing access to information anytime, anywhere and to even act and react according to its user’s environment, filtering information on his/her behalf without any conscious actions and/or awareness on the user’s part. What this really means is that pervasive computing’s promise of freedom (mobility, connectivity), control and empowerment (through access) is precisely based on “two important design parameters relating to privacy: the ability to monitor and the ability to search” (Bohn et al. 772). In other words, surveillance is inherent to pervasive computing; it is the invisible part of the technology’s complex structure and aesthetics.

Surveillance generally involves some form of collection and storage of information, presumed to be useful, about people or objects; the management and control of activities of people or objects through instructions or the physical design of the natural and built environment; and/or the administration of information gathering activities to observe the

³ See Tham’s Editorial in *The Straits Times*.

⁴ See Köhler and Erdman 831-852; Bohn et al. 763-785; and Hilty, Som and Köhler 853-874.

behaviour of those under supervision, and, in the case of people, compliance with instructions (Norris and Wilson *xi*). While surveillance is not a new phenomenon, what is pivotal about today's context is how this role as it is increasingly delegated to digital machines, is in turn creating new social practices. Digital surveillance is different in significant ways from the more traditional forms of surveillance. Fundamental to digital surveillance is digitalisation, a process of translation and reduction of vastly varied phenomenon into binary codes (Peterson 135). Inherent to this process of abstraction is a selection system that forms hierarchies of information (137) crucial not only for the efficient and fast storage, processing and flow of data, but for complex systems of control. Graham and Wood (537- 558) point out that since digitalisation enables "monitoring, prioritization and judgement to occur across widening geographical distances and ... on a continuous, real-time basis ... [it] encourages a tendency towards automation" (538). Algorithmic surveillance, which removes human discretion, can then be deployed to identify, assign and categorize opaquely based on norms and priorities set by governments and corporations. Graham and Wood further stress, automated surveillance and information systems "actively facilitate mobility, access, services and life chances for those judged electronically to have the correct credentials and exclude or relationally push away others...and thereby accelerate the trend away from persons toward data subjects" (544). So in order to reach the iN2015 promise of having the capability to take charge and the new freedom to connect, innovate, personalise and create, users must first be subjected to abstraction and relegate control to machines to be actively tracked, electronically tagged and sorted; in other words, to be data subjects in the technological economy.

In fact, observes David Lyon (67-82), everyday surveillance is routine in informational societies where subjects trade privacy for enhanced participation in the digital market place. While this may be empowering for some, Lyon argues that it raises other crucial issues of the discriminatory means, adopted by governments and corporations, of

distinguishing and classifying different groups of people; and how far data subjects retain control over their personal data. As he contends “surveillance as social sorting ... suggests that another, perhaps more significant digital divide is created by information rather than having to do with access to information ... [instead, it is about] ... threats to justice and to equality of opportunity” (77-78). Seen in this light, the iN2015 claims to give *every* individual seamless access to intelligent technology may actually be very selective, depending on who the individuals are and what their technological participation entails. In politics, for example, as highlighted by the civil society group Think Centre, Singapore’s online political participation has not match it’s technological, infrastructural advances and high literacy rate because of the way the ruling People’s Action Party use legal, technical and social measures to shape the way new technologies are used for political communication. Paradoxically, the Think Centre argues, the wiring up of the nation allows for information to be shared among government agencies and departments internally and externally, which in turn enables a co-ordinated approach to track certain citizens with greater efficiency and scrutiny (Gomez 9-18).

Meanwhile, the iN2015 promise to give every individual the capability to take charge through intelligent technology may not automatically confer control to the individuals themselves; in fact, the iN2015 Masterplan of integrating healthcare and its claim of empowering patients require closer inspection. The S\$200 million centralised electronic health record (EHR) system that is expected to be launched in 2010, allowing patients to have one record throughout his/her life that can be shared among different doctors and clinics, has been argued to potentially improve patient care, speed-up treatment, eliminate paper trail, save time and reduce mistakes (Tan “Seamless Sharing”). It is also hoped that making personal health records available to patients themselves will allow them to proactively manage their health and save costs in the process (“Innovate, Integrate” 81-82). But while

issues of confidentiality and privacy have been highlighted as areas of concern, it remains possible that patients in future may be discriminated against if/when their health records fall into the wrong corporate hands; and that mistakes may occur in data entry and/or transmission, affecting patients' records, doctors' diagnosis and insurance claims. More importantly, what continues to be unaddressed is how much control patients will have over his/her health data, particularly in the larger iN2015 Masterplan of integrating information between healthcare, clinical and biomedical sciences, where greater access of healthcare clinical data will be made available for biomedical and pharmaceutical research purposes; a move that feeds the Biopolis project.

