Economic technologies: The liberalizing and governing of poker machine gambling consumption

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Abstract

Australia's commercial gambling industry is a significant economic and social phenomenon. In particular, poker machine gambling in club and hotel venues has grown into a consumption market worth ten billion dollars. Yet little effort has been made to understand the emergence of this market from a theoretical point of view. This article adapts the concept of the 'technological zone developed by Andrew Barry, to the formation of club and hotel poker machine gambling consumption markets. It is argued that these markets are socio-technical achievements based on the dispersal of technical devices throughout social space. Key theoretical elements of technological zones, including metrology, infrastructure and qualification are applied to poker machine gambling markets to shed light on their material basis. It is argued that instituting material forms of technological government and commodity circulation simultaneously enables fast, continuous consumption, the micro-management of economic activity and reduction in costs associated with innovation and entry into multiple markets. It is also suggested that the formation of a technological zone forges something of a separation from historical concerns about the probity and fairness of gambling business.

Introduction

Economic life in contemporary capitalist societies is undoubtedly diverse and complex. Max Weber (1947) described economic action as a voluntary exchange of utilities, including goods, services and money, which reflects relations between social positions, patterns of socially embedded interactions and the power of social institutions. Where Marx had argued for the primacy of the relation to the means of production in structuring economic and social life, Weber saw more flexible and complex forms of social differentiation that assigned relative value to social positions through processes more akin to the operation of a market. Bourdieu (1984) elaborated the importance of symbolic exchanges in contemporary consumption choices, which transmute processes of differentiation into strategies of cultural capital accumulation that structure social 'distinctions'. Bauman (1998) has in turn emphasized the elevation of consumption practices to the status of 'vocation', arguing that the expansion of commodity consumption is now as important a goal for post-industrial societies as the expansion of productive forces.

Recent economic sociology has taken quite diverse approaches to dealing with interactions between buyers and sellers (see Fourcade, 2007 for an overview). One approach taken has been to look at the socio-technical instituting of commercial systems for the staging and sale of a variety of market goods (Barry & Slater, 2002; Callon et al., 2002; Slater, 1997).

Specific studies of complex commercial systems have emerged, including for financial credit (Poon, 2007) and fashion buying (Entwhistle, 2006). This article takes up a theme of this approach and these studies; that powerful commercial systems are complex socio-technical achievements that rely on significant deployments of forms of scientific knowledge and technology for their capabilities. As the article argues, it is important to realize that such capabilities simultaneously further both economic and governmental objectives, with consequences for forms of political contestation.

The technical processes underlying markets for consumer goods are thus viewed as integral to understanding social practices of consumption and their government. The staging of a commodity for sale and consumption by end-users comes often at the end of lengthy and complex chains of invention, investment, fabrication, mass production and distribution. Industrialization implies the application of a range of specialized rationalities and technologies to innovate in these processes. As Thrift (2006, p. 282) has described, industrial processes have become less 'linear', with feedback loops, end-user innovation and consumer communities operating to "draw consumers much more fully into the process, leaching out their knowledge of commodities and adding it back into the system". Open innovation further socializes processes of design and problem solving, further breaking down the distinction between those who are commodity-makers and those who are commodity-takers (von Hippel, 2005). In thinking about consumption there is thus a need to understand the power of commercial systems (Slater, 1999) that stage a good for sale, and particularly the ways in which it is integrated into social worlds and intensified in its interactive relationship with consumers.

The subject of this paper is a highly regulated consumption market, poker machine or electronic gaming machine (EGM)[1] gambling in hotel and club venues. Poker machine gambling in social venues can be thought of as a leisure or entertainment product that has been introduced into the social spaces of the popular classes in Australia (and New Zealand) and integrated into their hotel and club experience. In such social settings, poker machines are one form of consumer good that both competes with other in-venue products (eg. food and alcoholic beverages) for a share of customers money, and an entertainment service that complements these other offerings and the opportunity for 'socialising' provided in these venues. As gambling studies researchers have found, it is access to, and availability of, poker machines in social venues that is closely correlated to their quite extraordinary performance (Dickerson et al., 2003). The historical and political factors that lead to the situating of this particular

[1] Poker machines and electronic gaming machines (EGMs) are both terms commonly used to refer to the same devices, 'Australian-style' gaming machines with their distinctive combination of computerised information technology (CIT) and video technology. Gaming machines are commonly called 'slots' in the US, 'fruit machines' in the UK and video lottery terminals in Canada. Each is to some degree a distinct technological hybrid.

consumption good for sale in hotel and club venues are thus important to an understanding of this economic phenomenon. Although these factors are touched on briefly in the background to this paper, the main focus of attention is on aspects of *how* the consumption of poker machine gambling in hotels and clubs has been instituted, not why.

