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Current Analysis and Future Research Agenda on "Gold Farming": *Real-World Production in Developing Countries for the Virtual Economies of Online Games*

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Abstract

From the start of the 21st century, a new form of employment has emerged in developing countries. It employs hundreds of thousands of people and earns hundreds of millions of dollars annually. Yet it has been almost invisible to both the academic and development communities. It is the phenomenon of "gold farming": the production of virtual goods and services for players of online games. China is the employment epicentre but the sub-sector has spread to other Asian nations and will spread further as online games-playing grows. It is the first example of a likely future development trend in online employment. It is also one of a few emerging examples in developing countries of "liminal ICT work"; jobs associated with digital technologies that are around or just below the threshold of what is deemed socially-acceptable and/or formally-legal.

This paper reviews what we know so far about gold farming, seeking to provide the first systematic analysis of the sub-sector. It assembles available data at the sectoral, enterprise and worker level. Five main analytical lenses are then applied. Economic analysis shows how exchange rate variations and scale economies do and do not impact gold farming; and the strong influence of information failure in the purchase of virtual items: known as "real-money trading". Analysis from the perspective of industrial sociology charts the commoditisation and globalisation of the sub-sector, while value chain models identify resource dependencies and power inequities. Enterprise analysis investigates enterprise entry, existence and progression, and outlines the competitive forces shaping the sub-sector's development; particularly threats. Developmental analysis investigates the impact of this sub-sector in macro and micro terms. Finally, there is a sociological analysis of the role played by perceptions and other social forces.

In using a broad base of analytical perspectives, the paper aims to encourage, and provide a stepping stone for, further research on this growing phenomenon. It concludes by outlining and justifying a future research agenda.

Introduction

Technological change readily throws up phenomena that sit under the radar of academic research for many years. Gold farming is one example. As defined here, gold farming means the real-world sale of virtual goods and services produced in online games. For example, many online games have a virtual economy and an in-game currency. Gold farmers can play in-game to make some currency. They then sell that for real money – typically via a web site and using the PayPal payment system – to other players of the game.

This activity has been large enough to call an economic sub-sector – employing tens of thousands in developing countries and with global trade worth hundreds of millions of dollars – since at least 2003. From a development perspective, it is providing income, jobs and skills. It is thus offering one answer to the conundrum of how to create new livelihoods from the ICT infrastructure spreading throughout developing countries. And it is the first example of what will be a much larger set of economic activity in future; not just given the 80% per annum increases in global online gamers (White 2008) but as people spend more and more of their time interacting in cyberspace generally and in virtual worlds specifically.

Gold farming is thus an early example of online employment – what we might otherwise call "cyber-work" – in developing countries. It is also an example of what we might call "liminal ICT work": work associated with information and communication technologies that is around or just below the threshold of what is deemed socially-acceptable and/or legally-permitted¹.

Yet, to date, there has been practically no academic research on this topic. It has been noted in the mainstream media and, given the strong feelings it arouses, has been the subject of much opinionation in the blogosphere. But there does not appear to be a single journal article on gold farming².

Box 1: Understanding Online Games

The first computer game – a version of noughts-and-crosses – was created in 1952, with the first two-player game appearing ten years later (Kelly-Bootle 2006, Damer 2007). Our story, though, really begins with the creation of MUDs – multi-user dungeons – in the late 1980s. These were text-based games run on networked mainframe computers that created imaginary worlds, including imaginary objects (swords, armour, magical rings, etc). Players started occasionally trading those objects for real money. MUDs gradually metamorphosed into MMORPGs – massively-multiplayer online role-playing games. To date the most successful example of these is *World of Warcraft* from US-based Blizzard Entertainment (part of Activision Blizzard). Players pay a monthly subscription fee of around US\$15 and create a character that can then enter the virtual world of Azeroth. Their character (or "toon") can be seen on-screen (as an "avatar") and can travel through the virtual world killing "monsters" (creatures that inhabit the world which form a sub-set of all NPCs: non-player characters); undertaking activities like mining, fishing or crafting virtual items; and buying or selling items with other players. When a monster is killed it "drops loot", i.e. the player can collect both in-game currency and valuable items. It is this activity that forms the basis of much gold farming. As a player's

¹ Other examples would include sale of digital pornography (e.g. Barendregt 2006), and the unlocking or re-chipping of mobile phones (e.g. Hahn & Kibora 2008).

² By comparison, for example, informal real-world gold mining in Ghana is on roughly the same scale in employment terms (Hilson & Potter 2005), but has been the subject of dozens of journal articles. There are interesting parallels to research between real gold mining and virtual gold farming.

character kills monsters and undertakes various tasks, its "level" (i.e. its strength, stamina, abilities, etc.) rises; from level-1 initially up to much higher levels.

The popularity of specific online games ebbs and flows. At the time of writing, *World of Warcraft* was far and away the largest MMORPG with over 10m subscribers, half based in East Asia. Second most-popular was UK-based Jagex's *Runescape* with over 1m subscribers (Woodcock 2008). These are both examples of p2p – pay-to-play – games requiring monthly subscriptions, though *Runescape* – like a number of online games – has a free-to-play version that costs nothing to play but which restricts play to a small sub-set of activities available in the p2p version. An alternative model, much used in Asia, is "free-play, item-pay", in which the full game costs nothing to play but in which full participation and rising to higher levels requires the real-money purchase from the game developer of in-game items.

Given the unwieldy nature of MMORPG as a term, in the text that follows, the term MMOG (massively-multiplayer online game: 94% of MMOG subscriptions are for MMORPGs (Woodcock 2008)) or "online game" will also be used.³

This paper therefore aims to provide the first broad-ranging academic review of this emerging sub-sector; given the calls for more theorised analysis of gold farming (Toscano 2007). It presents something of a smorgasbord of analytical foundations, each one of which is intended to form a launch pad for more in-depth research. It uses secondary sources as its base, though recognising the urgent need for additional primary fieldwork on gold farming (see Appendix 1 for more detail on sources).⁴

What follows, then, will firstly be an overview of gold farming – its origins; its activities; and a collation of what statistical data there is. Succeeding sections take, in turn, a particular analytical perspective and apply a first-pass examination of gold farming from that perspective. Section B picks an economic lens and analyses the income, expenditure and profitability of gold-farming enterprises; reviewing how those may have changed given the serious devaluation of virtual against real currencies in recent years. The presence of scale economies is investigated before analysing the sub-sector as a classic case of information failure.

Section C grows out of industrial sociology to perform a quasi-Marxist chronology of the sub-sector's historical development, followed by analysis of gold farming's global value chain. Section D takes a more mainstream business approach, looking at the kind of entrepreneurs that enter the sector, and at how we might measure the progress of their enterprises. It then performs a competitive analysis focusing largely on the many threats that make gold farming an uncertain and vulnerable affair.

Development studies and gold farming have so far had nothing to say to one another, so Section E's developmental analysis is more formative than some of the others, briefly reviewing the macro-developmental impacts, and the micro-impact on livelihoods. The analysis ends with Section F's return to sociology, discussing the perceptions and discourse on gold farming that have arisen particularly in the West; and what we can learn about relations between the real and the virtual.

³ Almost all discussion of gold farming relates to MMORPGs. However, it does spread beyond that. For example, one Hong Kong-based firm is offering power-leveiling services for XBox-360 console online gamers (<http://www.levelmy360.com/>).

⁴ Because of this reliance on secondary, mainly-unrefereed sources, it is possible that this paper contains some "howlers": significant errors or misunderstandings. Likewise because my own in-game experience is restricted so far to *Runescape* and *World of Warcraft*. *Caveat lector*.

The final section provides a short summary of the paper, and concludes with a discussion of the future research agenda on gold farming; not merely what that agenda might contain, but also the rationale for pursuing such research.

Because of the breadth of data items available in current literature, and given the formative nature of research and the many possible routes forward, the paper is liberally sprinkled with footnotes and boxes expanding on or sidetracking from the main analytical content.

A. An Overview of Gold Farming

A1. The Origins of Gold Farming

Gold farming is a modern fraction of the relatively much older phenomenon of "real-money trading" (RMT)⁵; traced back to 1987 and the first cash payments between players for items or for improving characters within text- and basic graphics-based multi-user dungeons (Hunter 2006)⁶. RMT trundled on during the 1980s and 1990s but seems to have remained a phenomenon of the global North.

This began to change at the end of the 1990s for reasons related to two different markets. First, MMORPGs really began to grow in industrialised countries with the launch of *Ultima Online* in 1997. Alongside that growth was a strong take-off in real-money trading; facilitated by the founding of eBay (Lewis 2006). Whenever a new online game was launched, items would be available for sale on eBay within a few weeks.

As discussed in more detail in Section C1, the sale of in-game items and currency was initially a cottage industry of players-turned-traders based in industrialised countries. In 2001/2002, though, this changed as mainly US-based traders perceived the opportunities for outsourcing to low-wage labour locations such as Mexico and East Asia. Some of these traders were North Americans of Asian origin, or Asian students studying in the US (Jin 2006).

This "outside-in" model met up with an "inside-out" model that lay behind the second reason for growth of developing country gold farming: serving the domestic/regional market. There was a particular growth in online games-playing in East Asia from the

⁵ Following Lehtiniemi (2007), we can divide RMT into two elements: primary RMT that takes place in-game or beside-game as part of the sanctioned design of the game by the game company, and secondary RMT that takes place partly out-game and is not sanctioned by the game company. Examples of the former include the Station Exchange trading system on two *Everquest II* servers, and all purchases made within the free-play, item-pay online games popular in Asia. Unless indicated, gold farming will be taken as synonymous only with secondary RMT. It does not a priori restrict the notion of gold farming solely to developing countries, nor solely to formal activity undertaken on a commercial basis, though the majority of gold farming discussed here conforms to both those restrictions. In a strict sense, one should probably see gold farming and secondary RMT as two parts of the same value chain: the former being the production, the latter being the trade.

⁶ Maxson (2006) claims the practice dates back to the early 1980s with item and character trading on the game *Avatar*, which was written in 1979.

late 1990s.⁷ The games played were initially foreign imports such as Blizzard's *Starcraft* but in 1998 the South Korean firm NCSoft launched *Lineage*, the first significant non-industrialised-country MMORPG. The game soon spread to China and Taiwan and Japan. In-game traders began paying those around them to earn "adena" – the *Lineage* in-game currency (Chan 2006). As *Lineage* began being played outside East Asia (particularly when *Lineage II* was launched on American servers in 2003), and as East Asians increasingly played Western MMORPGs, the "adena farmer" model spread. It seems likely that it was at this point – from late 2003/early 2004 – that the number of gold farms rose from dozens to hundreds and then thousands (Jin 2006b, PJ 2007).

Summarising gold farming's origins, it was likely in existence from at least 1998 but under (Western) radar. Earliest recorded activities include:

- "Inside-out" model: Korean cybercafés being converted into gold farms to serve the local market in 2001 (Huhh 2008); Chinese gold farmers working for Korean and Japanese players from 2001 (Jin 2006)⁸, and
- "Outside-in" model: a US firm outsourcing to Mexican gold farmers in 2002 (Dibbell 2003).

Earliest usage of the terminology that I have been able to locate dates to 2003 on TerraNova (Kiblinger 2003) but it must go further back than that.

A2. Activities of Gold Farmers

What do gold farmers actually do? They sit at an Internet-connected PC and they play an online game for the purposes of making real money. Gold farmers make real money in three main ways, listed in what are likely to be (Carless 2007, Robischon 2007)⁹ decreasing order of activity and earnings:

- Selling in-game currency: akin to purchasing real-world foreign exchange. The currency is purchased via a web site at a clearly stated real-to-virtual currency exchange rate, with payment typically made via PayPal or credit card. Then the purchaser is messaged and told to "meet" one of the gold farming avatars in game, and the in-game currency is transferred. For example, in mid-2008, you could buy 5m *Runescape* gold for around US\$20.
- Power-lelling: payment is again made via a web site but this time the gold-farming firm is provided with the purchaser's game username and password. Their staff then "play" the purchaser's character in the game, building up its levels (of combat or other skills). Once the character has reached the agreed level, it is handed back to the purchaser. For example, in mid-2008, it would cost around

⁷ This growth was enabled generally by growing ICT (especially broadband) infrastructure, IT skills and incomes. It was enabled specifically by spread of cybercafés that provided group locations for young people, and micro-payment methods (Martinsons 2005). In turn, a number of these can be traced to the Asian currency crisis of 1997. Governments sought to spend their way out of this by investing heavily in ICT infrastructure. Some of the unemployed set up new businesses – either the PC kiosks in which games could be played, or actual games companies. Others among the unemployed turned to games-playing to fill the empty hours. Other push factors include leisure time for urban youth and spreading awareness of games. Pull factors include availability of attractive games.

⁸ PJ (2007) claims Koreans travelled to China in 2003 to train Chinese workers to gold farm.

⁹ Figures from Robischon (2007) for *Everquest II* suggest 59% of RMT expenditure on currency, 38% on characters, 3% on in-game items. See also Tae-jong (2006) who cites estimates that 60% of "profits" (most likely a miswriting for revenues) comes from selling in-game currency.

US\$50 to have your *World of Warcraft* level-40 character power-levelled to level-60. Very much related though much less often offered is account-selling; where the gold-farming firm sells a high-level character that they have made: a level-75 *Final Fantasy XI* account would cost around US\$400.¹⁰ Likewise, quest-completion services are offered: the gold-farming firm will take over your character and play it to complete a particular in-game activity such as a quest; completing the *Runescape* Lost City quest, for instance, costs US\$15.

- Selling in-game items: the transaction occurs in very much the same way except that an item rather than currency is transferred. Individual items have sold for as much as US\$20,000 (Davis 2006). A more typical example, though, would be that you could buy a *Star Wars Galaxies* AT-RT in mid-2008 for US\$10.¹¹

Box 2: The Darker Side of Gold-Farming Activity

Alongside the activities listed above, there are stories that gold farmers do a number of other things:

- Control bots/macroing: these are automated characters or automated program codes that control characters, neither of which are permitted by game companies. The gold farmers act like cyber-machine-minders; there to respond if players or game moderators or game events intervene to disrupt the automated activity. The accusation has been that this is widespread among gold farmers who are either farming or power-levelling (e.g. Lee 2005) and avatars giving every appearance of being bots do exist in-game, some of which are advertising gold-farming services. On the other hand, interviews and observation of gold farmers suggest many play as ordinary characters (Paul 2005, Jin 2006c).
- Develop hacks: in 2008, a legal complaint was filed by one founder of IGE (one of the main real-money trading brokers) against the other. Part of the complaint alleged that the in-game currency sold by the company was obtained by hacking game code (Duranske 2008).
- Defraud purchasers: see the discussion below on gold frauders in Box 14.

Beyond the basic "gold farmer" epithet are many different roles that gold farmers may play in-game (expanded from Davis 2007 and Zonk 2007):

- Hunter: these players kill non-player characters/"monsters". They will then take any currency dropped from the kill, and sell valuable dropped items in-game for more currency.
- Fighter: helps the hunter to kill NPCs but does not take the drop.
- Gatherer: undertakes a non-fighting role in the game to gather resources that can be sold for in-game currency, such as mining or wood-cutting.
- Producer: undertakes a non-fighting role in the game to manufacture items that can be sold for in-game currency, such as blacksmithing or potion-making.
- Banker: stores assets; may also "mule" the assets from one area of the game to another (e.g. a bank or trading location).
- Dealer: delivers the currency or item to the purchaser in the game.
- Marketer: "barkers" who generally advertise gold farming services to other players; "peddlers" who contact individual players with advertising messages.

¹⁰ Some firms also offer account renting: use of a high-level character for a limited period; e.g. 7 days use of a level-70 *World of Warcraft* character for US\$49 (<http://www.accountsbay.com/RentAccounts.aspx?GameCode=019>).

¹¹ "Escort services" have also been tried (Dibbell 2007). The virtual equivalent to guided ascents of Everest, these involve a group of gold farmers accompanying the customer on difficult or dangerous activities, such as dungeon-running in *World of Warcraft*. Non-gold-farming items that a number of gold-farming firms offer include sale of "keys" (codes used to activate a game account) and game cards (pre-paid amounts allowing playing time of say, 30 days, on an account).