The Biopolis, launched in 2003 is an S\$500 million purpose-built biomedical research hub where researchers from the public and private sectors are co-located.⁵ Catherine Walby, in her analysis of the Biopolis project, argues that to realise the Singapore government's ambition for a thriving biomedical industry, new subjectivities have to be articulated ("Singapore Biopolis"). In particular, she highlights how there is a shift away from the old ideal of the prudential citizen to the cosmopolitan, entrepreneurial global citizen; and for the test subjects, an emphasis on their roles as consumers rather than as donors or research objects. Therefore, the success of the technological economy not only depends on digitalisation that makes possible the rendering of citizens into data and the integration and access of such data across different institutions, but also the active participation of the population in such enterprises. The next section of the chapter will look at the precise subjects the iN2015 Masterplan extols and how these subjectivities together with new forms of social control ultimately benefit the Singapore technological economy and military.

⁵ For information on Biopolis, see <<http://www.a-star.edu.sg/biopolis/9-Biopolis>>.

Society of Control Meets Consumer Society: Singapore in the Age of “Mutated Capitalism”

The technological economy or informational society sums up the overlapping realms and mutually constitutive forces of politics, economics, and information technologies and telecommunications. What results is a new way of life, variously described as the post-industrial/post-Fordist society, knowledge-based economy, network society, new economy, cultural economy and economy of signs; but what links them all is the generation, through innovation and creativity, of new knowledge and immaterial goods, regarded as critical for the survival of the economy (Barry and Slater 1). So, as “the centre of economic gravity shifts from the production of goods to the production of innovation – that is, of new knowledge for the making of goods,” (Morris-Suzuki 76) new forms of social control are needed to keep this “perpetual innovation” economy alive.

In “Postscript on the Societies of Control” (35-39), Gilles Deleuze asserts that the disciplinary societies of the eighteenth and nineteenth centuries expounded by Michel Foucault are increasingly being superseded today by complex societies of control. The latter operate through a sophisticated combination of what Deleuze calls “mutated capitalism” and new information and communication technologies as well as their feedback loops. Some key features of societies of control include the proliferation of digital technologies and logic; the modular rather than discrete forms of operation and control; the supremacy of code or password over the signature or watchwords; and the conversion of individual and masses to “dividuals.” In this context, the distinction between the individual and masses no longer matter as they are all transformed into active data to fuel the current digital form of production, intrinsic to mutated capitalism. So unlike the disciplinary powers that are exerted on individuals as they move through discreet forms of institutions, like schools, factories, clinics, prisons, etcetera; social control here is diffused, no longer confined within a single entity and/or institution, and becomes perpetual. As observed by Deleuze, “control is short-

term and of rapid rates of turnover, but also continuous and without limit, while discipline was of long duration, infinite and discontinuous” (38). Furthermore, this shifting, modular and insidious form of control presents rivalries and competitions as excellent motivational forces to be emulated while perpetual training is made an essential part of life.

The Singapore government, apart from building and deploying the necessary infrastructures and technologies, has always ensured that its education and training systems are geared towards the needs of its free market economy. The iN2015 Masterplan continues this well-coordinated effort to align the deployment of education to the needs of mutated capitalism. As such, the iN2015 steering committee recommends several strategies to encourage the sophisticated and innovative use of the latest technologies, which will in turn help develop “an infocomm-savvy workforce and globally competitive infocomm manpower.” Specifically, they have identified two ideal subjects to be nurtured, through perpetual training, for the technological economy – “the techno-strategists who have the ability to combine technical know-how with domain experience to develop innovative solutions” and “the technologists, who need to be equipped with deep technical expertise to engage in R&D [Research & Development]” (“Innovation, Integration” 61). These subjects are also expected to have “strong analytical, communication and interpersonal skills,” able “to be more risk-taking, entrepreneurial and ... tolerate greater ambiguity” (70). To deliver these subjects, the government and industry have put together an S\$120 million investment, which is disbursed through several programmes. The “Infocomm Manpower Development Roadmap,” for example, entails student outreach programmes such as the “Infocomm Clubs” where primary and secondary school as well as junior college students can earn Co-Curricular Activities points by participating in the club’s activities, which might include

competitions, mentorship and inter-school collaborations.⁶ Scholarships are also available for students keen on information communication and new media-related undergraduate courses, both locally or abroad (Sadasivan “Grooming IT Talent”). In March 2008, another S\$70 million was pumped into this roadmap to enhance staff training and upgrading for professionals already in the information and communications sectors (Lam “Innovation, Competitiveness”). Since then, another S\$125 million was injected into the sector in face of the 2008 worldwide financial crisis. This is aimed at helping ten thousand information technologies professionals to keep their job and to train, through scholarships, the next generation of professionals. Part of this amount is also meant for the information and communications industry and small and media-sized enterprises, to develop information and communications solutions and stimulate IT adoption. Then in June 2009, S\$20 million was committed to two programmes, “iTap” and “iLead”, that will benefit one thousand IT graduates and professionals over two years. While “iTap” is open to graduate students to upgrade their skills over a broad area of information and communications training; “iLead” targets existing IT professionals to enhance their skills in specialised areas, such as application development, grid computing, green IT, information and communications security as well as wired and wireless networking engineering. Beneficiaries of both programmes will have to be bonded for a period that commensurate the training duration.⁷

To further new technologies adoption in schools, S\$620 million will be spent on a standard operating system to link up all schools on a common platform and another S\$80 million will be spent on the “FutureSchools@Singapore” scheme, which seeks to produce IT

⁶ In June 2006, there were 40 schools with Infocomm Clubs. Within a year of the iN2015 launch, this number increased to 140 schools, totalling 6,443 members (“Singapore Powers Ahead with iN2015”). Furthermore, there are at least 22 primary schools, 25 secondary schools and 6 junior colleges with media production studios, each costing between S\$20,000 and S\$200,000 to build and equip (Luo “Media Labs in Schools Give Students Leg Up”).

