Gender and New ICTs

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Abstract

This article studied the relationship between gender values and new ICTs. A quantitative content analysis was conducted to explore masculine and feminine values that are reflected in the television commercials about four major types of new ICTs: computers, cell phones, Internet services, and cell phone network services. The study found no significant gender difference for the overall frequency of all the commercials about new ICTs. Meanwhile, the study indicated significant associations between gender values and different types of new ICTs. For example, feminine values were positively associated with cell phones, cell phone-based ICTs, and access tools. Masculine values were positively associated with cell phone network services, computer-based ICTs, the Internet services, and networks. Gender-power relationship was adopted to explain the results by mapping out its distribution across a group of binary distinctions, including open-closed, design-consumption, and global-local.

Key words

Gender, new ICTs, computers, cell phones, internet, television commercials

Introduction

With their increasing adoption in our everyday lives, new Information Communication Technologies (ICTs) have become contested media with regards to their social cultural meanings and significance. A core issue in the debate is the relationship between gender and new ICTs. Wajcman noted "a profound pessimism about inherent masculinity of ICTs among the early research in contrast to an unwarranted optimism about the liberating potential of ICTs for women among the recent research" (Wajcman, 2007, p. 287). For example, van Zoonen suggested

that early feminist critics constituted the Internet as a medium embedded with masculine values because of its roots in the military-industrial complex (van Zoonen, 1992, p. 12). In recent years, however, other feminist authors have reclaimed the Internet as a technology close to the core qualities of femininity (Haraway & Randolph, 1997, p. 25; Spender, 1995, p. 57; van Zoonen, 2002, p. 7).

Although recent studies tend to support the feminine nature of new ICTs, Wajcman's words of "potential" and "unwarranted" illustrate two major worries (Wajcman, 2007, p. 287). First, although the studies identify the potential of new ICTs for women's liberation, there still remains the question of whether this potential can be developed into the dominant process in society. Second, there is still a shortage of solid evidence to warrant the femininity of new ICTs. In order to address these worries, this study conducted a quantitative content analysis to assess the relationship between gender and new ICTs. The analysis focused on the presentation of gender values in the television commercials about new ICTs. The sample commercials were broadcasted in China between 2005 and 2008, including four basic categories of new ICTs - computers, cell phones, Internet services, and cell phone network services.

Gender Perspectives

Gender and Technology: A Perspective of Social Construction

The perspective of social construction believed that both technology and gender are results of social construction. The social construction of technology emerged to correct and complement technological determinism, which believes that technological development is autonomous with respect to society: it shapes society but is not reciprocally influenced by society and it exists outside society but at the same time influences social change (MacKenzie & Wajcman, 1999, p. 10). While not denying social effects of technologies, the social construction of technology focuses on social forces that give rise to particular technologies and is concerned with explaining the social process of the conception, invention, design and development of technology.

From the perspective of social construction, gender, like technology, is also regarded as a product of social construction. The social con-

struction of gender arose as an alternative to biological and essentialist conception that attaches naturalness and biological inevitability to the concept of sex. Rubin proposed the term sex-gender system to capture the idea of social construction by which biological sexuality (i.e., male and female) is transformed into socially significant gender (i.e., masculinity and femininity), where gender is constituted simultaneously through deployment of gendered rhetoric, symbols, and images and through allocation of resources and power along the gendered lines (Rubin, 1975, p. 155). Research indicated that masculinity has been socially constructed with such values as powerful, aggressive, competitive, rational, and reasonable, and femininity with such values as caring, emotional, tender, cooperative, and expressive (Chodorow, 1978, p. 17).

The perspective of social construction was expressed in Wajcman's review of evolutionary trajectories in feminist studies about gender and technology. The early research criticized a taken-for-granted association between gender stereotype and technology in which technology was related to masculinity and excluded from femininity (Wajcman, 2004, p. 12). Wajcman suggested that the association of masculinity and technology resulted from the historical and cultural construction of gender (Wajcman, 2010, p. 147). During the late nineteenth century, the rise of mechanical and civil engineering increasingly became markers of technology and created a male professional identity in which white, male engineers with educational qualifications and the promise of managerial positions have been conceived of elite with exclusive rights to technical expertise (Oldenziel, 1999, p. 25). At the same time, the rise of engineering diminished the significance of both artifacts and forms of knowledge associated with women, and femininity was being reinterpreted as incompatible with technological pursuits (Wajcman, 1991, p. 30).