Background

Commercial gambling in Australia is a substantial industry and significant social phenomenon. The industry is made up of a range of different forms of gambling, varied types of product offerings and modes of delivery of consumption opportunities. Reith (1999, p.1) provides probably the best definition of gambling in its Western industrialised and commercialised form, as an activity "strictly demarcated from the everyday world around it and within which chance is deliberately courted as a mechanism which governs a redistribution of wealth among players and a commercial interest or 'house'". A total of 5,370 businesses were involved in the provision of gambling services in Australia as at June 2005, of which 77.8% were clubs, pubs, taverns and bars (ABS, 2006, p.5). In consumption terms, the commercial gambling industry in Australia was worth $16,910.3 million in 2004-05, equivalent to 3.05% of household disposable income. Of this, the dominant market was for EGM gambling in clubs and hotels which accounted for 59.7% ($10,095.5m) of total expenditure (gambler losses), compared to casinos 15.6% ($2,638.5m), off-course wagering on racing (TAB) 11.5% ($1,936.5m), and lotteries 9.6% ($1,619.1m) (Office of Economic and Statistical Research, 2006, Summary Table D).

The object of this paper is one particular form of this 'redistribution of wealth', the hotel and club 'poker machine' or electronic gaming machine (EGM) sector. Nationally, real expenditure on EGM gambling in hotels and clubs grew from $2,054.9m in 1989-90, when the industry only consisted of registered clubs in New South Wales (NSW) and the Australian Capital Territory (ACT), to $10,095.5m in 2004-05 (Office of Economic and Statistical Research, 2006, Table 223), following the introduction of EGMs to NSW hotels, and to hotels and clubs in other states and territories (except Western Australia) during the 1990s. Club and hotel EGM gambling consumption in NSW totaled $4,915.0m in 2004-05, compared to Victoria $2,393.0m, Queensland $1,677.5m and South Australia $749.3m (Office of Economic and Statistical Research, 2006, Summary Table D). The major beneficiaries of the growth in EGM gambling consumption in clubs and hotels are gaming operators, gaming venues, gambling management service companies, gaming machine manufacturers and governments. Table 1 shows the revenues received by state and territory governments from poker machine gambling in clubs and hotels and from gambling overall as a percentage of all state taxation.

Table 1: Australian state and territory gambling Tax Revenue, 2006-07

	NSW	Victoria	Queensland	SA	WA	Tasmania	NT	ACT	Total
State EGM tax ($AUD Million)	1,109	932	518	312	0	54	2	31	2,958
All State gambling taxes ($AUD Million)	1,653	1,508	825	422	164	86	65	48	4,772
All state taxes ($AUD Million)	20,425	14,204	10,471	4,083	6,719	959	431	929	58,222
Gambling revenue % state taxes	8.1%	10.6%	7.9%	10.3%	2.4%	9.0%	15.1%	5.2%	8.2%
EGM revenue % state taxes	5.4%	6.6%	4.9%	7.6%	0.0%	5.6%	0.5%	3.3%	5.1%

(Source: Australian Bureau of Statistics, 2008).

The amount of state tax revenue derived from consumption of poker machine gambling in 2006-07 ranged from $AUD 1.1 billion in New South Wales (NSW) down to zero in Western Australia, where poker machines are only allowed in the casino. As a proportion of all state tax revenues South Australia received the highest proportion from club and hotel poker machine gambling, whilst NSW, Victoria and Tasmania were all above the overall national proportion (5.1%). These taxes are direct taxes on poker machine gambling (Smith, 1998) as a 'special' kind of economic activity and do not include allocations to state governments via the goods and services consumption tax (GST) collected at the national level. State and territory governments have substantial and relatively direct economic interests in the industry.

The reliance of state and territory governments on gambling revenues is somewhat fraught politically. Historically, crime and gambling have been closely associated in Australia (Australian Institute for Gambling Research, 1999; Crofts, 2003; Hickie, 1985; Wheeler et al., 2007), and social struggle over the morality of legalised gambling was a strong theme of early colonial Australian history (O'Hara, 1988). Governments have progressively sought to make gambling governable (controllable and taxable), partly as a way of reducing the influence and financial viability of criminal organizations. Later, the tide of market liberalisation that was part of the 'structural adjustment' of the Australian economy from the 1980s, combined with changing taxation arrangements between federal and state levels of the Australian Commonwealth, contributed to the expansion of commercial gambling as state governments searched for new or expanded revenue raising options (Livingstone, 2001; PC, 1999). A range of secondary economic justifications were given for introducing poker machines to clubs and hotels: in NSW machine were introduced to hotels in 1995 purportedly to 'save' this ailing sector that were struggling to compete with the strong registered clubs sector; in Victoria and Queensland reduction in 'tax leakage' to clubs on their respective borders with NSW was cited; similar arguments were later made in South Australia (Australian Institute for Gambling

Research, 1999). Gambling liberalization and the opening of new markets for gaming machines was a coordinated form of economic action involving Governments, State agencies and corporate and other commercial actors.