⁷ See Tan “\$125m Prop for Infocomm Sector to Save 10,000 Jobs” and Tham “Treat for Infocomm Execs.”

best practices and adoption for accelerated learning in schools. Such schools will expose students to a broad range of technologies and applications, ranging from interactive white boards to 3-D visualisation technology to interactive computer games. Here, apart from the government, parents as well as private companies, such as Microsoft Singapore, have a hand in pushing for these modern classrooms.⁸ Moreover, to ensure that less well-off students are not left behind, the government also initiated the “Neu PC Plus Programme” to help needy families obtain desktop or laptop plus broadband access at subsidised prices.⁹ Overall, the iN2015 Masterplan is envisioned to benefit not only businesses and consumers but also the larger population - “the iN2015 Masterplan is not only about economic competitiveness. We will also be exploring ways to ensure that the elderly, less-privileged and people with disability [sic] can also enjoy connected and enriched lives or self-improvement and life-long learning” (“Singapore iN2015 Masterplan”). On top of the “Neu PC Plus Programme,” two other programmes aid this pursuit of a “digitally-inclusive society” - the “Silver Infocomm Initiative” and the “Infocomm Accessibility Centre.” The former offers training in “digital lifestyle skills” to senior citizens so that they can stay “economically active and independent in the digital age,” and the latter provides a space where people with disabilities are taught information and communication skills to “enhance [their] quality of life and employability, so that they can integrate into mainstream society” (Lee “Developing World-Class Enterprises”).

⁸ See Luo “Govt to Spend \$1.7b on IT Projects;” Tham “Schools Get Smarter,” “When 3-D is Better than 2-D;” and Oo “It’s All Fun and Games.”

⁹ Only families with household income of S\$2,500 or less are eligible for the programme. A desktop with broadband access will cost them S\$285 while a laptop with broadband access will cost S\$730. As of June 2009, 27,000 families have benefited from this scheme, with 7,000 PCs sold through the programme (Tham “Treat for Infocomm Execs”). Additionally, under the IDA’s “Inspire” fund programme, students can have the computers free of charge if they serve six to twelve hours of community service (Supian “IDA Now Bridging the Digital Divide”).

While it may seem heartening that such huge amounts of money and effort are being spent on education and making Singapore a “digitally-inclusive society,” what is worrying is the single-minded direction and impact on subjectivities such endeavours have, in highly competitive Singapore. Children and adults alike become immensely compelled to engage and leverage on new technologies; to integrate them into their work and everyday practices; and to engage in perpetual training in order to keep pace every step of the way with the demands of the technologies as well as those of the technological economy to constantly compete, upgrade, innovate and create. Therefore, the “freedom” promised by the iN2015 Masterplan is a very particular type of freedom that can only be achieved through access and active usage of new information technologies and telecommunications. In fact, the iN2015 Masterplan’s seeming inclusiveness belies a surreptitious form of exclusion, in this case, the inability of social and embodied subjects to *not* partake in its development and the related social sorting mentioned above. A case in point is the increasing trend of Singapore employers expecting job seekers, including blue-collar workers, to post their personal data directly into database repositories, making the hiring process easier for the former but not the latter. For despite self-help groups rolling out basic IT classes to help these workers, there will be those who are disadvantaged and/or do not see the relevance of IT skills to the blue-collar jobs they are seeking. Ultimately, freedom of access here also does not equate with political freedom, as earlier examples show, and can easily be rescinded. Another case in point is how Singapore’s national servicemen are discouraged from using the social networking website Facebook because of the military’s fear that sensitive information might fall into the hands of terrorists lurking in cyberspace.¹⁰ The Singapore government’s investments and drive to digitalise the infrastructure and build the workforce necessary to the information and communications industry, furthermore, comes at the expense of education by

¹⁰ See Luo “Wiring the Blue-collar Workers for the IT World” and Tan “Soldiers’ Facebook Warning” respectively.

skewing it to very selected sectors, such as the field of digital media and entertainment and the Life and Biomedical Science. What this means is that who really gets “liberated” in the iN2015 Masterplan is not every individual but the technological neo-liberal subjects from very particular economies.