- **Leveller:** takes over a purchaser's character and plays it in order to raise it levels (or plays a firm-owned character, raises its levels and then sells that account). In practice, a gold-farmer's avatar may play more than one of these roles (e.g. both marketer and dealer: Bell 2006). Gold farmers may play these roles alone or work in groups (e.g. Jin 2006d, Dibbell 2007). Some of these roles (e.g. barker) seem more likely to be automated than others.

Some field evidence from gold farms – such as Ge Jin's (2006c) videos – suggests everyone within a gold farm plays online; though potentially in the different roles just described. However, that may be true only in those gold farms that sell through an intermediary. Other evidence suggests greater division of labour, at least within those firms that sell direct to players. One entrepreneur reports that of his 20 staff:

"Three people do research and find the most efficient way of gold farming and power leveling, three people who are good at English do marketing and the rest are divided into four groups, the best gold farmer as group leader, farming gold." (Wang 2008)

We can summarise all this using the internal value chain model, as shown in Figure 1 (adapted from Porter 1985).

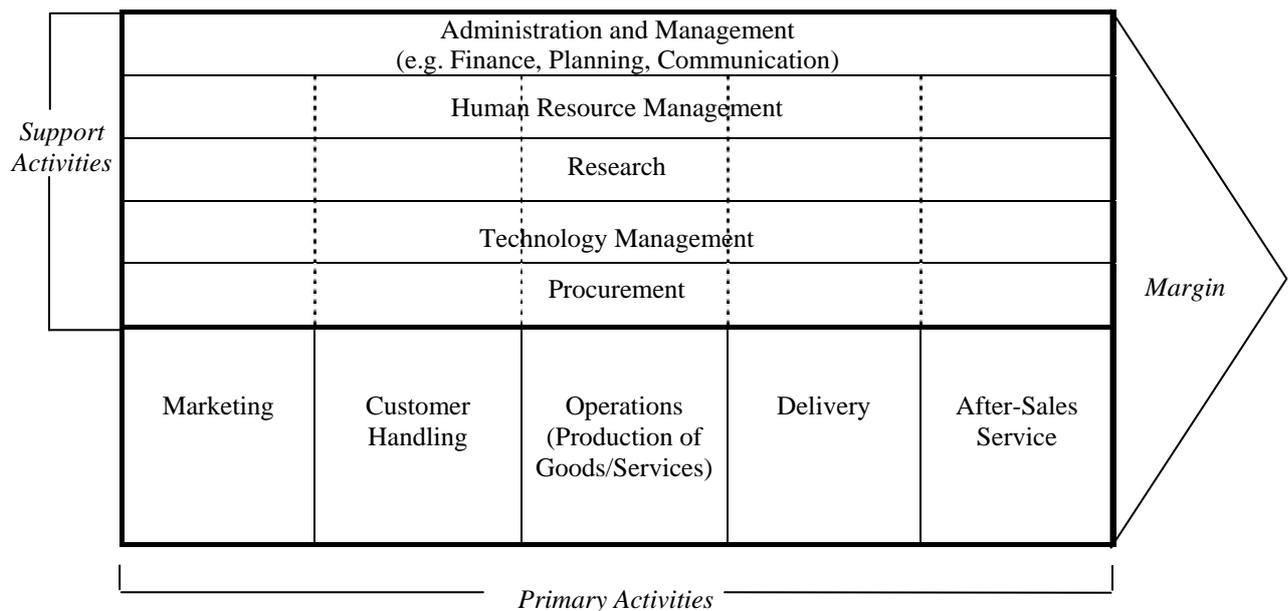


Figure 1: Gold-Farming Firm Internal Value Chain

Taking a small gold-farming enterprise, then there are three support roles:

- **Management:** just one or two people (typically the owner-managers) would handle the administration, management and HR management tasks.
- **Research:** this could be a separate role, as described in the quote above (we should perhaps call these "gold horticulturalists"). But in other cases, firms rely on their gold farmers' knowledge of the game for their "research" including on occasion the playing time their staff invest outside their working hours (Dibbell 2007).
- **Technical:** a technical staff member would cover technology management and procurement, or that would be outsourced to a cybercafé if the gold-farming was based there rather than at dedicated premises.

Most would also add a fourth role:

- Customer relations: responsible for all the non-operational primary activities that involve contact with potential and actual customers.

For those gold farmers that sell direct to customers (as opposed to those that go via brokers and exchanges), marketing is undertaken via the web (e.g. messages to gamer communities, or adverts on key web sites) or in-game. When a customer makes an approach, it is handled by customer reps through email, phone and/or online chat to understand what is required (see e.g. Admin 2007). A payment is then made. Gold farmer staff then produce the item, currency or service. In many cases, actual delivery happens separately. After-sales "service" would normally only consist of follow-up messages to past clients to see if they wished to purchase more.

Without getting inside a gold-farming enterprise it is difficult to provide more than this basic description. Field research would be needed to identify strengths and weaknesses of the ten value chain areas, and to look at balance of effort between the areas.

A3. Mapping the Gold-Farming Sub-Sector

Estimates of the size of the global computer games market vary considerably but focusing on just the games (i.e. not consoles or other hardware), one may estimate that the global market for the five game types (arcade, console, PC-based, online and mobile) was around US\$33bn in 2008 (*The Hindu* 2007, Jin & Chee 2008). There were perhaps some 50m online games players worldwide of whom around 20m were playing monthly subscription online games (White 2008, Woodcock 2008). Extrapolating up from average subscription fees of US\$10¹², the latter figure would suggest something in the region of US\$2.5bn per year subscription income.

There appear to be very few estimates framed in terms of the size of the gold farming sub-sector. Instead, most estimates are for the value of real-money trading (see Table 1). As noted above, these would be different if the RMT figures include "primary real-money trading" i.e. that conducted within or alongside games and sanctioned by the game company. A best guess is that the RMT figures cited here in fact exclude the primary market but only Lehtiniemi (2007) is explicit on this and better data-gathering and analysis are required.

¹² *World of Warcraft* is the dominant game; Blizzard had first quarter revenues for 2008 of US\$300m on a subscriber base of 10m, making US\$10 per subscriber per month (Androvich 2008). That average also fits with the actual US\$15 monthly fee in Western markets but less than that in Asian markets. It also fits with fees for two of the other most-played online games: *Runescape* (c.US\$7 per month) and *Final Fantasy XI* (US\$13 per month). US\$2.5bn per year also makes sense given *World of Warcraft* has half the market and makes roughly half that figure in annual revenue. However, this figure could be an underestimate since Barboza (2005) claimed US\$3.6bn per year in online game subscriptions in 2005.

<i>Year</i>	<i>Sources</i>					
2004	US\$83m (Russell 2004 cited in Steinkuehler 2006) [Asia only: minimum]	US\$417m (Russell 2004 cited in Steinkuehler 2006) [Asia only: maximum]	US\$887m (Castronova 2006)			
2005	US\$143m (Davis 2006) [Japan only]	US\$200m (Leupold 2005)	US\$500m (Lee 2005)	US\$550m (Lewis 2006) [South Korea only]	US\$880m- US\$1bn (Lewis 2006)	
2006	>US\$100m (Castronova 2006) [Minimum]	US\$200m (Castronova 2006) [More likely]	>US\$1bn (Castronova 2006) [Possible]	US\$1.1bn (Davis 2006) [South Korea only]	US\$1.6bn (Lehtiniemi 2007) [plus US\$463m primary RMT in East Asia]	US\$2.7bn (Anonymous 2005) [Extrapolation from 2005]
2007	US\$1.8bn (Dibbell 2007) [using Lehtiniemi data]					

Table 1: Estimates of Real-Money Trading

Data from Yee (2005) and Castronova (2006) leads to an estimate of average spend on gold farming per Western player of something like US\$10 per year¹³. Simple extrapolation from the 20m subscribed gamers, then, would suggest total market revenue for gold farming of US\$200m per year. That is arguably an underestimate for a number of reasons.

First, if we stay with the same notion of 20m gamers, we can use the data produced by *Everquest II*'s Station Exchange to give two other estimates. Average annual spend per player (all players, not just RMT-active) was US\$46. Multiplying up from global subscription numbers would produce a total global market of US\$920m. Attacking from a different direction, the spend (US\$1.87m) was 29% of that on subscriptions (40,700 players x US\$13 average subscription per month x 12 months = US\$6.35m). Applying that same percentage to the estimated annual total subscription income of US\$2.5bn would suggest a global RMT market of US\$725m.¹⁴

¹³ Yee's survey work found 22% of players had taken part in real-money trading and spent an average US\$135. Castronova estimates this was, on average, spent over a three-year period, giving a spend of US\$45 per year per RMT-active player, and hence a spend of roughly US\$10 per player averaging over all players. Statistics from Station Exchange – the RMT system introduced by Sony Online Entertainment on two of its *Everquest II* servers – are, supporting Yee, that exactly 22% of players registered to take part in trading (Robischon 2007). However, the spend was much higher than in Yee's survey – averaging around US\$240 per RMT-active player per year, and around US\$46 per year averaged over all players.

¹⁴ There are two potential downsides to the Station Exchange data. The legitimization and trustworthiness of Station Exchange RMT would probably increase player's likelihood to spend

Second, we can step outside the 20m online game subscribers paradigm in three ways:

- Not all those subscribers are Western and we know little about the extent of gold-farming purchases among Asian players. However, the figures in Table 1 suggest that gold-farming trade within Asian nations may be higher, not lower than that in the West. Lehtiniemi's (2007) estimate of US\$1.6bn, for example, is well-considered and analyses the Western market to be only 18% of the global total. The 20m figure also excludes those (another 20m) playing free-to-play games; nothing seems to have been written about gold farming on such games but it is likely to exist and could easily exist at the level of subscription game purchases. *Second Life* and other non-game worlds make up the remaining 10m of online players. These allow and integrate real-money trading, so – again – we know little about gold farming for these virtual worlds.
- If we take the minimum estimates (see below) for employment in gold farming of 150,000; monthly salary of US\$145; and minimum overhead of 100% on salary; that produces a total overall market of US\$520m per year. Using the more likely estimate of 400,000 employees, we arrive at a total overall market of US\$1.4bn.
- Unpublished research from two US game companies suggests the potential real-money trading market to be eight times greater than that generated by subscriptions (Eikenberry 2008). Those estimates do not tally with the actual experience of Station Exchange, but they do suggest a potential market of US\$20bn per year.

In particular, putting the first and second bullet points together – incorporating the larger Asian market, the large potential in free-to-play games, and employment data – the best guess here will be that gold farming is a US\$500m per year sub-sector. It seems unlikely to be less than US\$200m per year, and it could well be more than US\$1bn per year.¹⁵

No clear chronological trends are can be drawn out with confidence from Table 1 but there is little to suggest the gold-farming sub-sector is shrinking over time. If anything, the data leans slightly in the opposite direction though we do have a serious gap in post-2006 data.

compared to the normal "grey-to-black market" status of most gold-farming trades. If so, the SE figures overestimate the size of the overall market. (Put another way, comparing the US\$46 and US\$10 per-player annual spend data from our two sources might be taken as evidence that gold farming's crepuscular status was artificially suppressing consumer expenditure.) Second, the total Station Exchange trade figure could include arbitrage/re-selling, e.g. a player buying currency for a lower price and selling for a higher. The SE trade figure would therefore exaggerate the extent of final-consumer purchasing; again causing the per-player figure and any extrapolations therefrom to be an overestimate. Robischon (2007) claims this is not so by noting the top three buyers were not in the list of top 20 sellers. This falls short of being a comprehensive refutation of the arbitrage possibility.

¹⁵ One reason for not jumping feet-first in with the >US\$1bn estimates is that almost all the data foundations here come from 2005/2006. As discussed later in the paper, since that time currency exchange rates have fallen severely and it seems likely that profits have done likewise, thus greatly reducing market revenue. There also appears to have been more action taken against gold farming. The only counter-trend is the very high annual growth rates in numbers of online gamers. These trends might or might not roughly cancel each other out.

Location

Figure 2 (map from Johomaps 2008) shows the various global locations that have been mentioned as gold farming sites¹⁶. Looking at the map, one might be struck by how much the locations resemble those for "nearshoring": the outsourcing of work to locations close to major markets. There is some validity to this – the Mexican example was set up by a firm just over the border in Southern California (Dibbell 2005); Chinese gold farmers have particularly served the South Korean and Japanese markets (Jin 2006). In other ways, though, the trade appears globalised – all locations, for example, serve the US market – and location appears based on the presence of an online gaming community, broadband ICT infrastructure, and connections to major markets which can easily be independent of physical geography.



Figure 2: Reported Global Locations of Gold Farming

Box 3: Why Not India?

India was a first-mover in IT offshoring, having been active in global software outsourcing since the 1970s (Heeks 1996). It would therefore seem natural that it might play a significant role in gold farming; as a new wave of offshoring.

However, there look to be few spillovers from software outsourcing to gold farming. Much software work was – and still is – done at the client's site in the West. That done offshore was often restricted to high-tech enclaves. There was thus no wider associated growth of ICT infrastructure such as broadband, which is as good as a prerequisite for online gaming and, hence, for gold farming. Broader investment in human and physical ICT infrastructure is now occurring in India, but well behind that of East and South-East Asia. For example, by 2007, China had some 66m broadband subscribers,

¹⁶ There are many secondary reports of these locations but primary reports of gold-farming exports from other than China include: Mexico (Dibbell 2003), Romania (Lee 2005, Thompson 2005); Russia (Weir 2004, Rickey 2005); and Indonesia (Lee 2005, Paul 2005). All except Thompson appear to be based on interview by phone or email rather than field visit, and one may also note the lack of post-2005 sources. Primary reports of gold-farming for the local market include: India (Sengupta 2007); Malaysia (Singh & Choo 2006); South Korea (Huhh 2008, Jin & Chee 2008); and the Philippines (Magno 2006).

equivalent to 44% of its total Internet user population and 5% of its overall population (ITU 2008)¹⁷. India, by contrast, had just 3m broadband subscribers, equivalent to 23% of its total Internet user population and 0.3% of its overall population. There are also claims that India has not had the "games culture" seen in some other Asian nations (Manish 2005)¹⁸.

As a result, levels of online gaming are much lower in India than, say, China. In 2007, the top games in India had a few tens of thousand players, whereas the top games in China had more than a million (Sengupta 2007). Likewise, gold farming in India appeared to be a fairly informal and localised activity.

In future, gold farming will probably increase in India as gaming and infrastructure grow. Whether the country should seek to go down this route is a different question. There are undoubted income and employment benefits. However, gold farming's liminal or sub-liminal status has likely reinforced China's reputation – e.g. from piracy and other intellectual property violations – of being suspect as an IT trader. If India moves into this in a big way, it could damage the "India brand".

There is a generalised assumption that the great majority of gold farmers are based in China. In the absence of any better evidence, we will go along with this and guesstimate that China has around 80-85% of employment and output in this sub-sector.¹⁹ Figure 3 (map from AZGA n.d.) shows the locations in China that have been mentioned as gold farming sites²⁰. Looking at the map, one might be struck by how much the locations resemble those in which foreign investment and economic development in China has mainly taken place: the eastern and southern coastal provinces (Ogutcu & Taube 2002). This is probably explained by three factors listed above: relative wealth meaning more online gamers in these provinces; foreign, government and personal investment in these areas creating a stronger ICT infrastructure; and wealth/trade fostering good overseas connections. In addition, these are the areas of rural in-migration, creating a pool of potentially-employable labour.

What is unclear, on both a global and Chinese provincial basis is whether the blank areas on the map are blank because there is no gold farming, or simply because no-one has done any field research on gold farming in those areas.

¹⁷ By 2008, this had risen to 163m broadband users, 78% of China's 210m Internet users (CNNIC 2008).

¹⁸ An element of this that re-appears enough to be noted is the claim that Indians don't play computer games because they do not have enough time (Kandaswamy 2007, *GameGuru* 2008).

¹⁹ A figure justified only on the balance of reportage in academic, informed comment and mainstream media sources. This is a very weak basis for statistics but, in the absence of field data, the least worst option. Other than reported locations, a couple of other snippets suggest China's domination. Jagex found tens of thousands of automated money-making accounts (bots) on *Runescape* were registered from China (Ward 2008). Real-to-virtual currency rates on a wide range of MMORPGs (*Final Fantasy XI*, *Guild Wars*, *EVE Online*, *Runescape*, *World of Warcraft*) all spike in late January/early February (Davis 2008b). This is claimed to be because of the Chinese New Year holiday, which reduces supply (for some corroboration see, e.g., *WoWMine* 2008).