Gambling business is regulated by Australian States and Territory governments and diversity exists in the scale and scope of the commercial sectors in each authorizing jurisdiction.[2] However, as each poker machine industry has been liberalized it has been given special treatment in legislation, particularly in relation to licensing and taxation. Licenses to operate gambling business are limited in number and restricted on character grounds. The numbers of devices are capped and their distribution is frequently restricted by regulations, usually related to venue size, type or geographic location. The special taxation arrangements that apply to gaming machine business reflect the perceived riskiness of the market good. The 'framing' (Callon, 1998) of 'new' poker machine markets has thus been highly deliberative and coordinated. This can be contrasted with the historical evolution of the oldest (and prior to 1991 the only) market for poker machine gambling in Australia in New South Wales (NSW) Registered Club venues (Australian Institute for Gambling Research, 1999). The harmonization of this 'old' market for poker machine gambling with the newer markets occurred through the connecting up of NSW gaming machines to a central monitoring system in the years subsequent to poker machines being allowed in hotels in that state from 1995. As will emerge below, this is indicative of gaming regulation being transformed into an ensemble of technical practices in the service of a culture of audit and risk management.

In summary, the significance of gambling, and the club and hotel EGM poker machine industry in particular, cannot be downplayed. It is not peripheral or inconsequential, in economic or social terms. Understanding the rapid growth in consumption of this commodity requires a more detailed analysis of the "specificity of particular socio-technical arrangements" (Barry and Slater, 2002, p.178). The focus of the paper is therefore on material arrangements of technological artefacts, technical devices, regulations and specifications that organise practices of both government and commercial actors. The approach taken uses the work of Andrew Barry (2001, 2006) on 'governing technological society' and, in particular, his conceptualization of the 'technological zone' as a framework for understanding the instituting of club and hotel poker machine gambling markets. Insights into the operations of technical working parties and information flows involved in the government of poker machine gambling are based on formal and informal contacts with gaming regulators in several states over a number of years.

[2] There were 200,507 gaming machines in Australia as at June 30 2005: 100,233 in New South Wales; 43,590 in Queensland; 29,624 in Victoria; 15,001 in South Australia; 5,144 in the Australian Capital Territory; 3,556 in Tasmania; 1,849 in the Northern Territory; and 1,500 in Western Australia (OESR, 2006, Table 288).

Conceptualising the poker machine gambling industry as a technological zone

A 'technological zone' is conceived as an explicitly material frame for understanding the way forms of government and modes of economic activity are instituted. According to Barry (2006, p.239), the concept of technological zone "points to the existence of forms of space which are neither territorially bounded nor global in their extension, yet are of considerable political and economic significance". Barry describes the basis for a technological zone as being "a space within which differences between technical practices, procedures or forms have been reduced, or common standards have been established" (2006, p.239). The coordination of economic activity through dynamics of *harmonization* and *standardization* are thus key themes in Barry's work, which in this paper are argued to help in better understanding the phenomenon of poker machine gambling.

Barry (2006) identifies three general historical forms of technological zone. He argues that the "development of common measurement standards and practices makes information comparable, in principle, between different locations. This establishes what one might call a *metrological zone*" (Barry, 2006, p.240). Barry gives the example of the development of the metric system of measurement, which has enabled the comparison of information at a fundamental level across global space. An equivalent at the micro-level of poker machine gambling is the development of standardized forms of metering that enable the tracking of cash in, prizes won and cash out. Such meters enable the calculation of turnover and expenditure at the level of the individual device, independent of physical cash counts. The readings of these meters can be compiled and compared, enabling analyses of commercial performance essential to the management information systems underpinning strategies for revenue growth, along with the monitoring of tax revenues accruing to public authorities.

Secondly, Barry (2006, p.240) describes how "the development of common connection standards makes it possible to integrate systems of production and communication, as well as to exclude consumers and producers who do not conform". Connection standards construct *infrastructural zones* (Barry, 2006, p.240) that enable the development and deployment of information and communications technologies. Barry's description of infrastructural zones refers to the integration of systems of production and communication. However, this conception can be equally well applied to some commercial systems that stage commodities for sale to consumers. For example, poker machines in Australian clubs and hotels are all integrated into telecommunications infrastructure, allowing a range of *network operations*. As will be described in more detail below, the networking of communicative poker machine devices reframes commercial and governmental possibilities. Not the least of these is the possibility to account for poker machine devices in a new and comprehensive way. Poker machines in

Australia are not permitted to be operated unless they are connected up to a central monitoring and control system (CMCS) in their respective jurisdiction, with each jurisdiction's CMCS having its own communications protocols. Once integrated into the network, individual devices pulse a signal to the CMCS every 3-4 seconds confirming their location and operating status. The small number of licensed devices in each jurisdiction that are not in operation at any particular moment (eg. maintenance, transit) can be accounted for individually. The connecting up of poker machine devices into networks thus establishes an infrastructural zone that both defines precisely the localized spaces of gaming consumption and makes the identity of sellers of the poker machine commodity highly visible to regulatory authorities.