One of the central areas that have been identified to benefit from the iN2015 Masterplan and contribute to Singapore’s technological economy is the digital media and entertainment industry. This is in line with the iN2015 vision (which enhances the earlier Media 21 vision) to establish Singapore as the digital media and entertainment capital, offering “innovative content, services and technologies to the world” (“Innovation, Integration” 65). To this end, three significant spheres have been discerned by the iN2015 steering committee to shape digital media and entertainment development. These are: the availability and affordability of information and communication infrastructure and platforms, such as the pervasive wired and wireless infrastructure highlighted above; the adoption of information technologies and telecommunications “across the value chain,” which will in turn bring prices down; and essentially, the consumers who are potentially also the producers of digital contents (64-65).

Jean Baudrillard in the “Consumer Society” elaborates on a new humanism where competition has moved from the realm of production to consumption and where subjectivity and freedom are performed through consumption (13-31). Here consumer objects form the code through which an arbitrary system of classification and value is assigned and this code then provides a false transparency of social standing and social relations; its network of signs incites desires and creates needs. According to Baudrillard, needs should be understood as a need neither for a particular object, nor as individual pleasure and satisfaction. Rather, they should be recognized as a need for difference or desire for social meaning. However, since needs are created from a code of floating signifiers, they can never be satisfied, making

consumption limitless and therefore a good form of social control. As Baudrillard states, needs are “produced as a *force of consumption*, and as a general potential reserve within the larger framework of productive forces” (45).¹¹ In the iN2015 Masterplan, media consumption, therefore, becomes the “citizen’s *duty*” (51) needed not only to sustain the proliferation of new information technologies and telecommunications, but also as a form of social construction and control of subjectivities in the service of the state and the technological economy. One such example of media consumption cum consumer object in the technological economy is interactive computer games.

Kline, Dyer-Whiteford and De Peuter argue in *Digital Play* that the interactive computer game is an ideal type of commodity for the technological economy. As a product of computer technologies, its production typifies the youthful and innovative labour that is archetypal of post-Fordist enterprise; and apart from its aesthetics of simulation, interactive computer games are also experiential goods subjected to intense advertising, promotional and surveillance strategies quintessential to post-Fordist economy. As a result, they claim, interactive computer games are characterized by the need for constant creativity to incite perpetual desires as a way to build new audiences (60-78). Indeed, interactive computer games are growing in popularity and IDA has described gaming as “a serious business” expected to be worth US\$17 billion by 2010 (“IDA and GXA”). To tap on this ideal commodity the Singapore government, through IDA and the Media Development Authority (MDA), has been actively promoting games development through creating the necessary infrastructure, funding, forming alliances of games companies in Singapore and the region, and through hosting gaming competitions such as the World Cyber Games. Their objectives include helping games developers to reach gamers faster, promoting the development of

¹¹ This ties in with Deleuze’s premise of desire as a productive force rather than as lack, although he departs from Baudrillard in thinking that such desires can be subversive and beyond technological embodiment. See Deleuze and Guattari “The Desiring-Machines” 1-8, 38-44.

cross-platform games so that players can play games both at their desks and even while they are on the go; creating opportunities for Singapore gamers to compete with international and regional players, and turning gamers passion for the games into careers.¹² To further boost the industry, an S\$28 million laboratory called Interactive Digital Media Lab, has been set up to explore better gaming technologies; and another S\$1 billion have been set aside for the industry (including to build the ultra-fast broadband network) on top of the S\$200 million that has been pumped into the media industry since 2003. In short, the aim here is to “facilitate new media companies to communicate, share, access and distribute content efficiently.”¹³ The iN2015 “Connected Games” programme is, thus, an aspect and a culmination of these efforts to turn Singapore into a hub for trading and distributing digital media and entertainment products. Since games are digital commodities, the “Connected Games” programme will provide an “always-on” platform for developing, managing and distributing games content and related services, bypassing the need for physical trade events. IDA claims that through this infrastructure, game creators can have “a new avenue to monetise their intellectual property” and gamers will have a wireless, networked environment for “more engaged and pervasive” game-play (*IDA* “Connected Games”).

Despite gaming being marketed as a “fun,” “cool” and “empowering” activity due to its interactive nature and rhetoric of “play” (and “passion”) Kline, Dyer-Whiteford and De Peuter point out that game development is actually strongly “shaped, contained, controlled, and channelled within the long-standing logic of commercial marketplace dedicated to the profit-maximizing sale of cultural and technological commodities” (21). So not only is the game development process mundane, relentless and even brutal; but by making work more like play (and hinging on gamers’ passion for the games), employers are able to cover up any

¹² See Khoong “Powering-Up for Tomorrow;” “Game Development in Singapore;” Chan “Games for Work;” Tan “Funding Boost for Game Designers;” “Gaming Sector Wants Mid-Career Workers” and Tay “Let the Games Begin!”

¹³ See Chua “\$28m Lab to Explore Better Gaming Tech” and Chng “The Game is On.”

exploitative work conditions. Furthermore, such rhetoric also makes invisible the free volunteer labours that are very much a part of the gaming industry (197-202). What this means is that the “Connected Games” wireless networked environment will, paradoxically, also facilitate the exploitation of consumers as “unpaid creators, test subjects, expert informants, and volunteer labour” indispensable to an entertainment industry adept at its “representation of work as play...[and] conversion of play into work” (201-202). Singapore, through the iN2015 Masterplan, is hence an excellent example of the control society highlighted by Deleuze and consumer society emphasized by Baudrillard, where social control is diffused, motivated, defined by market imperatives and underpinned by consumption and the digital logic of participation and feedback loops. The last part of the chapter will investigate further the paradoxes of the iN2015 Masterplan and the grounding gestures that make these paradoxes invisible.