²⁰ Primary-reported locations – city/town and [province] – for Chinese gold farming include: Chongqing [Sichuan] (Barboza 2005, Chan 2006); Fuzhou [Fujian] (Barboza 2005); Hangzhou [Zhejiang] (Jin 2006e); Harbin [Heilongjiang] (Wang 2008); Jaixin [Hebei] (Jin 2006e); Jinhua [Zhejiang] (Jin 2006c, Dibbell 2007); Liaozhong [Liaoning] (Johnson 2006); Lishui [Zhejiang] (Jin 2006f); Nanjing [Jiangsu] (Dibbell 2007); Shanghai (Honge 2006, Lim 2007); Shenyang [Liaoning] (Wang 2008); Shenzhen [Guangdong] (He 2005); Suzhou [Jiangsu] (Jin 2006e); and Zhousan [Zhejiang] (Jin 2006e).

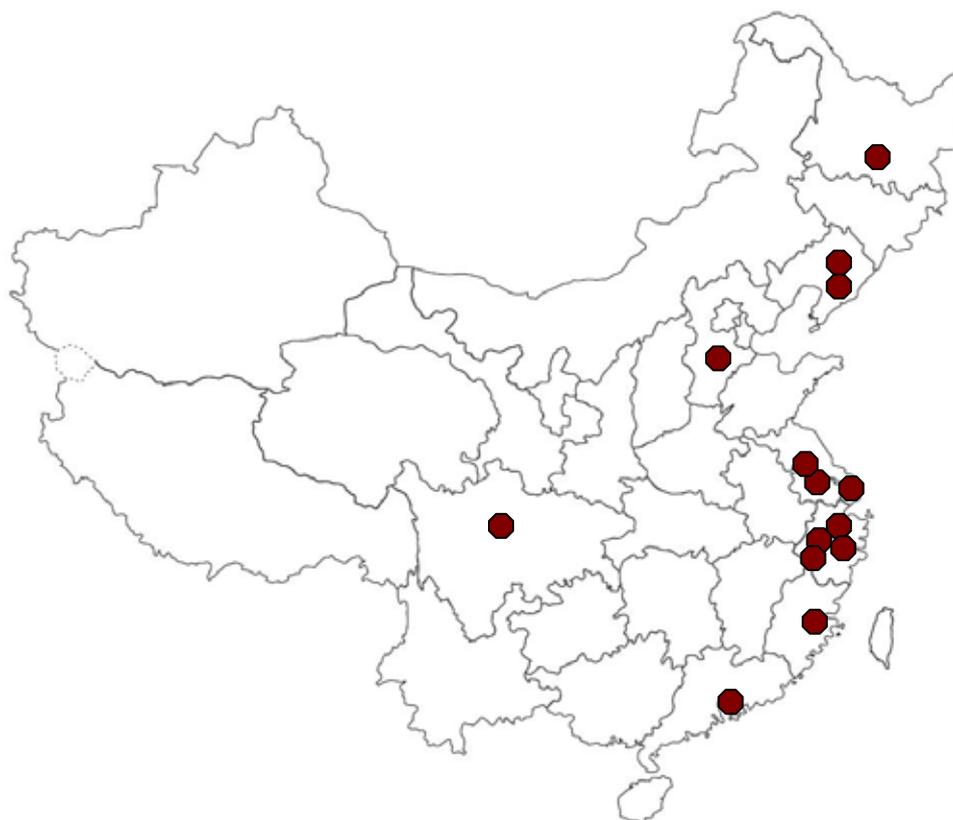


Figure 3: Reported Locations of Gold Farming in China

Narrowing the locational lens one step further, there are reports of urban-based entrepreneurs being interested in moving operations to rural areas in order to cut costs (e.g. He 2005), and there are plenty of assumptions about gold farming being rural (e.g. Warner & Raiter 2005, Bearup 2006). In practice, there have been no reports from rural villages, and just a couple of reports from rural towns with populations of some tens of thousands (Thompson 2005, Johnson 2006). By and large, reports have come from cities as have (see below) characterisations of worker demographics. It thus seems reasonable – at least until ICT infrastructure diffuses more fully – to label gold farming an urban phenomenon (Jin 2006b).

Employment and Enterprise Numbers

Because no-one looks to have undertaken systematic measurement, employment and enterprise statistics vary and typically give no explanation for their basis. For example:

- Employment: in China, chronological estimates of employment are 100,000 (Barboza 2005), 200,000 (Jin 2006/Lewis 2006 from same individual source), 100,000 (Dibbell 2007), 500,000 (Neff 2007), 400,000 (Wang 2008). Alongside these, Kushner (2007) estimates 1 million gold farmers worldwide.
- Enterprises: in China, estimates of the number of gold-farming enterprises – known as "gaming workshops" – are: 30 in 2004 (Carless 2007), 200 in 2004 (Russell 2004 cited in Steinkuehler 2006), 2,000 in 2005 (Lewis 2006), 2,000 in 2007 (Carless 2007).

A simple average for the employment figures suggests just over 400,000 gold farmers employed worldwide if we use the guesstimate that China has around 80-85% of employment in this sub-sector.

The enterprise figures given appear to be an underestimate. Johnson (2006) reports dozens of gold-farming operations in a 120,000 population town in NE China. Jin (2006) found hundreds of gold-farming operations in a 2.5 million population city in eastern China. This suggests a minimum of about one gold-farming firm per 10,000 population²¹. If we extrapolated that up to the whole of China, it would suggest at least 130,000 firms throughout the country in 2006. A more appropriate extrapolation, though, might be to the total population of just those provinces in which gold-farming operations have been identified²². That would suggest around 50,000 firms in China.

We can then convert this into estimated employees using average enterprise size figures. Average IT sector enterprise size in industrialised countries is about five employees (NGRF 2006) and (see Section D2) field reports talk of most gold-farming enterprises with 2-10 PCs. However, a more conservative converter might be the average size of urban informal sector enterprises in Asia: 2.5 employees (Ranis & Stewart 1999). If valid, that would suggest about 125,000-325,000 people employed in gold farming in 2006 in China alone depending which of the enterprise extrapolations above we accept. There is little evidence for change over time so, a best guess for 2008 might be a minimum of 60,000 gold-farming firms worldwide (most of them micro-enterprises with just one or two staff) employing 150,000 people; but with 150,000 firms employing 400,000 people equally possible.

The latter employment figure is perhaps more likely. It is a better fit to the sourced figures given above, including Wang's (2008) on-the-ground report that there were 20,000 gold farmers in Harbin alone, a city region with a population of 10 million. It also allows for the 60,000 enterprises figure to be correct with a less-conservative estimate of 6-7 employees per average firm.

In terms of the demographics of these employees, they appear to fall into three types (He 2005, Jin 2006b, Dibbell 2007, Wang 2008):

- Migrants from rural areas looking for work in urban areas.
- Young unemployed people based in urban areas.
- College students, who would work only part-time (and study part-time).

Many in the latter two categories would already be game players (Jin 2006, Jin 2006e). Female gold farmers do appear in accounts (e.g. Paul 2005, Yee 2006), but in practice the profession seems overwhelmingly male. Bell (2006) reports a 93%:7% male:female ratio, while Jin's (2006) field survey in China reports only male gold farmers.²³ In age terms, all reports (Bell 2006, Jin 2006, Yee 2006) state a range from

²¹ One per 10,000 is a low estimate from the figures given – two or three per 10,000 could be more likely. Figures in this ballpark are supported by the reports of the one-time main gold broker, IGE, which stated it had "tens of thousands" of suppliers in China (Carless 2006).

²² Fujian, Guangdong, Hebei, Heilongjiang, Jiangsu, Liaoning, Shanghai, Sichuan, and Zhejiang with a total population of just under 500m.

²³ As a background note, Yee (2005) reports that Western MMOG players in his survey had an 85:15 male:female split.

late teens to early 20s, consistent with Barboza's (2005) more specific 18-25 years range.

There is no direct data on investment levels but one can estimate a fixed investment of around US\$800 for hardware and operating software per two workers (given many gold farms seem to work a two 12-hour shift system) (Nystedt 2007). Taking the 400,000 employment figure above, that would suggest a total investment of US\$160m excluding premises. Actual per-capita investments would be higher, a) because not all PCs are shared by two workers; b) because firms also make fixed investments in telecommunications and games software; and c) because some (probably only the larger) firms make fixed investments in their web sites and marketing. However, such additional investments would be unlikely to more than double the original figure, so we can reckon that gold farms require a fixed investment per job of less than US\$800. This compares favourably with, say, investment per job costs in manufacturing in China, which are quoted as at least 3-4 times higher for township enterprises (World Bank 1998) and dozens of times higher for urban processing plants (ADB 2003). In terms of employment creation, then, gold farming may be an efficient use of scarce capital in developing countries.

Pay and Work for Individual Gold Farmers

Gold farmers simultaneously play and work; hence the some-time title "playbourers" (Chan 2006). We can divide playbourers into amateur and professional. Amateurs are players who make some additional income from gold farming, but for whom it is not their main source of income or (for students) main activity. They will typically gold farm to cover the costs of their game play, or for pocket-money, or on an occasional basis (e.g. when they find a rare item or amass more in-game currency than they require or get tired of a game and sell their characters) (see, for instance, Jin & Chee 2008). Professional playbourers are those who make their main income from gold farming.

For the latter group, we can characterise their work via four main descriptive categories (Heeks 2008):

i. Pay. Gold-farming makes headline news in part when individual farmers make huge incomes. One Chinese student was arrested in Japan in 2006, having made US\$1.3m over a two-year period, US\$850,000 of which he had remitted back to China (Davis 2006b). The reality for most gold farmers, however, is a lot more mundane. They are employed by an enterprise, and they receive a pay packet.

Table 2 indicates the reported pay for gold farmers in China from various sources which are listed either as "real" where the evidence comes from face-to-face questioning, or "virtual" where interviews were by phone or email. Where known, the specific location is indicated, plus any salary comparators. Taking an average, we can say that pay appears to be about 1,000 yuan/US\$145 per month. There is no clear trend within the data over time: other than the single-sourcing for 2004, yearly source averages are: US\$137 (2005); US\$139 (2006); US\$130 (2007).

<i>Source</i>	<i>Location</i>	<i>Local currency/mo</i>	<i>US\$/mo</i>	<i>Working hours</i>	<i>Salary comparator</i>	<i>Data source</i>
<i>Sage (2004)</i>	China	2,000 yuan	240			Primary, virtual
<i>Sage (2004)</i>	China		150			Primary, virtual
<i>Barboza (2005)</i>	Fuzhou		250	12 x 7	"pretty good compared with the other jobs I've had."	Primary, real
<i>Barboza (2005)</i>	Chongqing		75			Primary, real
<i>He (2005)</i>	Shenzhen	1,000 yuan	120	12 x 7	More than nearby factories and construction sites	Primary, real
<i>Lee (2005)</i>	Fujian		120	10 x ?		Primary, virtual
<i>Paul (2005)</i>	China		120			Primary, virtual
<i>Bell (2006)</i>	China	1,200 yuan	150	50 per week	Individual – was earning US\$75 in a factory	Primary, virtual
<i>Bell (2006)</i>	China		175	60 per week		Primary, virtual
<i>Honge (2006)</i>	Shanghai	1,200-1,500 yuan	150-185		50% of graduates earn 1,000-2,000 yuan in Shanghai	Primary, virtual
<i>Honge (2006)</i>	Town in NE China	600-700 yuan	75-85			Primary, virtual
<i>Jin (2006)</i>	Zhejiang province		40-200	12 x 7		Primary, real
<i>Davis (2007b)</i>	China	800 yuan	100	7 x 7	Equal to low-end Beijing salary	Primary, virtual
<i>Dibbell (2007)</i>	Nanjing		110	12 x 7	Slightly better than manual labour jobs	Primary, real
<i>Lim (2007)</i>	Shanghai		100	12 x ?		Primary, real
<i>Wang (2007)</i>	Harbin	1,600	210		Average wage in the city is 1,000 yuan	Primary, virtual

Table 2: Reported Pay Rates for Chinese Gold Farmers

A few notes of other data have emerged, as shown in Table 3. The Russia figure is either out-of-kilter or indicates why this might not be a competitive location once Chinese gold farming took off. The remaining figures suggest other locations might still be competitive with China, and that – not surprisingly – managers earn more than workers in gold farms.

<i>Source</i>	<i>Location</i>	<i>Local currency/mo</i>	<i>US\$/mo</i>	<i>Working hours</i>	<i>Notes</i>	<i>Data Source</i>
Weir (2004)	Russia		400			Primary, virtual
Thompson (2005)	Romanian small town		130	10 hours	Same wages working as a barman; but plenty of unemployment	Primary, real
Lee (2005)	China		180	14 x ?	Gold farm manager, not worker	Primary, real

Table 3: Other Gold-Farming Pay Data

There appear to be four approaches to payment:

- Regular wages: these are merely an implicit assumption within some reports; in practice, it is not clear how widespread – if at all – such payment is.
- Piecework: workers are paid by results; for example, Dibbell (2007) reports workers in China paid 10 yuan/US\$1.25 for every 100 gold coins they gather in-game in *World of Warcraft*.
- Quotas: workers are set a quota that they must achieve during their shift. For example, Sage (2004) reports Chinese workers having to gather 1 million gil during their shift on *Final Fantasy XI* (see also Yee (2006), Bell (2006) and Steinkuehler (2006)). Quotas may be linked to a bonus payment (PJ 2007).
- Targets: workers are set a target to achieve during their shift but these are less directly linked to positive or negative consequences (Paul 2005).

One would predict downward pressure on wages from in-sector factors (Heeks 2001). Competition between enterprises is strong as there are few entry barriers into the sector. Production and overhead costs cannot be squeezed; and overhead costs may rise as game companies take more aggressive action against gold farmers. Gold-farming firms operate in a grey area that lacks regulation or organisation of labour. As noted below, training requirements for new worker entry are small, thus creating a competitive labour market through the large pool of reserve labour competing for jobs.

ii. "Fringe benefits"

Meals and dormitory accommodation are reported as included from field research (Barboza 2005, ARD-TV 2006, Jin 2006, Dibbell 2007). There is a report of poor hygiene and poor food quality in some gold farms (PJ 2007).

iii. Working hours

An assumption of two-shift working, 12 hours per day, seven days per week has arisen in relation to gold farming. Data sourcing in Table 2 indicates those listing shorter hours all conducted their interviews at a distance, whereas those who visited the gold farms describe 12/7 working. Breaks are allowed within the shifts (Jin 2006), and at least some gold farmers report getting sick leave or time off when required (though that is doubtless unpaid) (Paul 2005).

iv. Skills and training. Training requirements for entry into gold farming appear limited: He (2005) quotes two days. However, in the overall scheme of developing country employment it would be inappropriate to describe these jobs as "unskilled"; better to call them at least "semi-skilled" since they require a set of IT skills that most developing country workers lack. Those playing high-level characters or installing automation game code would approach or enter the "skilled" category.

Other aspects of the working lives of gold farmers are discussed in Section E1 below.

The Consumer Market

Discussion and comment on gold farming has centred largely on the producers. The consumers are rarely mentioned and could usefully be the topic of more research²⁴. We can make a rough estimate of their numbers using two methods²⁵:

i. Player surveys. Yee's (2005) survey showed 22% of MMOG-player respondents had bought in-game currency²⁶. From Woodcock (2008) and White (2008), we can estimate 20m active subscribers in mid-2008. That would suggest 4.4m consumers buying gold farming services. This is likely a lower boundary since it is not clear to what extent the 20m free-play, item-pay gamers make use of gold farmers. As noted above, this could easily double the figure to 9m consumers.

ii. Financials. Reusing the calculation above of 150,000 minimum employed earning US\$145 per month with salaries at most half of total revenues, that produced a market size of US\$522m. Taking figures (Yee 2005, Castronova 2006) which suggest those who do buy spend an average US\$45 per year, that would suggest 11.6m consumers.

It is assumed that customer location follows the demographics of game play. One corroboration of this comes from traffic analysis (via <http://www.alexa.com>) of gold-farming web sites. For example, 50-70% of traffic on four well-known English-language sites – www.ige.com, www.brogame.com, www.thsale.com and www.wowmine.com – comes from the US. The next three locations (each with a few percentage points share) are the UK, China and Canada. As would be expected,

²⁴ A rare item of data from a gold-farming firm on the games from which customers order shows – not surprisingly – that orders mainly come from games with high subscription levels: *World of Warcraft*, *Runescape*, and *Final Fantasy XI* (Carless 2007).