Thirdly, Barry (2006, p.240) contends that "the development of common regulatory or quality standards has become critical to the government of economic and political life". The establishing of a *zone of qualification* thus depends on the "development of various technical devices which make it possible for the qualities of objects and practices to be assessed and compared" (Barry, 2006, p.240). Just as Barry describes, the development of common standards for poker machine devices has been a key process in the instituting and evolution of poker machine gambling markets. The *Australia/New Zealand Gaming Machine National Standard* (2007, currently in its ninth revision, henceforth *National Standard*), has been developed by a Working Party of regulators from Australia and New Zealand through a process involving consultation with gaming machine manufacturers (National Standard Working Party, 2007, p.13). The *National Standard* sets out "the core requirements, common to all jurisdiction, for the design of gaming machines and games for operation throughout Australia and New Zealand and to guide testers in their testing for compliance with the Standard" (National Standard Working Party, 2007, p.12). The *National Standard* thus limits or shapes the trajectory of industrial innovation, a process which, as will be described later, involves flows of knowledge and information between government agencies and design/manufacturing/testing companies. As part of this process of qualification, the development of the facilities and capabilities necessary for assessing whether industrial artefacts with complex software, hardware and other design components meet the requirements of the *National Standard* are outsourced to private companies. These entities must satisfy a further set of standards for inclusion as a Licensed Testing Facility, with the aim that assessments made by a facility in one jurisdiction be acceptable as evidence by other licensing authorities. As will be discussed below, the introduction of this third form of organization into processes of qualification configures information and knowledge flows with important commercial and political implications.

In summary, poker machine gambling consumption, conceived as a particular form of technological zone, is composed of material devices with communicative, monitoring and

measurement capabilities, connected up into distributed networks. The commercial and governmental goals that frame this zone are pursued through coordinated socio-technical arrangements. As Barry contends (2001, p.279), such arrangements are intimately bound up in the activities of governments which "have become less concerned with questions of distribution and public ownership, and more concerned with fostering a culture of regulation, monitoring, measurement, auditing, testing and compliance". The institution of such a culture "does not rely just on the conduct and properties of persons, but on the actions of a whole array of technical objects...government is exercised through the proliferation and dispersion of technical devices" (2001, p.19, p.175). Whilst the dispersal of poker machine devices throughout social space can be understood as a primarily economic form of action, processes of governing gambling can be argued to be intrinsic to this activity. The following sections explore aspects of the coordinated pursuit of diverse economic and governmental goals through material forms and technical practices that define a technological zone.

A networked commercial system

The gambler in the gaming room of clubs and hotels in Australia participates in a consumption market that is instituted through a systematic deployment of applications of science and technology in social space. As Madeleine Akrich describes:

> [m]achines and devices are obviously composite, heterogenous, and physically localized. Although they point to an end, a use for which they have been conceived, they also form part of a long chain of people, products, tools, machines, money, and so forth…even the most mundane objects appear to be the product of a diverse set of forces (Akrich, 1992, p.205).

The poker machine artefact is the outcome of such a 'long chain' of knowledge inputs, research and development (R&D) and industrial engineering. The industrial history of the EGM has been transformed with the emergence of new platform technologies, particularly computerised information technologies (CIT). Contemporary 'Australian-style' hybrid devices composed of computer and video technologies, including random number generators (RNGs), algorithms governing responses to RNGs, a central processing unit game (CPU), game software and a video display unit. As fundamentally CIT equipment, poker machines are no longer simple stand-alone machines but rather communicative and calculative devices, which are configured as nodes within networks (Austrin & Curtis, 2004).

The physical nature of mechanical gaming machine reels placed material limits on the numbers of different 'stops' or symbols that the machine could feature. Most early gaming machines had 22 stops on each of three reels, meaning that gamblers could, with relative ease, simply calculate the odds of winning the top prize (22 x 22 x 22 = 10,648, or odds of 10,648 to

1). This in turn limited the size of prizes that could be offered, with the relatively good odds of spinning up the top prize meaning that operators had to keep the size of prizes relatively low. Unlike mechanical poker machines, each of the five virtual reels in CIT-based devices can have between 20 and 60 different 'stops', and EGMs have reels of different 'length' on the same device. The approximate number of different possible combinations that can be mapped onto the virtual reel screen display is 80 million, with a requirement that the probability of attaining each winning combination in the base game is not less that one in seven million (National Standard Working Party 2007, s.3.9.16b). The number of possible winning combinations and opportunities to provide reinforcement for gambling behaviour (prizes) is thus increased exponentially.