Later when technology was extended from industrial engineering to domestic households and was widely used for cooking, childcare and communication, the disconnection between femininity and technology was disrupted to some extent. The fixed-line telephone was a good example. Research indicated that women's adoption of telephone overruled the prescribed ideal type of male telephone users, and turned the telephone from a rational, business medium to a sociable instrument for maintaining friendship and kinship (Moyal, 1992, p. 54). Consequently,

telephone networks were extended to residential areas and the sociable features of the telephone dominated marketing and advertising campaigns (van Zoonen, 1992, p. 17).

Gender and New ICTs

The association between femininity and telephone was continued in the recent studies about gender and cell phone. Research indicated that cell phone, like fixed-line phone, is used by both men and women to maintain their social relations (Ling, 2004, p. 36). Meanwhile, the biological sex difference has no longer been a significant factor to affect people's usages of cell phone (Ozcan & Kocak, 2003, p. 252). The findings suggested that the social construction of the cell phone and its use as feminine technology has become one and the same that any gender differentiation in its use has become obsolete.

Since 1990s, the rise of computer and Internet technologies has offered more possibilities to empower women and transform gender relations (Green & Adam, 1999, p. v). However, the early studies still maintained a strong association between masculinity and computer/Internet (Wajcman, 1991, p. 32). For example, van Zoonen suggested that computer technology falls into the domain of masculinity in a sense that it enables males to establish and reconfirm their gendered sense of self by engaging in the relevant activities (van Zoonen, 1992, p. 27). Turkle indicated that computer technology appeals to men more often than to women because it has been constructed as an object to subdue and control (Turkle, 1988, p. 52).

As more and more women embrace new ICTs in both professional and private spheres, the recent feminist studies observed a transformative trajectory in which computer and Internet technologies are redefined "from the exclusively masculine domain born out of the American military-industrial-academic complex towards its feminine antithesis of peaceful communication and experimentation" (van Zoonen, 2002, p. 10). For example, Balsamo argued that computer technology has been adopted in the service of redefining gendered bodies through such mechanism as cosmetic surgery (Balsamo, 1996, p. 61). Plant believes that digital technology enables users to construct their alternative gender identities by blurring the lines between human and machine as

well as between male and female (Plant, 1998, p. 27). Digital technology was built on networks rather than hierarchies to represent a new relationship between women and machine (Plant, 1998, p. 57). Similarly, Jenkins suggests that network technology builds up an ethic of community, consensus and communication on the Internet, all of which represent the central features of femininity (Jenkins, 1999, p. 236). As Haraway and Randolph concluded, new ICTs in essence are feminine media to provide the technological basis for a new form of society in which women are potentially liberated, and women, rather than men are uniquely suited to life in the digital age (Haraway & Randolph, 1997, p. 43).

The research above illustrated the primary trajectory in the research of gender and ICTs. The studies started with masculine domination and developed into feminine liberation. However, this more liberal position was undermined to some extent by the critical perspective adopted by feminist scholars. The critical approach can only qualitatively identify the association between gender and new ICTs but fail to illustrate to what degree femininity and masculinity are related to these technologies. In other words, if we claim the feminine nature of new ICTs, we have to prove that femininity has exceeded masculinity to be socially constructed with new ICTs. Thus, a quantitative study is needed to test the relationship between gender and new ICTs.

Media Representations of Gender

From a quantitative approach, the relationship between gender and new ICTs can be explored by examining media representations in which gender values are attached to these technologies. Media representations are the ways in which the media portrays particular groups, communities, experiences, ideas, or topics from a particular ideological or value perspective (Hall, 1997, p. 17). There is a dialectic relationship between media presentation and reality. On one hand, media texts are external ways of representing a reality "out there". On the other hand, media presentations themselves constitute the meaning of reality. From this perspective, Hall argued that media representations reflect cultural values (Hall, 1997, p. 26). He noted that cultures serve as ways of making sense of the world. For example, they provide us with "maps of mean-

ing" or frameworks for classifying the world according to some hierarchical value system—what is most versus least valued; who has power and who does not; what practices are or are not condoned or sanctioned. These "maps of meaning" or cultural models serve to order people's lives.