²⁵ Both estimates ride heavily on Yee's (2005) survey work and, in the latter case, Castronova's (2006) estimate that the US\$135 average spend reported in Yee's survey should be spread over three years of game play. This data was US-specific and is about four years old at the time of writing thus, for example, pre-dating the main anti-gold farming activities including delisting from eBay. That suggests the figure could be an overestimate. On the other hand, it excluded expenditure on power-lelling (Yee 2008), and was some way less than that reported in the Station Exchange's first-year experience (Robischon 2007); suggesting it may be an underestimate. Finally, average spend may be asymmetrically distributed, with a larger proportion of sub-average purchases.

²⁶ There were no differences across gender but some mild correlation with increasing age (quite possibly because the older you get the more money and less time you have); something borne out by the Station Exchange data showing the *Everquest II* average buyer age was 34.2 years compared to an all-player average age of 25 years (Robischon 2007). For some insights into the real-life experiences of a gold purchaser, see: <http://www.wowgoldfacts.com/>. Steinkuehler (2006) cites a smaller (n=793 as opposed to Yee's n=1923), earlier (2004) and single-game survey which suggested 31% of *Lineage II* players bought in-game currency via eBay. Lim (2007) reports 20% of players buying currency/services but this is likely a rounded repeat of Yee's figures.

Chinese-language sites (e.g. www.5173.com) derive the vast majority of their traffic from China.

B. Economic Analysis of Gold Farming

"Economics sees value wherever humans decide that some construct of theirs has utility but is scarce. Synthetic world goods have utility and are scarce; thus they have value that can be measured in terms of real dollars." (Castronova 2006:52)

The supply—demand economics of gold farming are therefore very simple. Some people in the world have more money than time. Other people in the world have more time than money. The former demand finds the latter supply via various physical and virtual channels. And thus a market and then an industrial sub-sector are made.

Box 4: The Economic Case Against Gold Farming

Castronova (2006) builds a case that some level of control on gold farming is economically justified because it will add more surplus to regular players and game companies than it removes from gold producers and consumers. Intuitively, one could readily grasp that unfettered gold farming might have an overall utility-reducing effect. However, some of the specific assumptions made by Castronova are challengeable:

- He equates those who want RMT removed with those who have had their game experience reduced by RMT. That may well not be the case because (see Section D4) a number of the former may be making moral rather than experiential judgements. (For example, one can be against the death penalty without having any direct relevant experience.) Thus the in-game utility of gold farming controls may be less than he predicts.
- Adverse in-game experiences may be wrongly associated with gold farming. Bots and the like may be set up by regular players. Likewise, some of the "gold farmer killing" videos on YouTube have associated commentaries arguing they are cases of mistaken identity (e.g. Odinsword 2007). Controls on gold farming, then, will not alter these wrongly-associated adverse experiences.
- For those players with vigilante tendencies, "gold farmer" harassment and killing have been enjoyable parts of their gameplay. Controls on gold farming will reduce their utility.
- Controls on gold farming may introduce other disutilities for regular players. In 2008, *Runescape* forums were flooded with players complaining about what they perceived as the deterioration in gameplay since anti-gold-farmer controls were introduced by Jagex at the end of 2007.
- Actual supply—demand curves for play utility and even gold farming are unknown (to be fair, Castronova does acknowledge this when coming up with his guesstimate that real-money trading costs US\$1.50 per user per month).
- Transfer of surplus from gold farmers to regular players by introduction of controls is portrayed not just in economic cost-benefit terms but in "merit" (i.e. moral) terms as a transfer of surplus from rule-breakers to rule-followers. But one can counter-argue the morality by perceiving this, instead, as a transfer of surplus from poor developing country workers who might otherwise be unemployed to rich industrialised country citizens. (Could one even argue that if the latter decide to spend less time playing, the more time they could invest in more socially and economically productive activity!)

In sum the economic case for controls on gold farming may be far weaker than Castronova argues.

B1. Enterprise Costs and Profits

Figures breaking down gold-farming enterprise income and expenditure are limited, uncertain and variable. What we have is as follows:

- From 2005, He (2005) reports 100 *World of Warcraft* gold would sell to players for US\$10. Of that the wages paid to the gold farmer would be US\$1.40. There was thus a more-than-600% income on top of wages to be divided between the gold-farming firm and the broker. Based on the other figures given here, the broker would probably have gotten the lion's share of this.
- From 2006, a Chinese entrepreneur with "over 40" staff reported doing US\$11,500 of business each month. If we take 40 as the number of staff, that means per capita productivity of US\$3,450 per year. Average staff salaries were US\$140 per month. That suggests a 100% overhead on salary costs to cover other costs plus any profits (Honge 2006).
- From 2006, Yee (2006) reports 1,000 *World of Warcraft* gold would sell to players for US\$66, of which US\$25 would be paid to the gold farming organisation.
- From 2007, Dibbell (2007) reports a 10-worker Chinese firm turning over US\$80,000 per year. In that firm, 100 *World of Warcraft* gold nets the farmer US\$1.25, the firm then sells it on for \$3.00, and it is finally sold online for US\$8.00.

These figures can be summarised as shown in Table 4.

<i>Source</i>	<i>Playbourer</i>	<i>Gold-Farming Firm</i>	<i>Broker</i>
<i>He (2005)</i>	14%	86%	
<i>Honge (2006)</i>	50%	50%	n/a
<i>Yee (2006)</i>	38%		62%
<i>Dibbell (2007)</i>	15%	38%	47%

Table 4: Division of Income in the Gold Farming Value Chain

On this basis we can say that, at a minimum, overhead costs and any profits add a further 100% on top of the wage bill (or, put another way, that wages make up a maximum of 50% of revenue). A more typical formulation, though, would be that – from a broker-mediated sale – half would go to the broker, one-third would go to the gold-farming enterprise, and one-sixth would be paid to the workers (though, see below, this may not true from 2008 onwards).

Zhe (2006) provides a monthly income and expenditure balance sheet for a Beijing-based firm of 10 employees plus one manager, working 12 hours per day farming *World of Warcraft* gold in 2005/6 (see Table 5). It assumes a productivity of 200 gold per person per 12-hour shift (i.e. 60,000 gold produced per month), selling for US\$17 per 100.²⁷

²⁷ The source of the figures is not stated though the writer does appear to have some "insider" familiarity with gold-farming operations.

<i>Expenditure Item</i>	<i>Expenditure (US\$)</i>		<i>Income Item</i>	<i>Income (US\$)</i>
<i>Worker wages</i>	1,205		<i>Gold sales</i>	10,200
<i>Food</i>	360			
<i>Rent</i>	360			
<i>US proxy server rental</i>	300			
<i>Manager wages</i>	180			
<i>Game subscriptions</i>	150			
<i>Internet connection fees</i>	145			
<i>Electricity</i>	90			
<i>Total</i>	2,790		<i>Total</i>	10,200
<i>Profit</i>				7,410

Table 5: Sample Monthly Expenditure/Income for a Chinese Gold-Farming Firm

These figures reinforce findings from Table 4 just above. Wages are 50% of total costs, and would be 50% of revenues if the gold-farming firm were just about breaking even; as the enterprise described by Honge (2006) probably was. However, the enterprise cited in Table 5 is not merely breaking even. Instead it is making a profit.

More than that, these figures indicate the super-profitability of gold-farming, at least during its initial years. Profits are 265% of operating costs. Zhe (2006) notes that these would be shared between the gold-farming firm and its overseas contacts. The latter would have some operating costs. Similarly, brokers will also have their costs, eating into the large share of revenue that Table 4 indicates they take. Nonetheless that Table too suggested the potential for super-profits.

That certainly chimes with some of the stories that hit the headlines. One US-based owner of Asian gold farms reported earning up to US\$720,000 per year (Lee 2005). One Korean entrepreneur caught by the Korean tax service had set up a gold farming operation for *Lineage II*, using Chinese gold farmers, in 2003. During the four years from 2003 to 2006, he made US\$9.6m (Davis 2007c).

Finally, we can also use Zhe's figures to calculate that, all other things being equal²⁸, the enterprise would no longer be profitable if the *World of Warcraft* gold price fell below US\$4.7 per 100 gold. As discussed next, that is precisely what happened some time in 2007.

²⁸ As noted above, there is no evidence at present that wages have changed in recent years. The same is true of other costs (though one might imagine Internet connection fees to have fallen). Zhe's calculations do not include fixed costs for hardware and software. Nor do they include IT operating costs (for instance, Mithra (2006) comments, "When you run two dozen computers night and day, even in a temperature controlled room, you end up replacing \$60 this and \$100 that at least once a week."). That would increase the costs and reduce the profits shown. So, too, would the yuan's devaluation from 8.28 to the US dollar throughout 1995-2005 to around 6.9 to the US dollar in mid-2008 following its 2005 unpegging.

B2. Exchange Rates and Enterprise Viability

Exchange rates between real-world and virtual currencies impact neither regular players nor game companies in subscription-based games. They do, though, impact gold farmers. Calculations from available data on leading games show that in-game currencies, on average, devalued against the US dollar²⁹ by roughly 75% between June 2005 and June 2008 (see Appendix 2).³⁰

In theory – as indicated from the figures in Table 5 – this devaluation should have a devastating effect on the economic viability of gold farming, causing even a low-wage labour model to collapse and driving gold farmers out of business. It has certainly been cited as the reason behind the collapse of the high-wage (i.e. industrial country-based) model (Concernedeq 2006).

Box 5: In-Game Inflation, Deflation and Gold-Farming

One of players', and game companies', main criticisms of gold farming is that it spoils the virtual economics of game worlds (e.g. Yee 2006). Principally, the complaint is that gold farming fuels in-game inflation (e.g. Kaminski 2006, Orii 2007, Ward 2008). The economics of this are apparently straightforward: increase in the supply of any item – assuming constant demand – causes its value to fall. As gold farmers pump additional currency into the virtual economy, it is argued, this is the real-world equivalent of increasing the money supply. The value of the currency falls. It therefore requires more of the currency to purchase any item – in other words, prices rise and there is in-game inflation.

Leaving aside arguments about the real-world relationship between money supply and inflation, we can throw in a few spanners that complicate the virtual world picture (developed from Paul 2005, Yee 2005b):

- Money supply: do gold farmers actually add to the supply of in-game currency? If gold farmers merely create currency that other players would otherwise have created, they do not provide any additional impact on the money supply. There isn't space here to go into virtual economics in-depth but one sign that gold farmers are merely substituting one source of supply for another comes in the complaints (about "spawn-camping" and "kill-stealing") by regular players that gold farmers are taking their currency sources. (Additionally, even if the money supply does rise, there is no simple link to prices since players may hoard³¹.)
- Size of effect: there are few signs that gold farmers or gold buyers have become the dominant force in game economies. Thus the effect they – as opposed to regular players – have on the virtual economy will be fractional; possibly even marginal. How regular players behave economically matters more.

²⁹ Yet another missing piece of the data puzzle is exchange rates against other currencies. Lim (2007), for example, reports prices of in-game currencies in RMB yuan to be around one-third the price charged in dollars.

³⁰ There are claims that anti-gold-farming campaigns by game companies do temporarily revalue currencies (Dibbell 2007). The only offered explanation for the devaluation is competition, with new entrants undercutting existing firms in order to try to win business (e.g. Carless 2007, Debatty 2008). The devaluation seems unlikely to be the result of in-game effects (see Box 5) since these point in different directions, and show no consistent relation to the external exchange rate. Note that virtual-world exchange rates do not work in quite the same way as ordinary real-world rates. For most MMOGs, it is much harder to sell currency than to buy it; and the spread is huge – US\$0.30-0.80 per 100 *World of Warcraft* gold when you sell; c.US\$2 when you buy in mid-2008. In that sense, the closer real-world equivalent is black market trade in a non-convertible currency.

³¹ In early 2008, players discovered that Blizzard had set a maximum limit of roughly 214,000 gold per player in *World of Warcraft* (Himes 2008). This is an astronomical amount for regular players and only discovered by players hoarding/not spending.

- Demand: may not be constant. On the simple fact of number of players, older games are likely to see falling demand; newer games rising demand (for data, see White (2008) and Woodcock (2008)).
- Game company effects: game companies, not gold farmers, are the game's "central bankers" controlling the ultimate source of money/item supply and also impacting demand. Game patches and redesigns may introduce new sources of in-game currency, or new sinks; they may also increase or decrease the demand for certain items and for currency.
- Deflationary effects: of the three main farmer activities (currency, items, power-levelling/account-selling), the last is likely to be relatively economically neutral, not least because it follows the behaviour of a regular player. In most games, gold farmers have only marginal ways to directly "farm" currency (e.g. collecting the relatively small amounts that killed monsters drop) but much more often, they will be gaining items and either selling them in-game for currency, or selling them out-game for real money. In either case, they will be increasing the supply of in-game items. Assuming constant demand, that will cause the price of those items to fall, having a deflationary effect on the virtual economy (though the caveats above apply to this also). That is certainly something about which regular players complain.
- Data: in-game inflation has undoubtedly been seen but there appear to be few long-term records. One shorter-term set for a game in which gold farming is present, *EVE Online* (for October 2005 to June 2007) shows deflation, not inflation (Lehtiniemi 2008). Similarly, comparing archived and current prices for a basket of different items on the *Runescape* Price Guide (<http://www.zybez.net/priceguide.php>) indicates a mix of inflated and deflated prices but an overall deflation of 25% between September 2006 and July 2008. Yee (*ibid.*) also claims in-game deflation in *World of Warcraft*.

In sum, the linkage between gold farmer activities and in-game inflation (or other price changes) currently receives a "not proven" verdict.

Given the extent of gold farming still in existence, there has not been a large-scale collapse. It could have happened somewhat but we have no evidence for any sub-sectoral shrinkage. Possible explanations for continuing presence of gold farmers in the face of such devaluation include:

- Increased productivity: finding ways to make more in-game currency per hour. This seems very plausible. Typical in-game earning rates for *World of Warcraft* cited from earlier work are 200-300 gold per 12-hour shift (e.g. He 2005, Zhe 2006). In 2007, Blizzard provided ways for players to earn more in-game. Current gold-earning guides indicate 100 gold per hour can easily be made, with several hundred per hour being feasible for highest-level players (e.g. Voodex 2008). It is possible, then, that productivity increases might fully compensate the devaluation (and also, given supply—demand economics, that they might have helped cause that devaluation). As discussed in Section A2, we know gold-farming firms do invest staff time in researching ways of raising currency-per-hour productivity (Dibbell 2007).
- Automation: making use of macros, bots, etc. to increase productivity and/or cut costs. This is possible but there is little data to support or reject it. Gold farming web sites typically claim never to use bots. But customers whose characters are being power-levelled do report use of bots on their accounts (e.g. Allen 2008, PowerLevelingReviews 2008). On the other hand, Mithra (2006) claims low-wage labour can even undercut automation since the latter does have its costs.
- Revenue adjustment: changing the profile or distribution of income. The super-profitability of gold farming may have been eroded by competition/devaluation, leading to more normal or even tiny profit levels. The conceivability of this is strengthened by claims of significant profit erosion after 2006 from industry insiders (Terdiman 2007, Salyer 2007).

- Disintermediation: cutting out brokers. Type "buy WoW gold" into Google in mid-2008 and you got four million hits. Sampling these suggests many appear to be gold farmers and their firms seeking to sell direct to customers. Archive analysis shows almost all started from 2005 onwards. And we know the main intermediary – IGE – lost market share significantly from 2006 onwards (Salyer 2007). From the figures given above in Table 4, removing brokers from the supply chain would significantly increase potential enterprise earnings and/or help compensate for currency devaluation. This therefore also looks like a possible explanation.
- Diversification: into other activities. An obvious example could be greater emphasis on power-levelling work, the price of which will not be affected by currency devaluation. However, data from Barboza (2005), Carless (2007) and from gold farmer web sites suggests that the price to level a character from 1-60 in *World of Warcraft* cost very roughly US\$350 in 2004, US\$250 in 2006 and US\$150 in 2008 (though with great variation between sites). These price falls are somewhat lower but not greatly dissimilar to, those for in-game currency, and probably equally caused by new entrants and competition. This type of diversification may thus not a particularly viable strategy to address devaluation. An alternative may be focusing on newer online games, where competition may be less and margins higher, but evidence is absent. Likewise for another potential diversification that appears on a number of gold-farmer web sites: sale of game account activation codes ("keys") and prepaid gameplay time cards.³² One could also view these as economies of scope – enabling the same marketing, sales and fulfilment fixed costs to be spread over a greater number of services.