The consumer good (the bet) becomes de-materialised and ephemeral with the move to CIT based devices, unlike the profound materiality of its staging and sale in the poker machine box, with its lights, music and thematic displays. The bet can be consumed continuously and rapidly, with game cycles usually in the range of 3.5-5 seconds. Ten or twelve bets per minute can thus be comfortably consumed, in this sense the consumption good is a kind of 'hyper-commodity' that can be circulated with optimal speed and efficiency. The 're-distribution of wealth' that is the operation at the centre of the commercial system thus occurs at a greatly accelerated rate in comparison to past technological platforms.

Technological change is thus a key dynamic shaping technological zones. The transformation of poker machines from mechanical to CIT devices expands the possibilities for pursuing the key economic goal of extending consumers participation and expenditure. Not only is interactivity made more rapid and continuous but it can be punctuated by other entertainment events, such as feature games within games, dynamic sound effects and graphics displays, and other bonus features that enhance the way the good (the bet) is packaged and offered for sale to consumers of EGM gambling. As Thrift (2006, p. 288) describes, in contemporary consumer markets "commodities must appeal across all the senses…sensory design and marketing have become key". Where mechanical pokies simply *responded* to a single linear operation, contemporary EGMs *resonate* in multiple sensory registers simultaneously (Thrift, 2006). This enhances the "stickiness" of the commodity and the "affective grip" the consumption experience has for consumers (Thrift, 2006, p. 288). The interactivity of the gaming machine consumption relationship is thus intensified, through expansion in the number of 'choices' to be made that enhance a sense of individual agency, and in the range of sensory and cognitive experiences available (Schull, 2007).

The integration of gaming machines into networks further expands the possibilities of the product offering. Gamblers' stakes can connect them simultaneously into a range of

different gambling pools or jackpots. These can be venue-based, local area (LAN) or wider area (WAN) jackpots circulating percentages of stakes into larger pools and calibrating the distribution of multiple patterns of interlinked rewards. In addition, poker machine devices are increasingly operating as terminals, with a variety of different games downloadable from a server and playable in a single unit.

The rapid iteration of the poker machine bet, and its simultaneous replication at multiple points of a network, generates incredible volumes of (digital) data. Despite this profusion, activity within the technological zone can be systematically managed and scrutinized at multiple levels of granularity by both government and corporate actors. Most monitoring and control systems (CMCS) monitor the activity at each of its nodes in real-time, through micro-second pulses that are relayed via venue controllers in each gaming location. Each CMCS requires specific communications protocols to enable inclusion in its network, whilst standardized forms of metering and types of information relayed mean that data can be compared between individual poker machine devices, gaming venues and subsequently between discrete poker machine networks. From a commercial viewpoint, these data are the key management information stream in terms of device performance and distribution and product mix in gambling rooms. These data inform strategic analysis and decision-making processes. Some CMCS even enable key variables in the poker machine 'game set', such as their credit value[3], to be altered remotely.

From a government viewpoint, network operations allow turnover and expenditure to be monitored in real-time and risk-management paradigms constructed to benchmark the 'normal' operation of the system. The National Standard (2007) contains a section (sec 3.16) entitled 'Gaming Machine Events', setting out those events requiring intervention: including operational faults; de-activation; changes of state such as opening of cabinet door or the device logic box; large jackpot wins, etcetera (National Standard Working Party, 2007, p. 59.). Different types of gaming machine event require different levels of intervention, including those by licensed gaming technicians or through the CMCS. In this way specified events are monitored and governed. At the same time other unusual events, including suspected money laundering, are cast into relief and hence can draw potential regulatory scrutiny (Australian Institute for Primary Care, 2006).

The networked commercial system is thus characterized by 'normal' pattern of operation made visible in digital data. The monitoring of specific gaming machine events is thus a banal yet critically important aspect of the government of the commercial system. The

[3] In effect the minimum bet unit of a device. Common credit values are 1 cent, 2 cent, 5 cent, twenty cent and one dollar.

sending of pulses, recording of responses and capture of play data enables the authorities to measure and monitor and construct a risk management paradigm on this basis. A culture of audit can be developed around this stream of information, with regulatory routines and interventions organized through a set of interrelated technical practices conducted both on-site and remotely.

In the theoretical terms of the technological zone, each club and hotel network thus defines an infrastructural and metrological space. The connecting up of individual CIT-based gaming machine devices, via telecommunications infrastructure to computerized information collation and processing capacities, establishes a space for the staging and governing of consumption. The sheer profusion of data created by the operation of the networked commercial system is thus a key factor that makes its commercial management and government possible; these commercial and governmental capabilities are brought into existence by the metrological capacities that are formed by, and form, a technological zone.