Grounding Gestures of the iN2015 Masterplan

To further game development beyond the entertainment arena, there are plans by the Singapore government to fund and extend interactive games as teaching tools. As highlighted by Rear-Admiral (NS) Lui Tuck Yew, Acting Minister for Information, Communications and the Arts, “moving away from entertainment, games are also a useful tool in engaging learners and helping them to develop new skills” (Tan “Boost for Video Games”). Due to the interactive computer game’s amazing ability to simulate and create immersive environments, the use of games as training tools is not a new phenomenon and is, in fact, widespread particularly in the military and Life and Biomedical Science. This repurposing of entertainment research and development, especially for national defence, brings interactive computer games full circle to its roots since most of the technology used in computer games now had its origin in military research (Hertz 204-205). Even though the military may

continue to fund research today, tapping on and modifying commercial off-the-shelf games for military purposes have become equally important. The benefits of this practice, as highlighted by the Singapore military, are three-fold. Firstly, it is a cheaper and more convenient alternative to engaging professional game developers for customised game contents under strict licensing rules. Secondly, it is a “cost-effective conduit to motivate and engage a game-savvy generation of soldiers in repetitive tactical thinking ‘anytime, anywhere’” (Fong “Adapting”). Lastly, it is a potent recruitment tool to “lure a younger generation hooked on the gaming subculture into a career” in the military (“DSTA in the News”). The iN2015 Masterplan to develop the gaming industry and empower an emerging breed of gamers, therefore, is also empowering for the military.

In the field of Life and Biomedical Science, games involving simulations are also envisioned to benefit, for example, Singapore nurses by providing them a platform to “analyse situations, develop priorities and think critically” before entering the clinical setting (Tan “Boost for Video Games”). Perhaps the most infamous use of simulation in Life and Biomedical Science is the Visible Human Project (VHP). A US National Library of Medicine project initiated in 1989, the VHP involves a pair of corpses that were frozen, systematically sliced, imaged, converted into computer data files, then reconstituted and animated to form two virtual bodies intended for clinical and biomedical research.¹⁴ Recognizing the repository's immense value to clinical and biomedical research, the School of Biological Science at the Nanyang Technological University (NTU) obtained the rights for an official VHP mirror to be based in Singapore. This they hope will make the VHP mirror at NTU a “major biomedical digital image resource” for the “growing number of educational,

¹⁴ The project has since enabled a wide range of educational, diagnostic, treatment planning, virtual reality, artistic, and industrial applications. See <http://www.nlm.nih.gov/research/visible/visible_human.html>. Personally, I have used the data for my interactive artwork, entitled *Virtual Bodies in Reality*, to comment on the changing nature of violence in digital space. See <<http://web.mac.com/margetan>>.

institutional, research and industrial establishments in Singapore and the region” (NTU “Visible Human Project”).

Catherine Walby, in *The Visible Human Project*, insightfully connects the constitutive moments of the Life and Biomedical Science to the corpse. Indeed, the use and study of corpses have been foundational to modern western science but what interests Walby is the irony of the situation. Particularly, how the promise of life (immortality) by biomedical technologies is paradoxically premised on death, and how this is at the same time made invisible by both the aesthetics of the technology and the discourses surrounding the technology. While Life and Biomedical Science purports to be about understanding life with the promise of deferring death, its technologies actually operate in an inverse logic – they freeze, objectify, render and kill. As Walby argues, the alteration of the human body into digital data through biomedical technologies create mechanical and limited modes of understanding corporeality, which in turn has profound consequences for understanding life and death (145).

In his theory of simulacra, Baudrillard postulates that as societies move toward a world of simulation, reality gives way to the hyperreal. Here signs do not refer back to their referents and are, in fact, taken as the real. The logic of simulation, hence, no longer deals with facts and/or reason; rather, is based on models and/or codes (which are already implicated in particular perspective) that then allows for different and even contradictory interpretations. As Baudrillard highlights:

Simulation is characterized by a *precession of the model*, of all the models based on the merest fact – the models come first, their circulation, orbital like that of a bomb, constitutes the genuine magnetic field of the event. The facts no longer have a specific trajectory, they are born at the intersection of the models, a single fact can be engendered by all the models at once. This

anticipation, this precession, this short circuit, this confusion of the fact with its model... is what allows each time for all possible interpretations, even the most contradictory – all true, in the sense that their truth is to be exchanged, in the image of the models from which they derive, in a generalized cycle.