In summary, then, and on the basis of far-too-limited an evidence base, productivity increases, disintermediation and profit erosion seem the most plausible explanations for gold farmer survival in the face of devaluation of in-game currency, alongside a number of other possible reasons.

B3. Gold-Farming Scale Economies

Economies of scale exist "where a firm can lower the cost of each unit of output by producing more units" (Sayer 1985:10); meaning that firms producing larger amounts have a competitive advantage because they can produce each item more cheaply than a smaller producer. They can do this where there are fixed costs: input costs which do not rise proportionately for each extra unit produced. The alternative is variable costs: which rise proportionately for each extra unit produced.

Basic in-game gold-farming appears to have few scale economies. Variable costs dominate as each additional production unit (i.e. individual or pair of players) requires one PC, one Internet connection, and one account. Players are typically paid incrementally based on output, so wage costs are fully variable. Productivity per worker is also constant – one person kills a monster or chops wood or crafts an amulet just as quickly whether there are not or twenty other co-workers doing the same.

³² The, perhaps naïve, assumption is that the key and card codes provided are legal. The consistency of pricing across gold-farmer sites, and the consistency with non-farmer sites such as Amazon, suggests this is the case.

Step back, though, and some economies of scale do start to emerge, mainly in relation to all the non-operations activities identified in Figure 1:

- Indivisible-cost items: some investments, although their input cost does vary with size of output, are discrete items ("lumpy investments"). For example, if it requires one manager to manage 20 gold farmers, or one technician to manage 20 PCs, this creates scale economies on the assumption that it is hard to purchase twentieths of their services – they only come in discontinuous amounts: zero, one, etc. There can also be an equivalent indivisibility in game-play. Some high-level monsters can only be killed by groups working together; hence the items or currency they drop have a scale economy.
- Fixed-cost items: some gold-farming firms will have fixed-cost investments in a web portal, in setting up payment and security systems, and in marketing their services. These create scale economies.
- Divisions/specialisation of labour: as noted above (in Section A2), gold farmers play various different roles in-game, and staff in gold-farming firms undertake different out-game activities. On the assumption that there are efficiencies gained from specialising in particular roles, then there will be scale economies for those firms that have enough workers to allow this specialisation.

The last two items on the list help explain why individual gold farmers may likely work via brokers/exchanges rather than seeking to sell direct since they thereby avoid fixed costs and the need to adopt multiple roles. If all three items in the list were economically overwhelming, then one would expect medium- and large-sized enterprises to emerge. That they probably have not suggests fixed/indivisible costs do not dominate³³.

There may also be scale diseconomies – from perceptions that the sector is too volatile to justify large-scale investment; to dangers of "becoming noticed" e.g. for taxation purposes by local government or for legal action by game companies and/or the inability to cut regulation-related costs as informal sector small enterprises can; to growing costs of coordinating a large operation. It appears possible that the presumed-largest player during 2004-2006, IGE, suffered all these diseconomies during 2007 (PJ 2007b).

B4. Information Failures and Real-Money Trading

In some ways it is a minor miracle that gold farming can exist as a sub-sector given that real-money trading is such a textbook case of information failure. Trading generically relies heavily on information during each of its three steps (Norton 1992, Casson 1997):

- Information acquired prior to trading (on general items/services available, on the existence of traders, on their reputation and trustworthiness, on typical prices).
- Information communicated during trading (on specific items or services offered and money sought, on quality of items/services offered, as part of negotiation).

³³ That would be the conclusion drawn from the figures in Table 5. However, we noted those figures failed to include hardware/operating software costs; and also excluded all costs associated with selling to end-consumers.

- Information acquired after trading (on whether or not the terms of the agreed trade contract have been fulfilled).

Availability, quality, cost and other characteristics of information, and the ability to communicate that information, are thus critical foundations for all trade and all enterprise (Porter and Millar 1985, Stiglitz 1988).

Given that everyone playing MMOGs and all gold farmers have web access, and given the huge quantities of data available on gold farming³⁴, then information failure might, at first sight, seem odd. The key problem is at least three-fold – the virtuality of trade (buyers and sellers never meet physically), the anonymity of online activity, and data quality (the snowstorm of data available that could be good, bad or indifferent). Data available online may be good for providing buyers with certain information – the virtual existence of sellers, typical prices, specific items and services offered. But the following information failures still occur:

- Information absence: both buyers and sellers may be completely unable to find out who, in reality, they are trading with.
- Information uncertainty: buyers and sellers will be uncertain about each other's trustworthiness; buyers particularly will be uncertain what – if anything – will really be delivered if they pay; buyers report being uncertain about whether or not partially-completed deals will ever be fully-completed; both sides will be uncertain about whether or not their trade is under surveillance from game companies.
- Information asymmetry: absences and uncertainties affect both sides of real-money trading but there is a typical asymmetry since key items of information about the trustworthiness and quality of items/service are known to the sellers but not the buyers.
- Communication problems: sellers typically offer online chat and email contacts but buyers report problems with communication relating to issues like language, time difference, non-response and being fobbed off with excuses (e.g. mmobux 2008).

Informational characteristics such as these failures in turn shape both the process and structure of commerce (Williamson 1975, Stiglitz 1988). The informational characteristics just described mean the build-up to trading may be relatively quick and easy. However, trading overall has the characteristic that it is risky; far more so than normal real-world trading.

That risk can be instantiated as both opportunism and adverse selection. Opportunism would mean actions such as overcharging for goods or agreeing to a contract knowing it cannot properly be fulfilled. One can seek evidence for this from those who post online about the experience of buying gold-farmed items/services. They are generally negative (e.g. Jamie 2007, Allen 2008, PowerLevelingReviews 2008). Of course one must allow for the profile of those who post being different from the average buyer profile, and the possibility that posts are made by those with vested interests for and against gold farming or particular suppliers. However, the level of detail provided in some posts suggests they represent real experiences, and that a proportion of purchasers are disappointed. Examples include:

³⁴ As cheap examples, Google produces 1.1m results for a search on "gold farming", 5.3m results for a search on 'warcraft gold'.

- Late delivery: rather than the instant service and large stock promised, purchasers find currency being delivered piecemeal over a long period of time; other actions promised quickly do not occur for days or even weeks.
- Partial delivery: full amounts of currency are not delivered; characters are returned having been only partially-levelled.
- Currency loss: currency is impounded by the game company.
- Account suspensions and banning: particularly for power-leveilling.
- Disputes: as purchasers try to get their money back.

Underfulfillment and opportunism thus do seem to be present.

Adverse selection would mean actions such as unwittingly selecting either a trade partner or trade items of poor quality. The quality of virtual trade items can readily be determined on their delivery but the risks of poor trade partner selection do appear to be present. They are present for sellers (e.g. defraud by players: see Box 12). And they are present for buyers. For example, out of more than 400 real-money traders reviewed by mmobux³⁵, only five got a rating of more than 7 out of 10, sufficient for them to be deemed "extremely reliable" (Carebear 2008). The vast majority of traders got very low ratings indicating a poor quality of trade.

On the basis of these information failure-shaped characteristics, one would predict the following outcomes:

- Suppression of trade: the level of trading is likely to be below that which would occur if the various informational challenges were mitigated or removed. One possible indicator – already mentioned above – is the gap between the US\$10 average annual spend per player ordinarily and the US\$46 spent when Sony set up Station Exchange for *Everquest II*; a system that addressed most of the information failures indicated here. That suggests a possible 78% suppression of trade due to information failures (though issues of legitimacy and effort would also have an effect).
- Localisation of trading: as traders seek to deal only with those they physically know. As indicated below in Section C1, RMT did begin on this basis. It still seems to be the starting point for individual developing countries as MMOGs take off. However, the online nature of the games, including their globalisation, has encouraged trade to move beyond the local, impelled by buyers and sellers not knowing enough other players to match their respective demand and supply.
- Presence of intermediaries: intermediaries address information absences and uncertainties by holding information about both buyers and sellers; for example, reputational/trustworthiness and quality information. They can reduce the information-gathering costs of all stages of trading. They can make trade less risky, or at least make it perceived to be less risky, because of their informational resources and reputation. In practice, though, the emergence of intermediaries (e.g. brokers or exchanges) appears relatively limited³⁶. Pressures for disintermediation thanks to the virtual nature of trade, and pressures from game companies are a partial explanation. The shifting and anonymous nature of buyers

³⁵ This site provides what appears to be the most comprehensive review of gold-farming firms: <http://www.mmobux.com/shops>.

³⁶ This is not easy to judge – separating intermediaries from end-producer gold farms on the basis of just their web sites is hard; judging volume of trade is even harder. But the web traffic volume of the only certain broker, IGE, is no greater than that of a number of gold-farming firms; and traffic volume for the few identifiable exchanges is typically quite a bit lower (see Appendix 3).

is another. And the brokers – though less so the exchanges – have their own reputational problems (e.g. PJ 2007).

- Reputational portals: given the importance and scarcity of information on reputation and trust, it should have a high value, and this should encourage information brokers to emerge who would gather and disseminate such information. In practice, there appear to be relatively few such brokers, most likely because they also struggle to establish their own trustworthiness and that of the information they provide. The one exception appears to be: <http://www.mmobux.com>.³⁷ Exchanges of which, again, there appear to be relatively few (e.g. <http://www.markeedragon.com>, <http://www.playerauctions.com/>, <http://www.randyrun.com>; <http://www.worldmmo.com>; <http://www.gamexa.com/>), typically provide this information as an integral part of their service (though the latter two appear to have only a few suppliers). (Comparative web traffic information on these exchanges can be found in Appendix 3.)
- Reputational tactics by sellers: given information uncertainties and the importance of trust, sellers would be expected to try to provide a lot of information about their reputation and trustworthiness. Overt tactics include the presence of customer testimonials (e.g. <http://www.wowpowerlevelingpro.com/index.aspx>); graphics of reputed global firms such as Mastercard, Visa, PayPal (e.g. <http://www.gmlvl.com/>); links to reputation rating sites such as BizRate (e.g. <http://www.igegolds.com/>); guarantees of fast, safe service and refunds if unsatisfied (e.g. <http://www.mmoempire.com/>); and demonstrations of altruism/corporate responsibility through donation programmes to Western charities (e.g. <http://www.ige.cc>). Other tactics include advertising methods for easier communication such as live chat; detailed explanations of the process (e.g. <http://www.wowmine.com/faq.php>); and imitation of the names of well-known players (e.g. <http://www.ige.cc>). The main problem is that, by and large, all these tactics are perceptual rather than real. They may have a marginal impact on some customers but they have no more actual value than a would-be real trader telling you "I am not a fraudster".³⁸ One should also mention the potential for "anti-tactics": providing false negative information about competitors. This means that even where companies are rated – for example, IGE has more than 25,000 ratings on BizRate – it is difficult to trust either the positive or the negative ratings.
- Repeat business: those purchasers who buy repeatedly are likely to stick with one supplier if they are satisfied with its service. Given the lack of data on purchasers, it is not clear if this happens in practice.

From all this, it can be seen that the informational characteristics of gold farming and real-money trading do, indeed, shape the activity in a powerful manner. For example,

³⁷ Problems with other reputation-and-review sites include the following. They make their money from links to real-money traders and all reviews are positive (e.g. <http://buywowgold.co.uk/>; http://www.warcraftgoldreviews.com/gold_seller_reviews.php). They relate largely to one individual's experiences (e.g. <http://www.powerlevelingreviews.com/>). They are very limited in coverage (e.g. <http://powerlevelingreviews.wordpress.com/>.) Some combination of the above (e.g. <http://wowgoldbuyer.com/>).

³⁸ Just to give one example of the potential gap between perception and reality, www.thsale.com's web site assures customers of the safety of its procedures and states, "We have never been informed of any account bans of thsale customers due to their dealings with thsale." They have clearly not looked at their customer reviews on BizRate: http://www.bizrate.com/ratings_guide/cust_reviews_mid-116075.html

they probably significantly suppress the level of trade. However, because of virtuality, the outcome is not exactly that which one would predict from real-world experiences. In particular, trade is more globalised and seems less intermediated than an offline equivalent with similar information characteristics (of which the drugs trade might be one example: see Box 16).

Box 6: Open and Closed Economies

James Clarke, Chief Operating Officer for the gold/services broker IGE, has made a real-world analogy, claiming that RMT is good for online games because closed economies are "not usually as vibrant" as those that are open to imports and exports (Carless 2006). Of course, in some ways, the analogy is incorrect – all game economies are closed because nothing can be introduced from outside the virtual world, and *World of Warcraft* is not about to start importing items from *Final Fantasy XI* (though don't bet against world-to-world trading, transport and battles as a next-ten-years development). Nonetheless, it might be intriguing to look at some of the macroeconomic analogies: if RMT is the equivalent of trade liberalisation, then one might predict winners and losers: those with good skills, technology and capital to benefit most; and the poorest to lose out.

C. Analysis of Gold Farming from the Perspective of Industrial Sociology

C1. The Historical Sociology of Gold Farming

One would hesitate to use the word "stages" in relation to a history of gold farming because the reality has been much messier. However, we can see some sort of chronology, framable in terms of Bernstein's (1983) timeline of capitalist development:

- Subsistence production: in the beginning (1978³⁹), players produced and consumed items themselves.
- Barter: players producing a surplus of one item could barter with others who had a surplus of different items. This was, for example, part of *Habitat*, one of the first PC-based online games in the late 1980s (Damer 2007). As in real life, knowing (or at least trusting) other players could be an important component, as would be the existence of some form of trade contract enforcement. At this stage, the commoditisation of virtual items had begun – they had not only a "use value" (an intrinsic value based on their use or consumption in the game) but also an "exchange value" (a value in terms of other items for which they could be exchanged).⁴⁰
- Monetisation: at some point (as noted in Section A1, Hunter (2006) tracks this to 1987), a trade jumped from barter of in-game items and currency, to exchange of

³⁹ The first multi-user dungeon game – generally seen as the key forerunner of modern MMORPGs – was *MUD* written by Roy Trubshaw, an Essex University student. It began running in autumn 1978 (Bartle 1990). Multi-player gaming (though not with tradable items) long predates this. Damer (2007) and others cite *Spacewar*, running on a PDP-1 in 1962, as the first multi-(two-)player computer game. For a fuller timeline of early online games, see Koster (2002).

⁴⁰ One other form of barter is reported from the 1980s in relation to power-lelling: "Men did it for women in the hope or expectation of some kind of emotional or physical relationship." (Hunter 2006).

real-world currency for in-game items. Thus virtual items (including in-game currency) began to be monetised. The commodification of virtual items was cemented as they began to have notional prices, as markets for their exchange started to arise, and as a division of labour emerged, with some players spending more of their time making items for others.

- Petty commodity production: at first, the production of virtual items/currency for sale would have been localised. We still see this today in the developing country players who sell at their own or nearby cybercafés (Magno 2006, Singh & Choo 2006). Likewise, players would have initially been selling only their own surplus items, but then gradually spending more time producing a surplus for sale, and less on just playing for fun. They thus started to specialise, moving on – again as we often see in developing countries today – from making money to pay for their games-playing to making cash for other real-world expenditure.

This brings us, then, to the situation around the turn of the century in MMORPGs. Virtual items were commodified to the extent that they could be exchanged, and players were starting to make money beyond that just required to play. Initially this might be called "gold market gardening" – an activity done alongside the player's main occupation and alongside other gameplay. But the opportunity to earn led some to specialise in this, abandoning other gameplay and, in some cases, other occupations to take on virtually full-time gold farming. Thus gold farmers started to exist – mainly based in Western countries, and equivalent to an individual artisan or cottage industry model of production (see e.g. Ontain 2007).