In this study, therefore, the content analysis of television commercials can reflect not only social reality in which new ICTs are used for masculine or feminine purposes but also dominant gender values towards new ICTs. Dominant values are based on social reality and, at the same time, suppress minor or marginalized values to some extent. Thus, the primary objective of this study is to test which gender values become dominant towards new ICTs across different product types in media presentations. As a result, the findings in this study will be based on social reality but will not 100 per cent reflect social reality.

The research indicated that gender values have been widely studied in media presentations, particularly in television commercials. The study of television commercials is crucial due to the large amount of time a person watches television. Television commercials are designed for persuasive impact, and they contribute mightily to cultural norms (Pollay, 1986, p. 18). This cultural norming process is achieved through repetitive television images, which reinforce cultural messages that become accepted as mainstream thought (Signorelli & Morgan, 1996, p. 112).

Research indicated that women in television commercials were portrayed as caring, humble, tender, happy, family-oriented, loving kids, sensitive, and communicative, while men, on the other hand, were pictured as competitive, aggressive, athletic, authoritative, rational, and ambitious (Allan & Coltrane, 1996, p. 200). Feminine values were more frequently presented than masculine values in the commercials of domestic products, such as personal hygiene products, cosmetics, food, medication, clothing, and household items. For example, Mwangi found that feminine values were significantly associated with household products and personal/baby products (Mwangi, 1996, p. 211). Ganahl, Prinsen, and Netzley suggested that gender representation in retail stores, health & beauty aids/pharmacy, and clothing was significantly disproportionate in favor of feminine values (Ganahl, Prinsen, & Netzley, 2003, p. 552).

Masculine values were more frequently used in the television commer-

cials of non-domestic products, such as cars, trucks, gas, finance services, and sports. For example, Mwangi found that masculine values were significantly associated with automobiles, hardware, alcohol, and financial services (Mwangi, 1996, p. 212). Similarly, Bresnahan, Inoue, Liu, and Nishida reported that masculine values were used to promote cars, automotive accessories, and technology (Bresnahan, Inoue, Liu, & Nishida, 2001, p. 129).

With regard to gender and technology, the existing studies on media presentation generally indicated significant association between masculine values and technology-related products (Ganahl et al., 2003, p. 553; Mwangi, 1996, p. 214), and, thus, supported the masculine domination of technology attested to in the early feminist studies. However, there are two problems in existing studies. First, few studies were conducted to focus on gender presentation in the commercials of new ICTs. So there is little evidence to empirically test the liberating potential of new ICTs that were advocated by feminist critical studies in recent years. Second, product types in these studies were poorly defined. The categories of technologies were either too broad to make distinctions among different types of technologies (e.g., household appliances and computers) or too narrow to merge similar types of technologies (e.g., automobiles and automobile accessories). The same problem also existed in critical studies about gender and new ICTs. They failed to draw distinctions between access tools and networks. For example, cell phones and computers are the tools through which people can have access to telecommunication and Internet networks. However, the existing studies either equated cell phones and computers to the overall concept of new ICTs or talked about networks without excluding access-tools.

To address the problems above, this study conducted a quantitative content analysis to specifically examine gender values embedded with new ICTs in television commercials. This study defined new ICTs in three different ways (see Table 1). First, new ICTs were coded into four basic types: computers, Internet network services, cell phones, and cell phone network services. Second, the four basic types were combined into two categories: access tools (cell phones and computers) and networks (Internet network services and cell phone network services). Third, the four basic types were combined into another two categories: computer-based ICTs and cell phone-based ICTs. Computers and

Internet network services consist of computer-based ICTs while cell phones and cell phone network services consist of cell phone-based ICTs[1].