(Simulacra 16-17)

Implicit to Baudrillard's observation is the idea of reversibility, and as exemplified by Walby's analysis of the VHP above, ideas of life is supplanted by digital technologies that produces deathly views of the body, which in turn mechanizes worldviews and ideas of life in a generalized cycle. This mechanical view of the body as organs of differentiated prosthesis, maintains Baudrillard, then allows indefinite extension of the body, which returns to modify the body and become part of the image of the body (98-100). Nevertheless, what is also crucial, apart from this tension between shoring up the status of human and the objectification and instrumental use of the body in Life and Biomedical Science, are the grounding gestures that enable such projects in the first place.

Drawing from Critical Theory, grounding gestures here refer to acts that construct our understanding of the world and yet remain outside of or invisible to the world they organise and explain (Tyson 256). As highlighted by Walby, the Genesis rhetoric deployed in the VHP project - VHP figures as digital versions of Adam and Eve - seeks to justify the project in a narrative of Origin and Being; while the realistic visualisation and animation of dead corpses as biomedical models ground the project's authority for understanding corporeality and life (*The Visible Human Project* 26, 149). These grounding gestures – the discourse around origin of life and the particularity of digital technologies to reanimate the dead - disguise the fact that the Life and Biomedical Science's promise of warding off mortality are constructed upon the same technologies that are implicated in threats of cruelty, violence and death. In a similar ironic vein, pervasive computing's promise of freedom, control and empowerment is

paradoxically premised on the particularity of the technology to inconspicuously monitor, search and sort. Yet, this hidden surveillance and control by machines are further made invisible by the rhetoric surrounding the technology. As exemplified by the iN2015 Masterplan, needs are actively created for the adoption and use of information technologies and telecommunications practically and through the rhetoric of freedom, empowerment and inclusiveness. However, this seeming inclusiveness belies the fact that interactions in digitalised space is precisely based on a complex system of control and exclusion, and that the survival of the Singapore enterprise and military is exactly based on a productive citizenry that actively use and consume these technologies.

As highlighted by Baudrillard, in the sphere of information and communication, the value of the message is not its content but its circulation, since for content to be conveyed well and quickly through the networks it has to be as transparent and insignificant as possible (*Transparency* 38, 49). In this context, desires, knowledge, actions, beliefs and pleasures have become less important in themselves than how they are “produced, induced, solicited, media-ized or technicized” (46). Furthermore, observes Baudrillard, new technology does not alienate humans but rather integrates them into the circuit, as the popularity of interactive computer games show. This is because artificial intelligence, since it is devoid of passion and artifice, frees users from real intelligence, “thought’s ambiguity and from the insoluble puzzle of its relationship to the world” (58). In this interaction, subjects are really relating to himself/herself engaging with virtuality and the programme rather than with an Other (radical or otherwise) (54). What this also means, paradoxically, is that the logic of interaction disguises the fact that consumers have to work and/or play within someone else’s framework, model and/or code. In other words, although desires are “positively” produced through the logic or particularities of the technologies, what the rhetoric promises - freedom, control and empowerment - remains always deferred.

Conclusions

The iN2015 Masterplan to transform Singapore into an “intelligent nation, a global city, powered by infocomm” is not as straightforward as it seems, as this chapter showed. To achieve this vision requires the melding of an ultra-high speed and pervasive infrastructure with an active citizenry coaxed into the sophisticated and innovative use of the latest technologies. This chapter attempted to critically analyse the architecture and discourse of the iN2015 Masterplan, vis-à-vis the aesthetics and rhetoric around pervasive computing. Through a series of paradoxes, it argued that both pervasive computing and the iN2015 Masterplan's rhetoric of freedom, empowerment and control are presupposed, paradoxically, on users' subjection to abstraction and control by the technology. By using Deleuze's societies of control and Baudrillard's consumer society as frameworks, this chapter maintained that Singapore, through the iN2015 Masterplan, is an excellent example of the control society, where social control is diffused, motivated, defined by market imperatives and underpinned by consumption and the digital logic of participation and feedback loops. Media consumption, hence, becomes the “citizen's *duty*” needed, not only in the selected fields of digital media and entertainment and Life and Biomedical Science, but ultimately, as demonstrated by this chapter, the military.

Crucially, this chapter exposed the grounding gestures that underpin the iN2015 Masterplan and inverted the relationship between promises and threats that spring from pervasive computing. It revealed how the iN2015's rhetoric of “freedom,” “control,” “empowerment” and “inclusion” justifies the proliferation and use of such technologies, creates needs and useful technological subjectivities; while disguising the exclusions that occur and the imperative technological consumption is to the survival of the technological economy and the military. In other words, the iN2015 Masterplan has set up the necessary architecture, produced highly technologised spaces and created insatiable needs for

technological consumption using the rhetoric of freedom, control, empowerment and inclusion for the people but what got “liberated,” at the end of the day, are the technological economy and the military with individuals forming the basis of their liberation.