From this point onwards, and seeing the money to be made, gold farmers looked for ways to expand their operations and cut their costs. They did this through three strategies; processes found in chronologies of capitalist development (Bernstein 1983) and the product life cycle (Porter 1980):

- Wage labour: initially gold farming operations expanded informally and based around real-world or in-game friends. At some point, though, gold farming took the leap from petty to capitalist commodity production when the first player paid another player to gold farm for them. In time, and as per the full capitalist commodity production model, some of the hired workers did not own the means of production: the PCs and software and even accounts were owned by the cybercafé owner or by the gold-farming firm owner. This is the model that pertains today in Asia, and has also been present in the West (see, for example, Concernedeq 2006).
- Globalisation/Offshoring: with wage labour forming by far the single largest cost of gold farming, it was inevitable that it would migrate to low-wage locations. Hence, the domination of Chinese playbourers in gold farming, which some see as having pushed US firms out of the market (Carless 2007).
- Automation: as seen in industries from automobile manufacture to software services, the key alternative cost-cutting strategy to offshoring is automation. Thus, rather than hire real workers, some gold farmers took to creating virtual ones (e.g. Kushner 2007). These are the "bots" that imitate the actions of real players, and which can be used to gather in-game items and currency.

The three strategies may be combined. Hence, the reports of Chinese playbourers minding multiple bots (Lee 2005). There may also be some geographical differentiation, with suggestions that American gold farmers have gone down the automation route, while wage labouring dominates Asian gold farms (Bell 2006,

Mithra 2006, Seiler 2007). The two, though, may also be combined with US-based developers creating macros or finding bugs to allow duping, and then offshoring control of these to Asian workers (Lee 2005).

Box 7: Parallels with Real-World Farming

The pattern described above matches that of agricultural development fairly well. This begins with subsistence farming: households or groups producing just enough for their own survival. (One difference is that "subsistence" players are already involved in out-game trading, as they pay for the hardware, software, and online connections necessary to "subsist", and in-game trading with NPCs.) As farming households produce some surplus, they will barter it with other households, a system likely to become more entrenched and regularised over time. At some point, a form of currency emerges to facilitate this process of exchange. Rural households begin to specialise in producing items for money-sale. Just as with gold farming, capitalism (buying wage labour to work on the farm), scaling (buying up land to farm more efficiently), automation (combine harvesters), and globalisation all then emerge. It remains to be seen if these parallels could produce some fruitful avenues for further research.

In charting the development of gold farming, then, we find that it fits quite well with standard industrial histories. Not just the Marxist analysis of commodification and capitalism described above, but also more business-oriented chronologies such as the international product life-cycle (Vernon 1996, Porter 1980) where innovation in an industrialised country is followed by rapid growth and intensifying competition, leading production to then shift to low-cost locations and markets to open up in those locations.

We can, therefore, use the frameworks of industrial sociology to help understand where gold farming has been. We might also use them to predict relations, underpinning factors, and where gold farming will go.⁴¹

C2. Gold-Farming Value Chain Analysis

Analysis of the links from producer to consumer comes in various guises: global commodity chain analysis, *filiere* analysis, global production network analysis (e.g. Gereffi 1999, Raikes et al 2000, Henderson et al 2002). Here we will simply call it "value chain analysis". That analysis identifies various stakeholders, arranged in a set of relations to one another, as shown in Figure 4.

To briefly describe, then, the stakeholders:

- ICT suppliers: provide the hardware, software and telecommunications infrastructure necessary for gold farming to take place.
- Gold farmers: those who work in-game. As the diagram indicates, they may sell direct to players, indirectly via brokers/exchanges, or they may work for a gold-farming firm.

⁴¹ Though Marxists anticipating an overthrow of the bourgeoisie by the proletariat, as opposed to just the ongoing oppression of the latter by the former, may be disappointed. In the real world, gold farming labour is unorganised. The virtual world does see its riots and protests but it is uncertain they achieve much in structural terms.

- Gold-farming firm: enterprises that undertake gold farming. As shown they may sell direct to players or indirectly via intermediaries. They will employ gold farmers and also workers undertaking support and other activities.
- Brokers: probably not directly involved in gold farming; if not, they are classic middlemen who intermediate between producers and consumers by buying from the former and selling to the latter.
- Exchanges: these put producers and consumers in touch with each other but, unlike brokers, do not directly participate in the trade.
- Player-buyers: those who buy in-game currency, items and accounts, or avail themselves of power-levelling services.
- Other players: "regular" game players who do not buy virtual goods and services.
- Game companies: develop and host the online games in which gold farming takes place.
- Government and other institutions: provide the institutional framework within which gold farming takes place.

Two other actors are noted:

- Other intermediaries: some gold farming firms will use intermediaries with payment accounts in Western markets to help trade with Western players (Jin 2006c).
- Fansites: are online communities of players. Sometimes used to collectivise the views and actions of players, they are also used by brokers and sometimes firms for marketing.

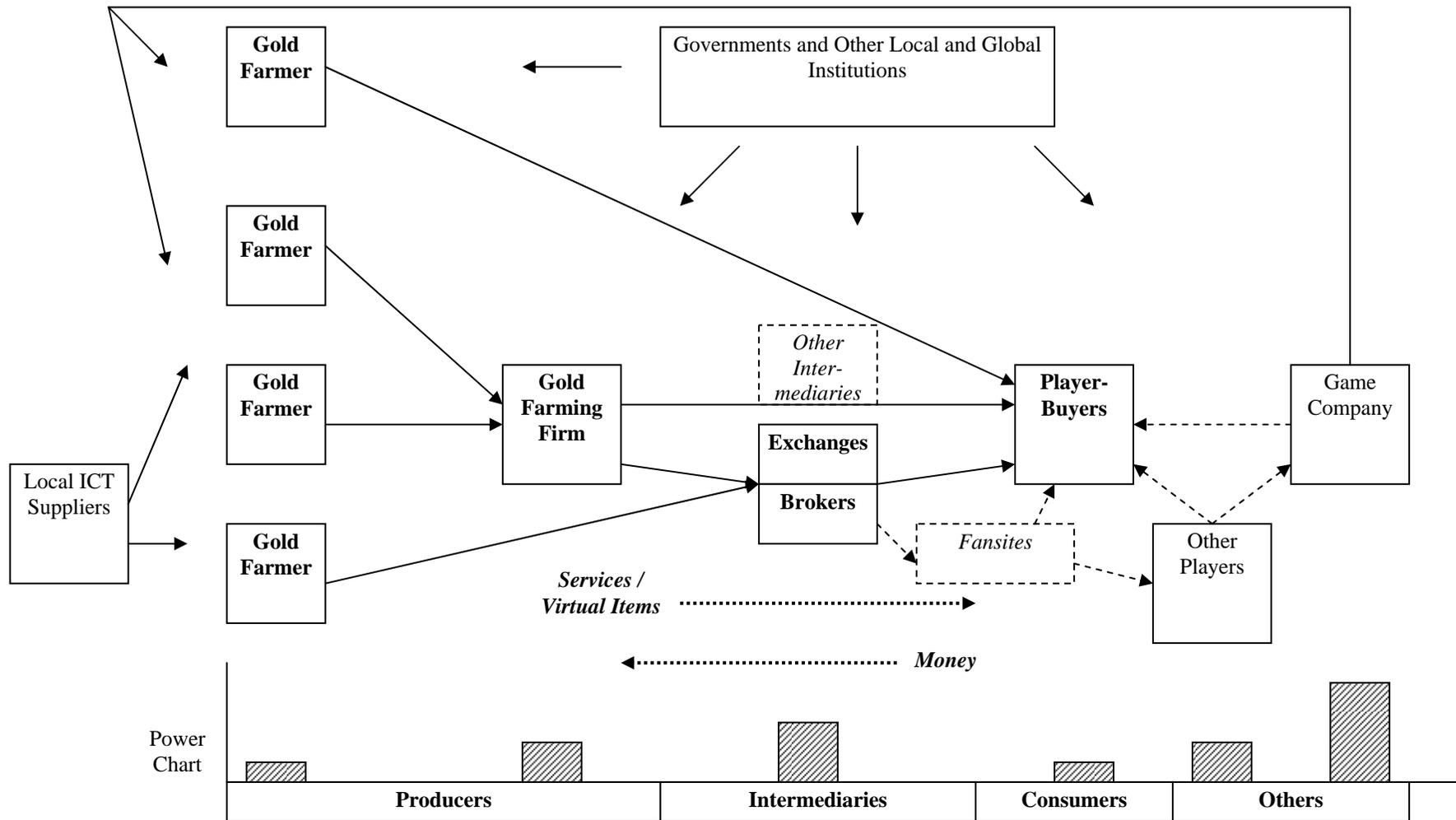


Figure 4: The Gold-Farming Value Chain

Box 8: Gold-Farming Intermediaries: Brokers and Exchanges

By far the most widely-cited broker is IGE, perhaps tactfully described as a company with a colourful history created by entrepreneurs with a colourful history (Stout 2004, Anonymous 2006, Carless 2006, PJ 2007b). Set up by North American entrepreneurs in 2001, its main operations are in the Philippines, Hong Kong and (at least until recently) mainland China. A key IGE strategy has been the purchase of gaming fansites. These are initially created by game players, independent of the game companies, as sites to build knowledge about the games, swap stories, discuss the game, etc. Brokers like IGE then buy these sites and use them, in part, to market their services. The purchases can also be seen as a lever with the game companies as when IGE bought Thottbot, the most popular *World of Warcraft* fansite. Equally IGE has been aggressive at buying out competing brokers. Partly as a result of these strategies, from 2004-2006, it was seen as the dominant force in the gold-farming market. In 2006 it was reported to have over 400 staff, half working on gold farming logistics (e.g. in-game delivery), half working on fansite content (Carless 2006). The company claimed to have "tens of thousands" of suppliers ranging from individuals to organisations, mostly from China, and was said to be selling "hundreds of thousands of dollars worth of goods every day" (Farooq 2007) bringing in US\$9m per month (Salyer 2007)⁴². However, in 2007 it faced a number of problems, not the least of which are claims that many suppliers were left unpaid. Revenue was reportedly down to around US\$3-4m per month (PJ 2007b) (indicating a less than 10% market share based on Section A3's best guess for market size), and its Shanghai office was reportedly closed. That it is no longer a uniquely-dominant force is also suggested from web traffic analysis (see Appendix 3) which shows its traffic to be similar to that of other leading players.

Others named as brokers include ItemBay (www.itembay.ca), set up by a Chinese-Canadian, and BroGame, though in both cases their actual status is unclear. For example, ItemBay gets its gold from what it describes as "gamers" who come into its China-based gaming workshops, and are paid on the basis of the gold they deliver (Bell 2006). That sounds much like a standard gold-farming firm set-up.

Brokers are defined as those who mediate between buyers and sellers. In the case of IGE, the original sellers are invisible, and IGE itself becomes a principal, i.e. it sells on to the buyer. In that sense its model might be called that of a re-seller or collator. Exchanges also mediate between buyers and sellers but during the actual trade both sides are visible to each other (at least, to the extent that occurs with online anonymity). The exchanges' model might be called some mix of dating and escrow agency.

Exchanges began informally as soon as fansites for online games emerged: many fansite forums have buy/sell threads. The existence of more formal exchanges came later though in many cases by a process of metamorphosis: for example, a main US-based site, www.markeedragon.com began life in 2000 as a fansite but has slowly formalised and promoted its exchange function over time. Exchanges take a commission on all sales and this is used to fund marketing, verification procedures (such as Markee Dragon's TrustWho), and forums for feedback on trading, scamming, etc. They accept sales by both individuals and gold-farming firms but in either case usually perform an escrow function, only releasing payment to the seller after both parties have confirmed the trade. Like brokers, they face the risks of disintermediation and the general difficulties of competition, achieving a profile, and threats to real-money trading (see Section D4). As an example, the Iron Prairie and Sparter exchanges were launched in 2007 but were no longer trading currency by mid-2008 (VWFBlog 2007).

As with brokers, the reality of many exchanges is unclear. For example, despite their names, both www.mmoexchange.com and www.themmorpgexchange.com appear to be fairly standard gold selling outfits, though the former does appear to have a means for players/gold farmers to sell (at relatively low prices).

We can understand the levels of power within the value chain from a resource-dependency perspective (Pfeffer & Salancik 1978). This understands the extent to

⁴² Salyer (2007) claims the company had a 60% market share at the time (which would posit a US\$180m total market in 2006).

which one set of actors is controlled by others in terms of the resources on which they depend.

- Individual gold farmers have little power. The resources they provide in skill, labour and in-game terms are readily substitutable by those further downstream in the value chain, yet they depend on those downstream actors for their key resource input: income. The substitution can occur either by switching to other gold farmers, or by drawing on the "reserve army of labour".
- Gold-farming firms' delivery of virtual items can be fairly readily substituted, but the resource of profile (and sometimes trust/reputation) they build cannot, so they have some power in the chain, though this is limited by their apparent lack of collective organisation.⁴³
- Brokers and exchanges have more power through the resources of trust and reputation they build with other actors, particularly consumers. As discussed in Section B4, we can also see this as the intermediation power of information – they know of both farmers and consumers who, individually, could not "find" each other in the market without the broker. They can readily substitute both up- and down-stream actors, but are themselves rather harder to substitute. Brokers' power increases if they buy up competitors and fansites.
- There are millions of player-buyers who are not collectively organised. They have little recourse against upstream actors: the law is unlikely to help; any complaints would be a speck lost in the sandstorm of criticism about gold farming; payment organisations like PayPal seem not to get involved. They are arguably readily substitutable, at least at an individual level, despite funding the entire value chain.
- Other players have had limited direct impact to date on the gold-farming chain; restricted to the occasional in-game farmer-killing sessions. This may change as at least one group has begun a collective legal action (Dibbell 2007). Their greater impact, though, is on the game companies through individual and collective complaints and, more important, threats to stop playing and hence stop paying. This provides an actual or threatened resource loss for the companies that they would take seriously.
- The game companies hold the greatest power including the "nuclear option" of closing down all game worlds, thus depriving all other value chain actors of resource access. Ultimately, everyone else is dependent on the game firms.

Of the other actors, one can say that government has more power than it has so far exercised. Governments could make it much harder for gold-farming to take place if they wished. Its continuation relies on the tacit tolerance or benign disregard of developing country governments. There has been some, limited, organisation among independent fansites, such as the creation of nogold.org which aims to organise commitment against gold farming, including blacklisting of gold farming web sites. However, many fansites rely on the advertising of gold-farming firms for their income.

⁴³ In 2007, Korean real-money traders were reported to have banded together to form the "Digital Asset Distribution Promotion Association", chaired by ItemBay's CEO (Anderson 2007). However, this appears to have been a specific reaction to moves by the Game Industry Division of South Korea's Ministry of Culture and Tourism to introduce a new bill prohibiting virtual currency (though not virtual item) trading (Paul 2006).

Box 9: Government Policy and Gold Farming

Government policy has – perhaps unwittingly – been a facilitator of gold farming in various ways. Liberalisation of and investment in ICT infrastructure provision has helped. So has investment in general ICT skill-building. Gold farming has also been facilitated by the ability of some farming firms to operate in the informal sector, free of wage, working condition, taxation and other regulatory costs.

Occasionally, there have been more direct interventions. The Korean government – in theory – banned virtual currency trading in 2007 (Yoon 2007). On the other side of the coin, local governments in China are reported to have invested directly in gold-farming; at least in trading portals (Jin 2006).

If we look at how the distribution of power within the value chain has shifted over time, three things can probably be said. That power has become more distributed as more gold farming firms entered the sub-sector. That there was a potential power shift from brokers/exchanges to gold-farming firms as the latter set up their own online trading sites; but with that shift limited due to issues of trust. That there was an actual power shift to game companies as they began taking action against real-money trading.

Value chains are typically divided into those which are producer-driven (dominated for example by large transnational manufacturers as with cars) or buyer-driven (dominated by large retailers and marketers as with garments or toys) (Gereffi 1999). The gold farming value chain leans more towards the latter where the retailers and marketers would typically act as "strategic brokers". But gold-farming is unusual in a number of ways. There is no dominant force given there is only one well-known broker (IGE) that no longer enjoys anything like a monopoly on trade. So we cannot call this an intermediary-driven value chain and should perhaps call it a "competition-driven" or "market-driven" value chain. Yet the most powerful force of all – the game companies – are external to the main value chain.