The importance of specifications

Poker machines can be conceived of as complex, hybrid devices that combine various forms of scientific knowledge (behavioural sciences, mathematics, computing) and industrial innovation (mechanical, electromagnetic, CIT platform technologies) into a "heterogeneously engineered" artefact (Law, 1994). Such industrial products are the object of ongoing processes of innovation. Innovation in poker machine operating systems, game software features, physical box design and theme rights, etcetera, is big business. The quest for an ever more efficient engineering solution to the EGM problematic – how to attract consumers and extend their involvement in gambling activity – is the subject of substantial research and development (R&D) investment. Aristocrat Pty Ltd., the leading Australian poker machine manufacturer reported spending $AUD104.2 million on R&D in 2006-07, for example (Aristocrat, 2008, p.9). Invention, innovation and R&D can be expected to continually transform technological artefacts, in so doing transforming the contours of the technological zones which their dispersal and interconnection construct.

Innovation processes in the gaming machine manufacturing sector do not occur in isolation but are coordinated in concert with regulatory authorities. The connections and information flows between government agencies and manufacturers are thus important for understanding the contours of the consumer market that is instituted. Poker machines must conform to the detailed technical specification set out in the *National Standard*, which contains detailed sections on computer hardware, game software, metering, memory, box artwork, bank note acceptors, random number generators (RNGs), paytables and return to player (RTP). The

intent of these specifications are "to ensure gaming on gaming machines occurs in a manner that is: a) fair; b) secure; and c) auditable; and that gaming machines are reliable in terms of these issues" (National Standard Working Party, 2007, p.13). The key goals of the technical practice of governing gaming machines are here clearly set out as ensuring the probity of the industry and the fairness of its products, and protecting the revenue derived from consumption.

The *National Standard* thus puts into circulation specifications that determine the formation of a zone of qualification that governs which products are included and excluded (Barry, 2001, p.63). Standardisation means harmonising technical requirements across "spaces of circulation which may be more or less global or local, more or less continuous and more or less subject to forms of political regulation and contestation" (Barry, 2001, p.200). In the case of the gaming machine industry in Australia and New Zealand, the space of circulation generated by the process of standardisation is trans-national in scope and envisaged to have specific practical benefits. A number of these benefits are identified, including reducing "duplication of effort on the part of manufacturers in the design and manufacturer of gaming machines" and providing "cost savings when equipment previously approved in one jurisdiction is assessed for approval in other jurisdictions" (National Standard Working Party, 2007, p.13).

Harmonising the requirements for compliant gaming machines means that processes of design and innovation can also be simplified and streamlined, as requirements for entry to diverse markets become standardised. It is important to recognise here, therefore, that the generation of a technological zone via a set of specifications and related technical practices of government formats the properties and qualities of the consumer good in concert with industrial innovation dynamics (Callon et al., 2002). In the case of gaming machine markets, the *National Standard* is explicit in its recognition of this point, stating that "[n]ew developments in gaming machine technology are recognised and encouraged" (National Standard Working Party, 2007, p.13). The *Standard* specifies that "it is not the intention…to unreasonably…limit technological application to gaming equipment…limit creativity and variety of choice…limit marketability…preclude research and development into new technology, equipment or innovative solutions" (National Standard Working Party, 2007, p.13). The *National Standard* can thus also be understood as putting into circulation a general approach to the management of innovation in the gaming machine manufacturing sector.

In such a context, government of poker machine devices demands relatively sophisticated levels of technical expertise, as the conformity of devices requires technical testing of game software, random number generators and other core technical components. One way in which this technical competence can be accessed is to outsource aspects of technical government to private sector expertise. This is the case as regards to the testing of new or re-

configured products for conformity to the *National Standard*. Testing required as part of the approvals process is carried out by independent third party organizations that have been licensed as testing facilities. These testing facilities must themselves conform to certain requirements for licensing, for example retaining a minimum number of staff (Australian Institute for Primary Care, 2006). The boundaries of the zone of qualification established by the *National Standard* are thus continually defined and re-defined via the assessments carried out by licensed testers. Approval by regulators is subject to satisfactory qualification.

The triangular relationship between state approving authorities, licensed testers and poker machine manufacturers requires significant exchanges, and sharing, of information. As one regulator described, it is important to 'avoid million dollar questions', where innovation has proceeded along a particular path only to be 'knocked out' in the approvals process. Manufacturers and regulators therefore discuss proposed innovations at an early stage in their development, in keeping with the aims of the *National Standard* to not restrict design, technical and other advances and in the interests of manufacturers being able to recoup returns on their R&D and product development investments. At a more formal level, the *National Standard* is revised periodically through a process of national collaboration between technical regulators from each state and territory and New Zealand, and with formal input from gaming machine manufacturers, who can submit their own suggestions for modifications to existing specifications for consideration by the National Standards Working Party. The flows of information, both relatively informal and formalized, which circulate between the parties with interests in the innovation process and the operation, transformation and implementation of technical specifications is thus crucial to the formation of technological zones.