Works Cited

- “About iN2015 Masterplan.” *IDA Singapore*. n.d. Web. 13 Apr. 2008.
- Barry, Andrew, and Don Slater, eds. Introduction. *The Technological Economy*. London and New York: Routledge, 2005. 1-27. Print.
- Baudrillard, Jean. “Consumer Society.” *Jean Baudrillard: Selected Writings*. Ed. Mark Poster. Stanford: Stanford University Press, 2001. 32-59. Print.
- . *Simulacra and Simulation*. 1994. Trans. Sheila Faria Glaser and Ann Arbor, Michigan: University of Michigan Press, 2006. Print.
- . *Transparency of Evil: Essay on Extreme Phenomena*. 1990. Trans. James Benedict. London and New York: Verso. 1993. Print.
- Billinghurst, Mark and Thad Starner. “Wearable Devices: New Ways to Manage Information.” *Computer* 32:1 (1999): 57-64. *ACM Digital Library*. Web. 31 Jul. 2007.
- Bishop, Ryan, John Phillips and Yeo Wei-Wei, eds. Introduction. *Beyond Description: Singapore Space Historicity*. London and New York: 2004. 1-16. Print.
- Bohn, Jurgen, et al. “Living in a World of Smart Everyday Objects: Social, Economic, and Ethical Implications.” *Human and Ecological Risk Assessment* 10:5 (2004): 763-785. *Informaworld*. Web. 9 Apr. 2008.
- Chan, Yeng Kit. “Games for Work. Games for Play.” Opening Ceremony of World Cyber Games 2005. Suntec International Convention and Exhibition Centre, Singapore. 8 Sept. 2005. *IDA Singapore*. Web. 19 Mar. 2009.
- Chng, Grace. “The Game is On.” *The Straits Times* [Singapore] 11 Jul. 2009: D2. Print.
- Chua, Hian Hou. “\$28m Lab to Explore Better Gaming Tech.” *The Straits Times* [Singapore] 18 Sept. 2009: C3. Print.
- . “All Set to Speed Down Internet Highway.” *The Straits Time* [Singapore] 6 Aug. 2009: B5. Print.

- Deleuze, Gilles. "Postscript on the Societies of Control." 1992. *Surveillance, Crime and Social Control*. Eds. Clive Norris and Dean Wilson. England: Ashgate, 2006. 35-39. Print.
- Deleuze, Gilles and Felix Guattari. "The Desiring-Machines." 1984. *Anti-Oedipus: Capitalism and Schizophrenia*. Trans. Robert Hurley, Mark Seem and Helen R. Lane. London: Continuum, 2004. 1-8, 38-44. Print.
- "DSTA in the News: News Radio 93.8FM Coverage." *Defence Science and Technology Agency (DSTA)*, n.d. Web. 13 Mar. 2009.
- Fong, Gwenda. "Adapting Commercial Off-the-Shelf Games for Military Simulation." *Defence Science and Technology Agency (DSTA)*, n.d. Web. 13 Mar. 2009.
- "Game Development in Singapore Looks Set to Rise." *IDA Singapore*. Sept. 2006. Web. 12 Mar. 2009.
- Gomez, James. *Internet Politics: Surveillance and Intimidation in Singapore*. Bangkok and Singapore: Think Centre, 2002. Print.
- Graham, Stephen and David Wood. "Digitizing Surveillance: Categorization, Space, Inequality." 2003. *Surveillance, Crime and Social Control*. Eds. Clive Norris and Dean Wilson. England: Ashgate, 2006. 537-558. Print.
- Herz, J.C. "The Military-Entertainment Complex." *Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts, and Rewired Our Minds*. London: Little Brown & Co, 1997. 197-213. Print.
- Hilty, Lorenz M., Claudia Som and Andreas Köhler "Assessing the Human, Social, and Environmental Risks of Pervasive Computing." *Human and Ecological Risk Assessment* 10:5 (2004): 853-874. *Informaworld*. Web. 9 Apr. 2008.
- "IDA and GXA Initiate Collaboration Between 10 Asia Pacific Game Associations." *IDA Singapore*. Oct 2007. Web. 12 Mar. 2009.

- “IDA Invites Proposals for Connected Games.” *IDA Singapore*. Aug. 2007. Web. 13 Nov. 2008.
- “Innovation, Integration, Internationalisation: Report by the iN2015 Steering Committee.” *IDA Singapore*. n.d. Web. 13 Apr. 2008.
- Khoong, Hock Yun. “Powering-Up for Tomorrow.” The Launch of the Games Exchange Alliance and IDA’s 3rd Games Industry Networking Event. Barcelona Wine Bar, Singapore. 1 Oct. 2004. *IDA Singapore*. Web. 12 Mar. 2009.
- Kline, Stephen, Nick Dyer-Witheford and Greig De Peuter. *Digital Play: The Interaction of Technology, Culture, and Marketing*. Canada: McGill-Queen’s University Press, 2003. Print.
- Köhler, Andreas and Lorenz Erdman. “Expected Environmental Impacts of Pervasive Computing.” *Human and Ecological Risk Assessment* 10:5 (2004): 831-852. *Informaworld*. Web. 9 Apr. 2008.
- Lam, Chuan Leong. “Innovation, Competitiveness and Government.” Regional Innovation Forum 2008. Conrad Hotel, Singapore. 4 Mar. 2008. *IDA Singapore*. Web. 13 Nov 2008.
- Lee, Boon Yang. “Developing World-Class Enterprises and Capabilities for a Creative Economy.” Committee of Supply Debate. Parliament, Singapore. n.d. *IDA Singapore*. Web. 12 Mar 2009.
- Luo, Serene. “Govt to Spend \$1.7b on IT Projects.” *The Straits Times* [Singapore] 13 May 2009: A5. Print.
- . “Media Labs in Schools Give Students Leg Up.” *The Straits Times* [Singapore] 9 Sept. 2009: B1. Print.
- . “Wiring the Blue-Collar Workers for the IT World.” *The Straits Times* [Singapore] 7 Jul. 2009. Print.