We can also comment on two other features of value chains. First that "*coordination* of the entire chain [is] a key source of competitive advantage that requires using networks as a strategic asset" (Gereffi 1999:3). Brokers should be able to exercise this coordinating function and, indeed, it is what provides their power. However, the virtuality of the traded items, the anonymity of traders, and the immersion of both producers and consumers in an online broadband world mean this coordination function is at continuous risk of being undercut. Again, the gold-farming chain is unusual in this respect (though also arguably a portent of the future).

Second, that "*organizational learning* [is] one of the critical mechanisms by which firms try to improve or consolidate their positions within the chain." (*ibid.*: 3). We know relatively little about competitive strategies in this value chain, though – as discussed in Section A2 – we have seen learning about new farming techniques and new delivery techniques to be one part of what gold-farming firms do. Another value chain competitive strategy is altering the nature of relations within the chain (Grantham & Kaplinsky 2005). Disintermediation of brokers by gold-farming firms has been one such strategy. Another has been the attempt of new brokerages and exchanges to set up on the basis of a collaborative rather than conflictual relationship with the game companies.

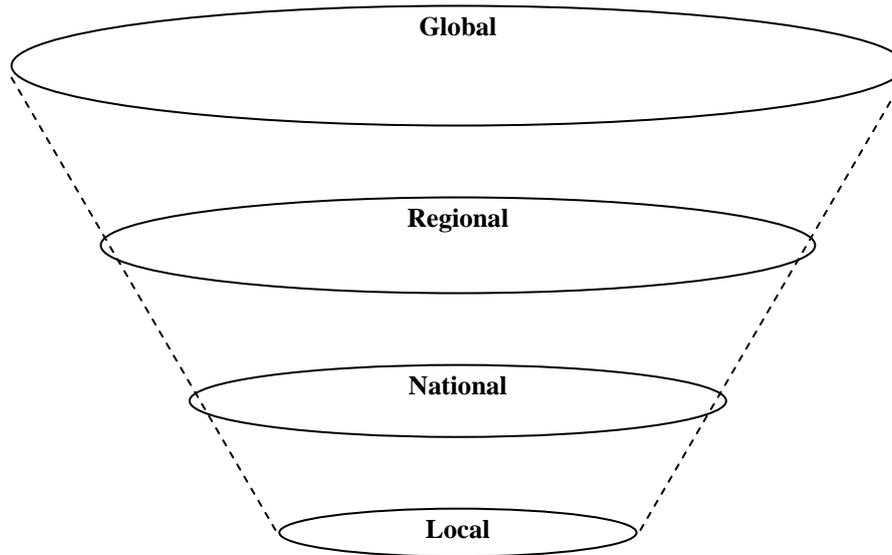


Figure 5: Spans of Different Gold-Farming Value Chains

Lastly, we can consider value chain span (see Figure 5). In these terms, the gold-farming value chain can operate at various levels:

- **Local:** players within a physical geographical location – either a single cybercafé or a cluster in one district – earn money by selling items and services to other players. This appears to be informal, with earnings being small (a few or a few tens of US dollars), irregular and used either to cover the costs of game play, or to provide a bit of extra "pocket-money". Descriptions can be found from Malaysia (Singh & Choo 2006) and the Philippines (Magno 2006). This was also the origin of real-money trading in South Korea in 2000, with cybercafé ("PC bang") owners enticing new gaming customers by allowing them to make real-money purchase of high-level items from experienced customers (Huhh 2008).
- **National:** players in a developing country buy from gold farmers located in that same country, often through country-specific portals. The most obvious example is China with gold farmers reporting that many of their buyers are Chinese (Honge 2006), and with active exchanges such as <http://www.5173.com> (or with gold and services sold on general portals like <http://www.taobao.com>). There also appears to be some type of national market emerging in India (Sengupta 2007).
- **Regional:** players in richer countries buy from gold farmers in a poorer country from the same region. As mentioned in Section A3, this could be seen as a form of "nearshoring". It is most often reported in sales from China to players in Japan, Korea and Taiwan (Jin 2006, Jin 2006e), but there is also one example of a gold farm in Mexico selling to players in the US (Dibbell 2003).
- **Global:** players in one region of the world buying from gold farmers in another; of which the stereotype would be US players buying from Chinese gold farmers.

It is the global trade that has garnered almost all attention. However, it is entirely possible that the other three levels of trade are larger. For example, Table 1 noted the best guess for global sales (US\$500m) was less than the two estimates for Korea alone. There are uncertainties about the basis for the Korean calculations but, at the very least, this supports a contention that the focus of gold farming research should be on all four levels, not just the global trade.

Box 10: Clusters, Linkages and Networks in Gold Farming

Clusters are physical groupings of enterprises. Clustering brings a variety of potential benefits to the enterprises involved: input efficiencies (cheaper provision of infrastructure, labour training, finance); output efficiencies (cheaper distribution of outputs and easier for customers to search); learning efficiencies (cheaper learning and innovation); transactional efficiencies (cheaper trading and sharing with other enterprises); political efficiencies (cheaper achievement of political visibility and credibility) (Albu 1997, Christmas 1998). We have reports of multiple gold-farming enterprises located in one or two towns or cities in China (Jin 2006, Johnson 2006). What is not clear is whether these are unique clusters, or a pattern repeated across China; nor whether gold farmers obtain any clustering benefits.

Linkages are relations between enterprises. A key relation is that of outsourcing: provision by a sub-contractor of goods or services that could otherwise be provided by the client enterprise. Outsourcing can save money and increase flexibility. However, it brings managerial challenges and there is little history of sub-contracting in developing countries, including China (Zhaoqiao 1993). From a theoretical perspective, outsourcing in the gold-farming sub-sector may be difficult because some of its preconditions – separable production tasks; market stability sufficient to justify risk; trust (Heeks 2001b) – may be absent. In practice, some gold farmers base themselves in a cybercafé and thus outsource technology management to the cybercafé owner. Whether the relation between brokers and gold-farming firms can be called outsourcing is unclear: it looks more like market-based purchase. Beyond this, we know little about linkages in gold farming, and nothing about presence or absence of networks: linkages between groups of enterprises with broadly similar sectoral interests.

Finally, it is entirely conceivable that gold-farming enterprises are networked clusters, involving "commodity exchange, information exchange, exchange of services, subcontracting, mutual reliance on technical specifications or standards, a common labour force, a common language, a common location, a common social background and so on." (Pedersen et al. 1994:10). As elsewhere, though, even basic information is lacking at present.

D. Enterprise Analysis of Gold Farming

In this section, we turn to analyse gold farming using other frameworks from the business and management literature that fall within the ambit of enterprise analysis. We start by applying some classifications to entry, existence and progression in the sub-sector. Then competitive frameworks are used to analyse the enterprise context, discussing in detail the many threats that gold-farming firms seem to face.

D1. Analysing Entrepreneurs and Sub-Sector Entry

Heeks (2008) – from Grindle et al (1989) and Mead (1994) – differentiates three different types of enterprise based on the motivations and context of the entrepreneur involved:

- *Survivalists* are those who have no choice but to take up the income-generating activity because they have no other source of livelihood. Income provided may be poverty-line or even sub-poverty-line. Most "entrepreneurs" in developing countries are of this type, and Mead describes them as "supply-driven": forced into enterprise by push factors related to their poverty and lack of alternatives.
- *Flyers* are true entrepreneurs who have taken up enterprise because they see opportunities for growth. Income levels may meet more than basic needs, and enterprises may graduate to the medium-scale category. Only a very small proportion of developing country small entrepreneurs fall into this category, and

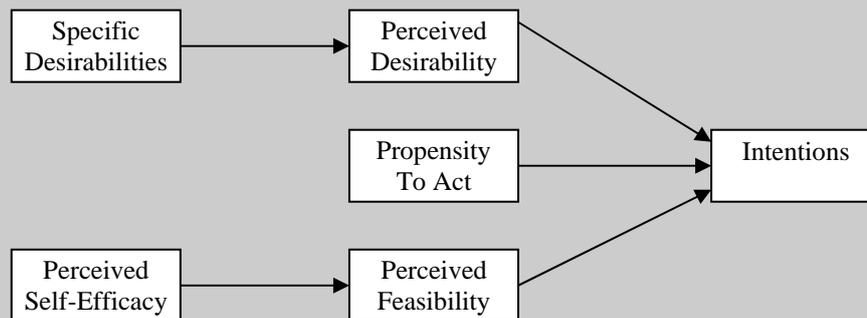
Mead describes them as "demand-driven": pulled into enterprise by factors such as the opportunity for profit.

- *Trundlers* fall in between the two other groupings and represent those whose enterprise turnover is roughly static and who show no great desire or no great capacity to expand. Income provided will be enough to meet basic needs. These form the second-largest group of small entrepreneurs in developing countries, and their stasis reflects the relative lack of strong external push/pull factors.

There is evidence of individuals seeking employment in the gold-farming sub-sector due to their unemployment and lack of other avenues (Jin 2006)⁴⁴. There is also one note that a requirement in late 2003/early 2004 for Chinese cybercafés to close at midnight led some to start going out of business, and then look to gold farming as an alternative (PJ 2007). However, on the basis of available evidence, it would appear that most gold-farming firms are flyer-run; with at least some being set up by gamers and/or gold farmers who see an opportunity for higher earnings (Jin 2006f, Dibbell 2007, Wang 2008).

Box 11: Alternative Typology of Gold-Farming Entrepreneurs

Shapero's (1982) model – summarised below – explains why entrepreneurs move into enterprise.



Agboma (2007) uses this model to investigate entry into the information technology sector in a developing country. He concludes there are two types of entrepreneur:

- Technical entrepreneurs: who move into the field because of their interest in IT.
- Business entrepreneurs: who move into the field because they identify this as a sector with profit prospects.

A similar typology seems feasible within gold-farming: players vs. profiteers. The former – we may also call them "gamer entrepreneurs" – are attracted because of their interest in online games. The latter – we may also call them "business entrepreneurs" – are attracted by the profile and perceived profits associated with the sub-sector.

We can therefore surmise that most gold-farming entrepreneurs have been pulled into the market by awareness of demand coupled with availability of input factors. Those input factors would include Internet-connected PCs, game software, semi-skilled labour, and information on processes and consumers. Where they access another key

⁴⁴ In more detail, the motivations of those who become gold farmers are reported as a mix of the push of unemployment, underemployment or poorly-paid work as the only alternatives; and the pull of those who are already gamers finding a way to make money from play (Jin 2006e).

input – their finance – is only reported in passing in a few case studies, but it appears to be mainly family and friends (Barboza 2005, Wang 2008)⁴⁵. Gold-farming enterprises therefore seem to show some traits typical of developing country enterprise: being mainly micro-enterprise-sized and informal sector-based (see below), often being set up by someone with prior experience in the sector, and often using informal finance sources (Heeks 2008).

The entrepreneur classification further helps to understand or predict a number of things on the basis of other evidence about flyers (*ibid.*). First, that such enterprises are unlikely to require much external intervention; instead, their main concern is that government and other agencies should "stay out of the way". Second, that such enterprises have a disproportionate impact on developing country economies; for example in terms of contribution to employment growth, economic returns, and formation of medium-sized enterprises. Third, that such enterprises are likely to sustain longer than the other types but, if they do fail, the entrepreneur is most likely to set up a new enterprise.

D2. Classifying Existing Gold-Farming Enterprises

Most of the literature focuses on cases of gold-farming enterprises with a few dozen up to some hundreds of staff⁴⁶. However, Jin (2006b) states "The size and organizational structures of gold farms vary ... they can be like large corporation, underground gang or home business". Jin (2006) therefore reports finding hundreds of firms with "3 to 10 computers", and Wang (2008) confirms that most gold-farming enterprises "have less than 10 people, a couple of computers."

Definitions vary but it can be said that a modal definition of "large enterprise" is one with more than 250 employees, of "small enterprise" one with fewer than 50 employees, and of "micro-enterprise", one with fewer than 10 employees (ILO 2008). Only three enterprises involved with gold-farming – IGE, Thsale and ItemBay – possibly fall into the large enterprise category; each reported to have around 300-400 staff (Bell 2006, Carless 2006, Salyer 2007). Instead, we can say that almost all gold-farming firms are small enterprises and, most likely, the great majority are micro-enterprises. We expect, then that the size profile will be similar to that found in other economic sectors; hence the use in Section A3 of 2.5 employees per average enterprise. However, that could be too conservative, with 6-7 employees per average enterprise probably fitting better with the two sources cited above.

It seems unlikely that this is a particularly concentrated sub-sector. Judging from the plethora of suppliers, it appears to be highly competitive and thus quite likely to be dispersed. The web traffic data from Appendix 3 seems to bear this out, though one game company claims there is collaboration between leading gold-farming players (Seiler 2007).

⁴⁵ There is one reported example of a US-based entrepreneur investing in Indonesian and Chinese gold farms (Lee 2005), and one imagines that Asian emigrants based in the West would have invested. As noted above, Chinese local governments are also reported to have made some investments (Jin 2006).

⁴⁶ Staffing sizes mentioned in case enterprises are: 10 (Dibbell 2007), 20 (Wang 2008), 30 (Johnson 2006), 40 (Carless 2007), over 40 (Honge 2006), 50 (Dibbell 2007), 80 (Jin 2006c), 100 (Lee 2005), 300 (Salyer 2007), 400 (Bell 2006), 500 (Zonk 2007).

Running through some other basic enterprise classification schema (Heeks 2008), we can say that gold-farming enterprises are:

- Services not goods producers; though they share some characteristics of goods producers because they trade in virtual goods.
- Consumer not producer enterprises: they sell to end consumers not to enterprises which will use their outputs for further processing.
- Both domestic- and export-market oriented.
- Privately-owned.
- A mix of registered and unregistered. Jin (2006) reports some gold-farming firms in China being both registered and paying tax, but others as sitting within the informal sector: unregistered and not paying tax.
- Mainly male-managed. Such evidence as there is (e.g. Lee 2005, Jin 2006) does not mention female managers.

We have no specific data on enterprise age, so can only note generic figures for small enterprise in developing countries: that 15-25% of any cohort will have started up in the previous year (Heeks 2008).

D3. Charting Enterprise Progression

Having classified some of the static features of gold-farming enterprises, we now turn to dynamics. We can view the issue of progression in two related but so far unanswered ways. First, charting how a gold-farming enterprise progresses: "does it go anywhere?". Second, charting how a gold-farming entrepreneur progresses: "can developing country entrepreneurs use it as a stepping stone to something else?".

In terms of the former question, we could measure progress in the standard ways such as employment or turnover or profit. We appear to have no dynamic data to help on this. Or we could measure in terms of enterprise lifespan. The only data here is Jin's (2006c) passing report on an entrepreneur closing his firm due to competition and inability to access Western trading channels. With no other data, we again note generic developing-country small enterprise figures: that 50% would be gone within three years, and 75% within ten years (Heeks 2008).

In terms of both questions, we could frame – even if not provide – an answer by invoking the idea of technological capability. Following Lall (1987), one may define technological capability as the general ability to undertake the broad range of tasks outlined in Table 6, and technological development of a gold-farming enterprise as growth in the capability as defined by movement up the categories and regardless of whether or not the final stage is attained. These capabilities are actually embodied in the skills and experience of individual workers, often seen as the most critical resource for ICT-based industries (Kumar 1988). In this case, technological development will particularly represent the accumulation of increasingly skilled workers.

Level 1: Non-production operational capabilities

- 1a: Playing a software game
- 1b: Choosing a software game
- 1c: Training others to use the game
- 1d: Playing all aspects of the game

Level 2: Non-production technical capabilities

- 2a: Installing the game
- 2b: Troubleshooting the game

Level 3: Adaptation without production

- 3a: Creating a situation-specific application within the game; e.g. by using macros
- 3b: Hosting a game

Level 4: Simple game production

- 4a: Creating a very basic game with a game production package; e.g. GameMaker
- 4b: Creating a small utility program or modification; e.g. a bot

Level 5: Intermediate game production

- 5a: Creating a basic game; e.g. a simple mobile game
- 5b: Creating one element of a game; e.g. artwork
- 5c: Recoding language and interfaces to meet local user needs
- 5d: Redesigning a game program to meet local user needs
- 5e: Redesigning a program to meet regional/global user needs
- 5f: Minor process change: modifying the game production process

Level 6: Skilled game production

- 6a: Local product innovation: developing a new game to meet local user needs
- 6b: International product innovation: developing a new game to meet regional/global user needs
- 6c: Major process change: redesigning the game production process
- 6d: Process innovation: designing a completely new game production process

Source: adapted from Heeks & Grundey (2004)

Table 6: Scale of Game Technological Capability

All gold-farming firms are, of course, operating at at least Level 1 and almost certainly Level 2. Some firms could well have developed Level 3/4 capabilities, since – as discussed earlier – they are reported using macros, bots and other game modifications, and they do have research capabilities. In capability terms, it would be a step further forward to move to more "mainstream" game industry activity. Such activity certainly exists in the same developing countries as gold farmers. What we do not yet know is whether there is any progression or connection between the two, as we have only the following scraps of data:

- Progression along the value chain (i.e. moving from a production role to a sales, marketing and production role; not the same as technological progression) is seen

as being constrained by lack of skills (particularly English) and contacts (particularly in Western markets) (Jin 2006e).