Table 1
The Coding Scheme of Product Types

Product type I	**Definitions**
Computer	• Desktop and laptop computers • Does not include computer-related components and accessories, such as storage device, keyboard, mouse, monitor, CPU, and software programs.
Internet network service	• Internet access services offered by Internet network operators, such as China Telecom and China Netcom • Internet applications and services, such as news portal, instant messenger, blogging, searching, e-commerce, social networking, and gaming • Does not include cell phone-based Internet services (e.g., WAP)
Cell phone	• Cell phones • Does not include cell phone-related accessories, such as charger and battery
Cell phone network service	• Primary phone-call services offered by telecom operators, such as China Mobile and China Unicom • Added-value services, such as ringtone, wallpaper, mobile banking, SMS, GPS, gaming, and cell phone-based Internet services (e.g., WAP)
Product type II	**Definitions**
Computer-based ICTs	• Computer + Internet network service
Cell phone-based ICTs	• Cell phone + cell phone network service
Product type III	**Definitions**
Access tool	• Computer + cell phone
Network	• Internet network service + cell phone network service

[1] Computers and Internet network services were coded into the category of computer-based ICTs, because computers were traditionally used to access to Internet network services. Although 3G technologies have enabled cell phones' connectivity to the Internet, cell phone-based wireless Internet was only limited to a small number of high-end users in China before 3G were officially launched in 2009. Given that the sample commercials in this study were all collected before 2009, cell phones were not considered as access tools to Internet services except those being specifically designed for cell phones, such as WAP websites.

Hypothesis and Research Questions

To test the overall situation of gender values in the television commercials of new ICTs, a hypothesis was proposed: Feminine values are more frequently used than masculine values in the television commercials about new ICTs. The following three questions were raised to explore gender values across different types of new ICTs: Is there any relationship between gender values and the four basic types of new ICTs? Is there any relationship between gender values and computer-based/cell phone-based ICTs? Is there any relationship between gender values and access tools/networks?

In addition, the brands of the products in television commercials were also coded into two categories of foreign brands and local brands. Foreign and local brands are related to the distinction of globalization and localization that introduces another dimension to the issues of gender values and new ICTs. The last research question was posed to examine the relationship between gender, globalization, and new ICTs: Is there any relationship between gender values and foreign/local brands across different types of new ICTs?

Method

Sampling

The sample consisted of 662 television commercials about new ICTs, including computers (n = 146, 22 percent), Internet network services (n = 66, 10 percent), cell phones (n = 344, 52 percent), and cell phone network services (n = 106, 16 percent). The sample commercials were broadcasted in China between January 1, 2005 and December 31, 2008, and were extracted from a database run by TVC Bank, a television commercial monitoring service based in Beijing, China. TVC Bank monitored 60 major television channels in Mainland China, including national channels (e.g., CCTV 1-11), provincial satellite channels (e.g., Beijing, Shanghai, Guangdong, Guangxi), and provincial capital city channels (e.g., Guangzhou, Nanjing, and Shenyang). Most of the channels, except

provincial capital city channels, are accessible by cable television subscribers all over the country. TVC Bank recorded the television commercials broadcasted during the prime time between 7:00 pm and 11:00 pm each day.

Developing Coding Schemes

To develop coding schemes, 200 of 662 commercials were randomly selected, following the proportions of different product categories. Zhang and Harwood's coding scheme was adopted and revised to identify cultural value themes (Zhang & Harwood, 2004, p. 8). Zhang and Harwood's scheme summarized previous studies and condensed a large number of cultural value themes into 13 categories, including family, health, tradition, filial piety, patriotism, education, modernity, beauty/youth, pleasure, success/status, materialism, environmentalism, and quality/effectiveness. Because Zhang and Harwood's coding scheme was originally designed to code all product categories in Chinese television commercials (Zhang & Harwood, 2004, p. 8), some of value themes might not be used for new ICTs in this study. So the research team first viewed 200 selected commercials to test the validity of Zhang and Harwood's scheme. Consequently, three cultural themes were deleted because they were not reflected in selected commercials. They were patriotism, tradition, and filial piety. Then, the research team consulted Beere's handbook of tests and measures about gender roles, which included a total of 211 measures pertaining to societal roles and attitudes towards gender-related issues (Beere, 1990, p. 16). As a result, the remaining 10 value themes were divided into two major groups: masculine values and feminine values. The coding scheme is listed in Table 2.