In arguing for the importance of specifications in formatting economic activity, it is important not to carry the argument too far. Whilst as Barry (2001, p.63) describes, "the ideal of standardization is the fantasy of a smooth and homogenous technological zone in which the speed of circulation is maximized", in actuality, "[w]hile many standards are fixed and accepted, standardization is never a completed process" (2001, p.63). In the case of the poker machine gambling industry this is true in at least two respects. First, each jurisdiction has a unique administrative framework for regulating gambling. This is reflected in the dialogic process by which the *National Standard* evolved. Although the dynamics of standardization and harmonization underpin the evolution of the specifications each jurisdiction attaches an Appendix to the *National Standard* that reflects jurisdiction specific issues and which takes precedence where there is conflict between the two documents. As one regulator described, sharing information about state and territory processes and initiatives provide an opportunity for others to identify 'what works'. Once identified as effective, 'what works' may be adopted by

other jurisdictions. So whilst metrological and infrastructural zones that have common bases, and a zone of qualification based on shared, negotiated protocols and technical requirements is embodied in the *National Standard*, the evolution of technical practices that may lead to transformations in broader zones are likely to take place in delimited spaces, prior to being communicated, diffused and subsequently codified in the technical specifications.

Secondly, standardization and harmonization are limited by the obdurate materiality of socio-technical systems. The clearest example of this is in New South Wales. Historically, the NSW club sector had the oldest industry and hence the most varied stock of gaming machines. The retro-fitting of communications protocols (X-standard) to the stock of machines in NSW clubs and hotels was thus a relatively difficult and costly process compared to rolling out networked stock 'off-the-shelf' at industry start-up, as occurred in other jurisdictions. Regulators from NSW actually did not join the National Standards Working Party until relatively late (around 1998), reflecting the uniqueness and path dependence of industry arrangements in that state. Older machines were given a sunset date leading to turnover toward more sophisticated communicative devices. However, the CMCS that was implemented in NSW lacks some communicative capabilities found in other jurisdictions, a consequence of these historical circumstances and the diverse material forms confronted in connecting up the pre-existing stock of machines into a network.

In summary, codified specifications have been integral to the formation of a technological zone and the dynamics of standardization and harmonization that this entails. Despite limitations based on diverse politico-administrative arrangements and material forms, innovation and transformation in the poker machine industry is shaped and constrained by these dynamics. The formation of technological zones thus allows for the coordinated pursuit of both economic and governmental goals. However, as the following section describes, despite their apparent reliance on forms of technical government, technological zones remain sites of political contestation.

The politics of fairness in the technological zone

The specifications codified in the *National Standard* and its various Appendices form zones of qualification and metrology that, as Barry (2006, p.249) describes, forge a separation between the legitimate inside and the ungoverned space outside the technological zone. The gambling industry has always been to some extent a controversial one, and the stated aims of the *National Standard* (2007, p. 13), in relation to the probity, fairness and revenue security of the gaming machine industry, reflect political, as well as economic, imperatives associated with governing gambling. The institution of commercialised gambling as a sector based on products and

surveillance systems that are highly technicised and perceived as relatively independent of human intervention, forges a separation from perceptions of crime, actual corruption or other interference in the fairness of gambling.[4] The institution of conceptually distinct regimes of metrology, such as through the introduction of licensed third party organisations to undertake technical testing as part of the gaming machine approvals process, further strengthens this separation, by introducing the need for collusion between different entities to allow systematic corruption of the process of product qualification. As Barry (2001, p.279-80) describes, "[m]etrology – in all its forms – becomes a secure relay between the political and the economic field. It connects them yet keeps them distinct and pure". The club and hotel EGM gambling sector is thus rendered less controversial, less political, at least in relation to perceptions of criminal influence, due to its technological basis.

The political problematic for Governments that license poker machine gambling products has been less to do with crime than it has been to with personal, financial and social consequences emerging from consumption of the product. The distribution of poker machines in clubs and hotels in Australia is strongly correlated with locations of relative socio-economic disadvantage (Marshall & Baker, 2002; Livingstone, 2001; PC, 1999; South Australian Centre for Economic Studies, 2005a, 2005b). As consumption has grown and private profits and public coffers have swelled, so have the costs of some of the 'externalities' associated with poker machine gambling (PC, 1999), particularly the phenomenon of 'problem gambling' (Collins, 1996). As one of the major beneficiaries of EGM gambling revenues, governments have been confronted with a clearly delineated controversy – the social costs of poker machine gambling – requiring increased political attention and policy responsiveness (Livingstone & Woolley, 2007).