- Lyon, David. "Cyberspace, Surveillance, and Social Control: the Hidden Face of the Internet in Asia." *Asia.com: Asia Encounters the Internet*. Eds. K.C. Ho, Randolph Kluver and Kenneth C.C. Yang. London and New York: RoutledgeCurzon, 2003. 67-82. Print.
- Mann, Steve. "Humanistic Computing: "WearComp" as a New Framework and Application for Intelligent Signal Processing." *Proceedings of the IEEE* 86:11 (1998): 2123-2151. *IEEE*. Web. 9 Apr. 2008.
- Morris-Suzuki, Tessa. "Information Capitalism: an Alternative Analysis of the Information Society." *Beyond Computopia: Information, Automation and Democracy in Japan*. London and New York: Kegan Paul International, 1988. 70-86. Print.
- Norris, Clive and Dean Wilson, eds. Introduction. *Surveillance, Crime and Social Control*. England: Ashgate, 2006. xi-xxv. Print.
- Oo, Gin Lee. "It's All Fun and Games." *The Straits Times* [Singapore] 29 Jul. 2009: 14-15. Print.
- Peterson, V. Spike. *A Critical Rewriting of Global Political Economy: Integrating Reproductive, Productive and Virtual Economies*. London and New York: Routledge, 2003.
- Sadasivan, Balaji. "Grooming IT Talent." Express IT! iN2015 Competition Award Ceremony. NTUC Centre Auditorium, Singapore. 17 Nov. 2005. *IDA Singapore*. Web. 13 Apr. 2008.
- "Singapore iN2015 Masterplan Offers a Digital Future for Everyone." *IDA Singapore*. 20 Jun. 2006. Web. 13 Apr. 2008.
- "Singapore Powers Ahead with iN2015." *IDA Singapore*. 19 Jun. 2007. Web. 13 Apr. 2008.
- Supian, Hedirman. "IDA Now Bridging the Digital Divide." *Today* [Singapore] 27 Feb. 2009. Print.

Tan, Judith. "Seamless Sharing of Medical Record on Track." *The Straits Times* [Singapore] 15 Sept. 2009. Print.

Tan, Weizhen. "\$125m Prop for Infocomm Sector to Save 10,000 Jobs." *The Straits Times* [Singapore] 28 Feb. 2009: B3. Print.

---. "Boost for Video Games as Teaching Tools." *The Straits Times* [Singapore] 18 Sept. 2009: C3. Print.

---. "Funding Boost for Game Designers." *The Straits Times* [Singapore] 1 Jul. 2009: B4. Print.

---. "Gaming Sector Wants Mid-Career Workers." *The Straits Times* [Singapore] 7 Aug. 2009: B13. Print.

---. "S'pore is Most Wired Nation: 99.9% Penetration Rate Beats Govt's 2015 Target." *The Straits Times* [Singapore] 20 Feb. 2009: B11. Print.

---. "Soldiers' 'Facebook Warning.'" *The Straits Times* [Singapore] 6 Mar. 2009. Web. 22 Mar. 2009.

Tay, Ronnie. "Let the Games Begin!" The World Cyber Games Singapore Finals. Suntec International Convention and Exhibition Centre, Singapore. 7 Aug. 2008. *IDA Singapore*. Web. 12 Mar. 2009.

Tham, Irene. "Schools Get Smarter" and "When 3-D is Better than 2-D." *The Straits Times* [Singapore] 29 Jul. 2009: 12-13. Print.

---. "Treat for Infocomm Execs." *The Straits Times* [Singapore] 17 Jun. 2009: 14. Print.

Tham, Yuen-C. Editorial. *The Straits Times* [Singapore] 29 Jul. 2009: 6. Print.

Tyson, Lois. "Deconstructive Criticism." *Critical Theory Today: A User-Friendly Guide*. 2nd ed. London and New York: Routledge, 2006. 249-280. Print.

"Visible Human Project." *Nanyang Technological University*. Web. 18 Apr. 2008.

Walby, Catherine. "Singapore Biopolis: Bare Life in the City-State." Science, Technology & Society Cluster Talk. National University of Singapore. 16 Oct. 2008.

---. *The Visible Human Project: Informatic Bodies and Posthuman Medicine*.

London: Routledge, 2000.

Weiser, Mark. "The Computer for the 21st Century." *Scientific American* 265:3 (1991):

94-104. Web. 21 Aug. 2007.