Table 2
The Coding Scheme of Gender Values

Feminine Values

- Family : The product is good for the family (e.g., enjoying product with other family members).
- Pleasure : The product will provide enjoyment.
- Beauty/Youth : Use of the product will make individuals appear attractive, elegant, or handsome.
- Health : Use of the product will make individuals free from disease or enhance physical vitality.
- Education[2] : The product improves knowledge or wisdom, including improved school performance.
- Environmentalism : The product is associated with environmental protection - purchasing suggests environmental concern.

Masculine Values

- Modernity[3] : Emphasis is placed on the product being new, contemporary, or up-to-date. The commercial may present the sophisticated technology used in manufacturing.
- Success/Status: Use of the product will elevate users' social position/rank, make individuals feel in control of their lives, or enable them to achieve their life goals.
- Materialism: The product is associated with financial or material acquisition.
- Quality/Effectiveness[4] : The excellence, durability, or effectiveness of the product is emphasized.

Coding

Two Chinese coders were trained to independently code the rest of the 462 commercials by gender cultural values and product types. The coders were asked to identify the dichotomized categories of masculine and feminine values[5] in each commercial based on a Gestalt impression (Cheng & Schweitzer, 1996, p. 205; Zhang & Harwood, 2004, p. 10), and to watch the commercial more than once if necessary. When a commercial could not be coded into any category, it was put into the "other" category. One hundred commercials (21.6 percent) were randomly selected to test the intercoder reliability. The intercoder reliability

[2] The theme of education refers to children's education. Caring-for-children represents a pervasive feature of femininity (Beere, 1990, p. 16).

[3] The theme of modernity reflects such masculine features as dominance, ambition, competitiveness, control, and technical expertise (Beere, 1990, p. 16).

[4] The theme of quality/effectiveness represents such masculine features as rational, analytical, goal-oriented, consistent, and dependable (Beere, 1990, p. 16).

[5] The coders were not asked to identify specific subcategories.

for gender cultural values is percent agreement rate and Scott π = .905. The intercoder reliability for product types is 98 percent agreement rate and Scott π = .934. In addition, the commercials were also coded by their brand types (i.e., local Chinese brands and foreign brands) that have already been identified by the editors in the data bank.

Results

The goodness-of-fit test was conducted to describe the overall frequency of masculine and feminine values in the television commercials about all new ICTs products without considering product types' difference (nine commercials falling into the "other" category were not further considered). No significant difference was found between masculine values and feminine values (see Table 3, $\chi^2 = 1.86$, $p>.1$). The result failed to support H1.

Table 3
The Overall Frequency of Gender Values

Gender	Frequency (N = 453)	%
Masculinity	241	53.2
Femininity	212	46.8

Note. $\chi^2 = 1.86$, $p>.1$

From Table 4 to Table 6, cross-tabulation analyses were conducted to explore the interdependent relationship between gender values and three groups of new ICTs types. Table 4 reported significant associations between gender values and four basic types ($\chi^2 = 57.69$, $p<.001$). Gardner's (2001)[6] post hoc test was used to specify which gender value and product type was associated (Gardner, 2001, p. 79). Feminine values were positively associated with cell phones (adjusted residue = 6.9), and masculine values were positively associated with both Internet network

[6] Gardner (2001) suggested that the cell's value is significant if the adjusted standardized residual in the cell exceeds the Z score required for the Bonferroni-adjusted alpha level that is calculated by dividing the desired alpha level (i.e., .05) by the number of cells (p. 79). For the 2*4 table in this study, the adjusted alpha is .05/8=.00625 and Z score at the .00625 level (two-tailed) is 2.5.

services (adjusted residue = 5.3) and cell phone network services (adjusted residue = 2.8). Non-significant association was found between gender values and computers (adjusted residue = 2.0).