State agencies charged with setting up and administering a legitimate poker machine industry are thus implicated in an emergent tension between their historical role and their response to the public controversy. In general, state agencies see the fostering of a culture of system auditing and technical government as conceptually distinct and operationally separated from the development of what might be called a 'consumption ecology' based on a philosophy of 'responsible gambling'.[5] Governments and state agencies have developed an 'ecology of care' within poker machine gambling venues, structured by 'harm minimization' principles and strategies, including the provision of consumer information, counseling services and access to

[4] In fact, criminal activity in relation to gaming machine networks may itself become CIT and network based (McMullan & Perrier, 2003, 2007)

[5] Increasing attention has been paid to the configuration of poker machine technology and its relationship to safe consumption and problem gambling in recent years (see Blaszczynski et al., 2005; Delfabbro et al., 2005; Dickerson et al., 2003; IPART, 2004; Livingstone & Woolley, 2008; Sharpe et al., 2005).

clinical treatment. What has emerged in the spaces of consumption within the technological zone is thus a dialectic between a commercial system that produces harm via its interactive relationship with some consumers (Lloyd, 2002; Schull, 2007) and a state-sponsored ecology of care within these (nominally private) spaces.

Separate government Working Parties deal with technical matters and with responsible gambling, reflecting an administrative partition between 'system' and 'effect'. However, despite this formal separation the flows of information contributing to the formation of the technological zone tend to mediate between the two. For example, one state regulator described assessing proposed or actual technological innovations as equally a matter of experience or 'feel for the game' as it was a matter of knowledge and application of standards. This regulator stated the importance of 'player protection', describing how an innovation that was not technically in breach of specifications, but which in the opinion of regulators would lead to larger average bets being made on a device and hence have the potential to exacerbate 'problem gambling', would likely be the subject of a process of negotiation and modification with the manufacturer. Certain thresholds for game features viewed as potentially risky for gamblers have subsequently been codified in Appendices to the *National Standard* through such processes.

In summary, it can be argued that the flows of information and processes of negotiation around certain 'objective' technical questions also reflects a situated politics of fairness, centred on the relative (un-)safety of consumers who interact with the commercial system, that is historically and socially distinct from a concern about crime and corruption. Despite degrees of formal separation between 'the system' and consumption practices, the regulatory 'feel for the game' required to negotiate the boundary of the zone of qualification, particularly in relation to public controversy over 'problem gambling', implicitly reflects the interactivity of socio-technical arrangements and the relationship between gaming machine devices and social consequences. It is at such points that we can see contestation over the boundaries of the technological zone, a dynamic carried forward through provisional resolution of emergent conflicts between economic, governmental and public policy goals. This occurs through interrelated processes that are both informal (information sharing) and formal (revision of specifications) in character.

Conclusion

Poker machine gambling in social venues in Australia can be understood as an economic activity that has been instituted through the coordinated efforts of Governments, state agencies and a range of commercial actors. The importance of applications of scientific knowledge and

technical capabilities has been shown to be integral to this process, conceptualized as the formation of a 'technological zone'. The properties of this technological zone define the limits of legitimate economic activity and exclude other actors from participation.

Consumption within the club and hotel gaming rooms has been instituted as fast, fun and fair. State agencies were given a clear task by State and Territory Governments, to set up and regulate a fair and profitable commercial gambling sector in hotel and club social venues. The resulting economic activity has been portrayed as a socio-technical achievement, realised through processes of information sharing, government through technical practice, and the fostering of a culture of audit and risk management. These processes have enabled both commercial and governmental goals to be achieved and to be continuously 'worked on' through the formal pursuit of technical standardization and procedural harmonization.

The forms of coordination that have enabled the liberalization and government of poker machine consumption markets have thus relied on technical understandings of efficiency to integrate diverse objectives. These include standardized metrology, secure telecommunications infrastructure and codified specifications around which informational flows are organized. The dispersal of technical objects across social space thus stages both the 're-distribution of wealth' that is the central operation commercialized gambling industry and its government. The coordination of innovation and transformation in the material basis of the commercial system through the application of specifications and the sharing of information, highlights the fact that defining a technological zone of economic activity requires ongoing commercial and governmental processes that are always to some extent incomplete and subject to negotiation. Despite the separation these processes have forged with historical concerns about corruption and criminal influence surrounding gambling, club and hotel poker machine gambling remains a controversial form of consumption. The socio-technical institution of this form of economic activity is thus also a site of political contestation, organized around a politics of fairness in relation to the consumption practices that have emerged in interaction with what is now a powerful commercial system.

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