Table 4
The Cross-Tabulation between Gender Values and Product Type (I)

		Masculinity	Femininity
Cell phone	Count	88.0	146.0
	Expected Count	124.5	109.5
	Adjusted Residual	-6.9*	6.9*
Computer	Count	62.0	38.0
	Expected Count	53.2	46.8
	Adjusted Residual	2.0	-2.0
Cell phone network	Count	51.0	24.0
	Expected Count	39.9	35.1
	Adjusted Residual	2.8*	-2.8*
Computer network	Count	40.0	4.0
	Expected Count	23.4	20.6
	Adjusted Residual	5.3*	-5.3*

Note. χ^2 = 57.69, p<.001 Absolute critical value of adjusted residual is 2.5. *Significance

In Table 5, masculine values were positively associated with computer-based ICTs and feminine values with cell phone-based ICTs (χ^2 = 26.36, p<.001). Table 6 indicated that masculine values were positively associated with networks and feminine values with access tools (χ^2 = 35.1, p<.001).

Table 5
The Cross-Tabulation between Gender Values and Product Type (II)

		Masculinity	Femininity
Computer-based ICTs	Count	102.0	42.0
	Expected Count	76.6	67.4
	Adjusted Residual	5.1	-5.1
Cell phone-based ICTs	Count	139.0	170.0
	Expected Count	164.4	144.6
	Adjusted Residual	-5.1	5.1

Note. χ^2 = 26.36, p<.001

Table 6
The Cross-Tabulation between Gender Values and Product type (III)

		Masculinity	Femininity
Access tools	Count	150.0	184.0
	Expected Count	177.7	156.3
	Adjusted Residual	-5.9	5.9
Networks	Count	91.0	28.0
	Expected Count	63.3	55.7
	Adjusted Residual	5.9	-5.9

Note. $\chi^2 = 35.1$, $p<.001$

Table 7 and Table 8 used cross-tabulation analysis to explore the interdependent relationship between gender values and brands across different types of new ICTs. In the commercials about computer-based ICTs, masculine values were positively associated with foreign brands and feminine values with local brands (see Table 7, $\chi^2 = 11.37$, $p<.01$). In the commercials about cell phone-based ICTs, masculine values were positively associated with local brands and feminine values with foreign brands (see Table 7, $\chi^2 = 15.8$, $p<.001$). In the commercials about networks, masculine values were positively associated with foreign brands and feminine values with local brands (see Table 8, $\chi^2 = 6.62$, $p<.05$). In the commercials about access tools, non-significant association was found between gender values and brands (see Table 8, $\chi^2 = 0.1$, $p>.05$).

Table 7
The Cross-Tabulation between Gender Values and Brands across Product Type (II)

Product Types	Brands		Masculinity	Femininity
Computer-based ICTs	Foreign brands	Count	74.0	18.0
		Expected Count	65.2	26.8
		Adjusted Residual	3.4	-3.4
	Local brands	Count	28.0	24.0
		Expected Count	36.8	15.2
		Adjusted Residual	-3.4	3.4
Cell phone-based ICTs	Foreign brands	Count	51.0	101.0
		Expected Count	68.4	83.6
		Adjusted Residual	-4.0	4.0
	Local brands	Count	88.0	69.0
		Expected Count	70.6	86.4
		Adjusted Residual	4.0	-4.0

Note. For computer-based ICTs, $\chi^2 = 11.37$, $p<.01$, For cell phone-based ICTs, $\chi^2 = 15.8$, $p<.001$

Table 8
The Cross-Tabulation between Gender Values and Brands across Product Type (III)

Product Types	Brands		Masculinity	Femininity
Access tools	Foreign brands	Count	92.0	116.0
		Expected Count	93.4	114.6
		Adjusted Residual	-0.3	0.3
	Local brands	Count	58.0	68.0
		Expected Count	56.6	69.4
		Adjusted Residual	0.3	-0.3
Networks	Foreign brands	Count	33.0	3.0
		Expected Count	27.5	8.5
		Adjusted Residual	2.6	-2.6
	Local brands	Count	58.0	25.0
		Expected Count	63.5	19.5
		Adjusted Residual	-2.6	2.6

Note. For access tools, $\chi^2 = 0.1$, $p>.05$, For networks, $\chi^2 = 6.62$, $p<.05$

Discussion

The gender-power relationship was adopted to explain the results above by mapping out its distribution across a group of binary distinctions, including open-closed, design-consumption, and global-local. The relationship between power and gender is reflected in the concept of hegemonic masculinity that recognizes domination of men over women and valuation of males over females in patriarchic societies (Bird, 1996, p. 121). The concept also indicated that male domination and control are structured into social institutions (i.e., media, religion, and education systems) and are exercised in a hegemonic way that persuades the greater part of the population to conform to power relations of gender in ways that appear "natural", "ordinary", and "normal". The research indicated that hegemonic masculinity was widely presented in the practices of social institutions, particularly mass media (Consalvo, 2003, p. 40; Donaldson, 1993, p. 647).

For the overall frequency of new ICTs commercials, a non-significant difference between masculinity and femininity supports neither the traditional position about the domination of hegemonic masculinity nor the revolutionary position that new ICTs have become feminine media. Instead, the commercials appealed to both masculine and feminine values in a non-discriminative way. This observation suggested that in

terms of media presentation: 1) the domination of hegemonic masculinity has been undermined by new ICTs to some extent and 2) although new ICTs have been widely used in the feminine fields, femininity has not yet exceeded masculinity to dominate the situation. As a result, a balance was achieved between femininity and masculinity.

However, the results also indicated significant associations between gender values and different types of new ICTs. Some associations reflect the gender-power relationship across opposite design models - open and closed. In essence, computer-based ICTs and cell phone-based ICTs represent two major types of ICTs in human history - mass communication and telecommunication. They were built with different design models. Basically, mass communication is an open system that is based on a one-to-all model. Information in the mass communication system can be accessed by a large audience. In contrast, telecommunication is a closed system that is based on a one-to-one model. Information in a telecommunication system can only be accessed by a very limited number of people, mostly one caller and one receiver. This design difference was continued in computer-based ICTs and cell phone-based ICTs despite the fact that technological convergence blurred the distinction to some extent. Openness is the primary feature of an Internet network, with some exceptions, such as instant messengers and emails, allowing the one-to-one closed communication. In contrast, the primary service of a cell phone network focuses on one-to-one closed communication while some added-value services allow one-to-all communication, such as ringtone and wallpaper downloading.

The different design models provide technological conditions for social power to shape gender relations. In this study, hegemonic masculinity can easily penetrate and conquer the computer-based ICTs because they share the same open design with traditional mass media, which hegemonic masculinity has dominated already. Masculine values, therefore, were found to be positively associated with the computer-based ICTs in Table 5. In contrast, hegemonic masculinity can hardly break into the cell phone-based ICTs because of their closed design. So end-users are free from the control of social power and are allowed more freedom to realize their gender values. Meanwhile, the closed design creates a one-to-one channel for users to communicate their private issues that are embedded with feminine values (Moyal, 1992, p. 54). In this way,

feminine values that are marginalized by hegemonic masculinity find their existence in cell phone-based ICTs. Thus, feminine values were positively associated with cell phone-based ICTs.

The gender-power relationship in the binary distinction between design and consumption can explain the significant associations between masculinity/femininity and networks/access tools. The access tools of computers and cell phones are closer to the daily consumption of end-users than network services because access tools are immediate interface to end-users no matter whether they consume access tools themselves or consume network services through access tools. So end-users have more freedom to define access tools with their favorite gender values. In contrast, network services are far removed from end-users and their functions are mostly designated by their designers. The feminist research about both fixed-line telephones and computers revealed that end-users' daily consumption can change these technologies that were originally designed for masculine uses to encompass feminine values (van Zoonen, 1992, p. 13; Wajcman, 2007, p. 290). The association between masculinity/femininity and networks/access tools supports the pervasive feminist position that social construction of gender and technology can be reconfigured at the consumption end. This study suggested that the distance from the consumption end decided to what degree reconfiguration can happen.

The binary distinctions of open-closed and design-consumption jointly explain the associations between gender values and the four basic types in Table 4. The interaction between open-closed and design-consumption was listed in Table 9. It is not difficult to understand the gender values of Internet network and cell phones because their column and row have the same gender orientations in Table 9. On the other hand, the gender values of computers and cell phone network deserve our attention. For computers, feminine consumption neutralized masculine open-design so as to generate non-significant association. For cell phone network, in spite of its closed-design, television commercials predominantly promoted added-value services that are based on the one-to-all model. The rise of added-value services reflects the technological convergence of telecommunication network and Internet network. The openness nature of added-value services enabled the dominance of masculine values in their commercials.

Table 9
The Intersection between Design-Consumption and Open-Closed

	Design (M)	Consumption (F)
Open design (M)	Computer network (M)	Computer (non-significant)
Closed design (F)	Cell phone network (M)	Cell phone (F)

Note. M: Masculine values, F: Feminine values

The significant association between brand and gender involved the binary distinction between global and local. Freeman suggested that masculine values were traditionally labeled with global process because of a spatial reorganization of production across national borders and a vast acceleration in the global circulation of capital, goods, labor, and ideas, in which technologies play a critical role (Freeman, 2001, p. 1011). On the other hand, local process was related to feminine values because it contains flesh and blood of people's daily lives as they are bound up with ever-changing localities as well as cultural and political particularities.

In this study, foreign brands and local brands respectively represent global and local processes. The results of the study, however, rejected the traditional, static view about globalization that identified globalization with masculinity and localization with femininity. Instead, foreign brands were found to be associated with both masculine values (in computer-based ICTs and networks) and feminine values (in cell phone-based ICTs). Similarly, local brands were found to be associated with both masculine values (in cell phone-based ICTs) and feminine values (in computer-based ICTs and networks).

This finding illustrated complex interactions among gender, power, and new ICTs in globalization. In this process, gender values attached to global and local largely depend on gender-power distribution and are better presented in foreign brands than in local brands. When the computer-based ICTs and networks are dominated by hegemonic masculinity, masculine values are expressed in foreign brands as an indicator of globalization. When the cell phone-based ICTs are dominated by femininity, foreign brands are associated with feminine values. In contrast, local brands as an indicator of localization seem to become a space to preserve the opposite gender values against those of globalization. For the computer-based ICTs and networks, local brands contain the margi-

nalized feminine values. For the cell phone-based ICTs, local brands contain the marginalized masculine values.

These complex relations supported Freeman's position that global-local and masculinity-femininity are mutually constituted and transformed in a dynamic, flux way (Freeman, 2001, p. 1017). This position represents a stance towards globalization in which, as Freeman explained, "the arrows of change are imagined in more than one direction, and where gender is interrogated not only in the practices of men and women in local sites but also in the ways in which both abstract as well as tangible global movements and processes are ascribed masculine or feminine value" (Freeman, 2001, p. 1013). Meanwhile, foreign producers are more skillful than local producers in capturing gender-power distribution. Zhang and Harwood explained that China is still a developing country and its local advertising has not reached the levels of sophistication found in developed countries (Zhang & Harwood, 2004, p. 25).

Conclusion and Limitation

This study provides an empirical test about gender and new ICTs in which critical feminist studies were quantitatively examined by the content analysis of television commercials about new ICTs. The findings support neither feminine liberation nor masculine domination in media representation of new ICTs. A balance between masculinity and femininity suggests an ongoing transformative process in which hegemonic masculinity compete with emerging new ICTs. The transformative trajectories are further specified by mapping out the gender-power relationship across a number of binary distinctions, including open-closed, design-consumption, and global-local.

Although this study focuses on media presentations rather than social reality, its findings support the arguments in previous studies that were conducted by critical feminist scholars for the purpose of observing reality, for example, different gender values attached to binary distinctions of open-closed, design-consumption, and global-local. Thus, it is safe to conclude that the results of this study, though not 100 percent, to a large degree faithfully reflect the ongoing reality in which gender and new ICTs are socially constructed, instead of being distorted it.

Although this study offers some insights into gender and new ICTs, a couple of important limitations should be acknowledged. First, the television commercials used in this study were all broadcasted in mainland China. The gender values of new ICTs were somewhat affected by the Chinese context so as to limit the external validity of the results to some extent. Second, the sample of television commercials was obtained from a television commercial service that monitored 60 major television channels. The sample hardly represented the entire population of television commercials about new ICTs in China. Third, the findings in this study were based on the analysis of media presentation. Because of the dialectical relationship between media presentation and social reality, media presentation can only reflect the dominant cultural values in society, and must inevitably suppress minor or marginalized elements.

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