- One gold-farming entrepreneur mentions his wish to progress by staying in the IT sector but graduating on to work in e-commerce (Barboza 2005).
- One gold-farming manager describes his personal progression into games design (PJ 2007).

If progression up the technological capability scale were possible, it would certainly be valuable. As discussed next, gold farming is a very precarious way to earn a living. Higher-skilled work via the games industry would be less vulnerable and also better paid.

D4. Competitive Analysis

There are various ways in which one could approach competitive analysis of gold-farming. For example, one could do a simple SWOT analysis, mapping the current internal strengths and weaknesses of gold-farming firms, and future opportunities and threats. Strengths could relate to playing skills, low costs and ready supply of labour. Weaknesses could relate to poor management and marketing, staff turnover, and – for some probably – questionable ethics. Opportunities would include the demand caused by growing numbers of online players worldwide, with particular growth in Asian markets including growth spurred by the emergence of an Asian games industry⁴⁷.

One could use Porter's (1990) "diamond" (see Figure 6) to analyse how China has been able to create a competitive advantage in gold-farming⁴⁸; most likely thanks to elements such as:

- Factors conditions: strong ICT infrastructure, and available or trainable skills.
- Demand conditions: strong demand growth both nationally and overseas.
- Related and supporting industries: the growth of both the cybercafé and games industries within China.
- Firm strategy, structure and rivalry: the drive to enterprise in China since the 1990s, and strong competition between firms.
- Other: government's mix of supportive intervention on infrastructure and non-intervention on issues like legality/formality, and the chance of proximity to Korea.

⁴⁷ Not just the existing strength of the Korean games industry and the recent emergence of China, but also MMORPG producers or co-producers/localisers materialising in countries like VietNam (Phong 2007) and India (Sify 2008)

⁴⁸ Or one could turn this inside-out to argue the competitive fragility of gold-farming based on poor skills and strategies, uncertain demand, destructive competition, etc.

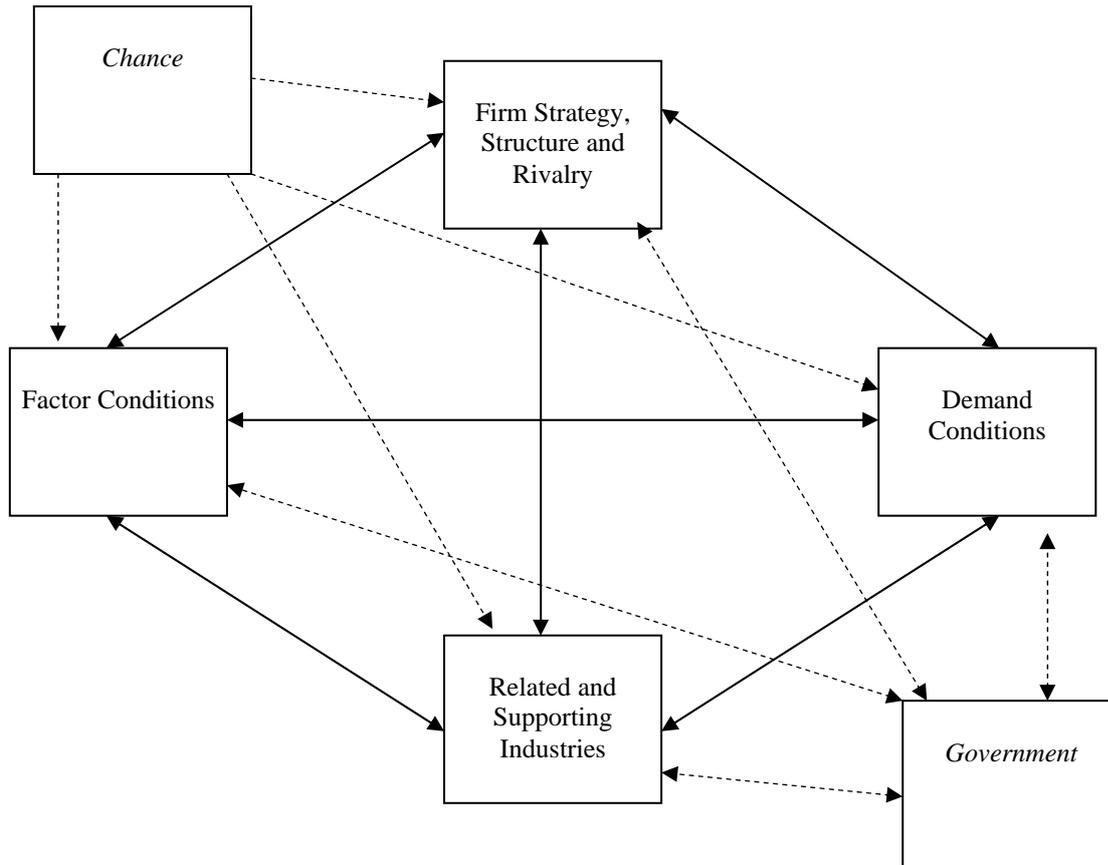


Figure 6: The System of Competitive Advantage

Or, one could use Porter's (1980) "five forces" model (see Figure 7) to understand the nature of competition in the gold-farming sub-sector. This would again cover the high level of competition between gold farms (reflected – see Section B2 – in the declining price of virtual goods and services). It would identify the relatively low barriers to entry: economies of scale are relatively limited for producers, as discussed in Section B3; firms are poorly differentiated; capital requirements are low; and customer switching costs are low. Only the issue of access to distribution channels is a potential entry barrier. One would draw on value chain-type analysis to say that gold farming firms' suppliers have limited power because switching costs are low and supply is relatively competitive. Buyers would be analysed similarly to argue that brokers and exchanges have more power than individual player-consumers.

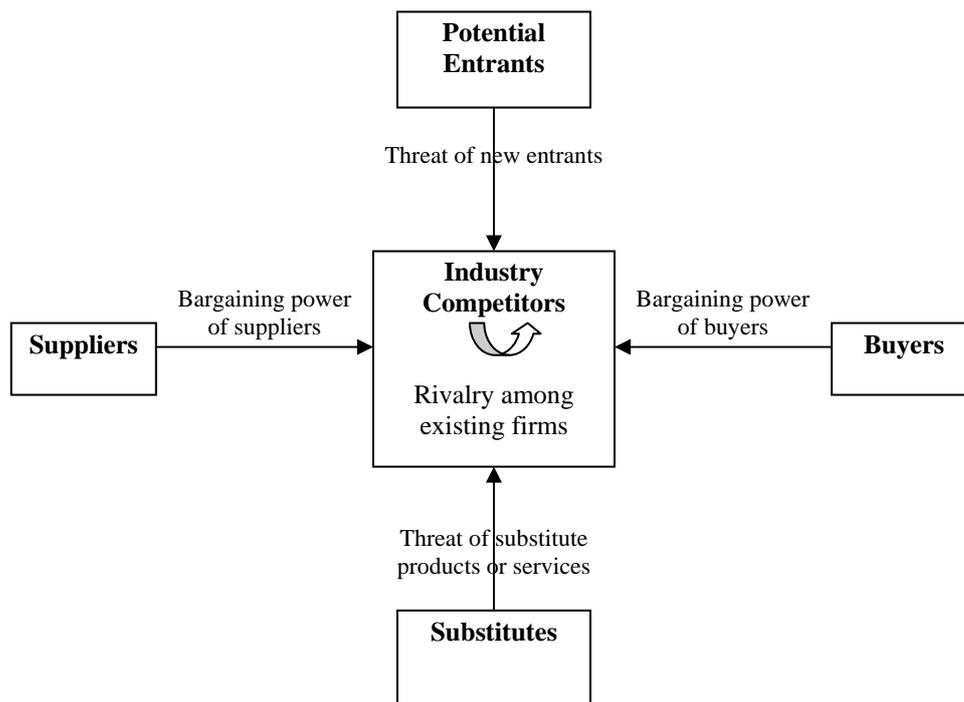


Figure 7: Competitive Forces Framework

But in all three cases, we so far have left out one element – threat. As plain "threats" in the SWOT model; as an element in the analysis of demand and government and rivalry in the diamond model; and in understanding the power of buyers and the threat of substitution in the five forces model. We analyse this element here in much greater detail because risk and uncertainty and vulnerability seem so strongly to characterise the gold-farming sub-sector.

Other than competition/new entrants, an obvious threat is rising labour costs, an issue across all Chinese sectors and in Asia more broadly (*Reuters* 2008, UN 2008). As mentioned in Box 9, government action may also be a threat. Western governments so far seem more interested in the taxation of virtual income than in gold farming (Crooks 2006). Governments in Asia have been more engaged, with the Japanese government launching an investigation into real-money trading (Wyman 2006)⁴⁹, and with the Korean government enacting legislation against it (see Box 13).⁵⁰

⁴⁹ Though this appears to have resulted in a laissez faire policy outcome (Davis 2006).

⁵⁰ An indirect impact on gold farming might come from generic game-related concerns of governments in Asia. These seem to be about the level of violence depicted and about the amount of time young players are investing in gameplay (Wahid et al 2006). On the latter, the Chinese government, for example, has enacted restrictions both out-game (e.g. limiting cybercafé hours) and in-game (e.g. halving game points for under-18 players (all players must register with their ID card details) after three hours, and reducing to zero after five hours) (*China Daily* 2007, PJ 2007).

Box 12: Fraudulent Threats to Gold Farming

Alongside the "legitimate" threats described in this section is another. Very little written about, and no doubt something many regular players would – rightly or wrongly – see as just desserts, gold-farming firms appear to be under threat from fraudsters.

The threat appears to come from two directions. First, there are player-scammers: for example, one discussed how he defrauded a number of gold-farming firms (Aiken 2007). There are also sites with guides to scamming gold-farming firms (e.g. MMOwned 2008). Some of the scams are indirect and exploit knowledge of how gold-farming firms work e.g. constantly logging into an account being power-levelled in order to get that account banned (Leftypaladin 2008). Some abuse the customer-orientation of gold-farming firms e.g. demanding a refund or additional delivery by falsely claiming purchased currency was never received (Floozle 2008). Others take services for free e.g. by changing the password on a levelled account before paying for the power-levelling (Robomir 2008). In all cases there is a loss of staff time without any payment for the gold-farming firm, and their sites demonstrate fairly elaborate precautions against fraud.

A second potential direction comes from within game companies. Steven Davis has warned about the dangers of "insider trading": game company employees working as competitors to gold farmers, or in collusion with one set of gold-farming firms seeking to restrict the actions of competing gold-farming firms. Only one case looks to have come to light to date: a senior manager working for Shanda in China who duplicated rare items on *Legend of Mir 2*, earning himself and two accomplices US\$250,000 over a 12-month period (Davis 2006c).

In either case, we appear to know nothing about the actual extent and impact of these on gold farming.

However, the main focus in the remainder of this section will be the threat from other players and, more, from the game companies. The discussion that follows looks first at identification of gold farming; then at the responses to gold farming, and at the incentives to respond; and finally at the impact of those responses.

Identifying Gold Farming

Following the discussion in Section A2, we can see gold-farming firms tend to have three main types of in-game presence:

- Low-level grunts: characters that advertise the services and web site of the firm to other players, or which mule money and items around.
- High-level earners: who have in-game powers that enable them to either get high-level (i.e. high-worth) items and/or earn significant amounts of in-game currency through their avatar.
- Bots: automated avatars that undertake repetitive money-making activities (mining ore, chopping wood, killing gremlins, buying from NPCs), or repetitive activities such as advertising.

Gold farmers are also present in-game when they take over a player's character for power-levelling.

Avatars advertising gold-farming services are easy to recognise. Otherwise, in-game recognition of gold-farming avatars relies on rather unscientifically putting together clues (Paul 2005):

- Behaviour: e.g. trying to remove other players competing for high-level resources or items; constantly doing the same thing or being found in the same gameworld area.

- Appearance: e.g. low-level avatars may be dressed in the standard clothing or equipment that all new players are issued; characters may be in play 24/7.
- Level: e.g. either level-1 or a high level.
- Interaction: e.g. do not answer interactions, or answer in poor English. Other than actual advertising this, above all else, seems to be regarded as an acid test: "English speaking gold farmers tend to go unnoticed because they can communicate with players (and so say they aren't farming, or move to a different farming area if players complain) and because if you can respond you're generally not seen as a "chinese gold farmer"." (GrinR 2005).

Game companies have some additional sources of recognition evidence. These vary from game to game and company to company, though they still rely somewhat on perception. They may include:

- Out-game monitoring: gleaning information from auction sites and gold farming sites and trying to link to in-game characters.
- Circum-game monitoring: tracking the IP address⁵¹ of log-ins to see those that suddenly jump from one location to another (found with power-leveiling); tracking how long a character is playing (may be 24/7 with power-leveiling); looking for use of automated code (bots/macros).⁵²
- In-game monitoring: of messaging (for advertising); of trading (large amounts of cash or high-cost items being exchanged for nothing between players).

Responses: The Threats to Gold Farming

If they are recognised, gold farmers face threats on a rising scale:

- Abuse: rude messages from other players. A number of gold farmers report being the subject of abusive in-game messages (e.g. Jin 2006e).
- Reporting: other players can report suspicious or prohibited behaviours to the game company. This only causes a problem if it leads to more serious repercussions. Many players will have done this in practice. Over time – for example with *World of Warcraft* in 2007 – game companies have made it easier to report spamming and other RMT-related actions. They also rely on reporting to guide further actions such as patching and account banning (e.g. Square Enix 2008).
- Bot disruption: bots work by repeating certain program code; some game companies try to combat this with "random events": unexpected activities that only a human can resolve and which will stop the bot from working. In *Runescape*, for example, a tree being chopped may turn into an Ent as a random event. If the avatar keeps chopping, their axe will break. Regular players may also attempt to disrupt perceived bots.
- Character attacks and killing: where allowed, other players may kill avatars they suspect of gold-farming or may induce non-player characters to kill those avatars. To see this in practice, type "killing gold farmers" into YouTube or Google and peruse the results (also Weir 2004, Dibbell 2007). Gold farmers themselves also describe experiences of other players deliberately killing them (Bell 2006).

⁵¹ The Internet Protocol address – the unique four-number code that identifies each Internet-connected device.

⁵² Game companies have access to an immense amount of game data. They are thus able to use data mining to identify issues for further investigation (Kazemi 2007). For example, plotting data on all trades as a network, or all quest completion times to identify anomalies. Other game company tactics include use of monitoring software to detect use of bots and other cheats, such as Blizzard's *Warden* system.

Random events may include attack from a non-player character; an example in *Runescape* is the arrival of an evil chicken which will kill players that keep doing whatever they are doing and fail to run away or fight back. Likewise Square Enix installed a high-level monster in a *Final Fantasy XI* game area where low-level gold farmers were seen to be fishing a lot, in order to kill or deter those characters. In most games, avatar death is only a temporary disruption but may lead to some item loss.

- Nerfing: where gold farmers are found to be making use of some particular item or aspect of the game to make money or to power-level, those items/aspects may be "nerfed" – downgraded or even potentially removed from the game by game company programmers.
- Account banning: where – through monitoring or reporting – game companies believe they have identified gold-farmer characters, those characters and their associated accounts may be banned. Some subscription fees may be lost. It takes time and effort to resubscribe. And many hours or days or even weeks of work may be lost if a high-level character was banned. In May 2006, to take just one example, Blizzard banned more than 30,000 accounts on *World of Warcraft*, citing automated gold/item farming as a key reason behind the bans (Reimer 2006); ArenaNet claims to ban "typically more than 5,000" accounts per week on *GuildWars* for real-money trading (ArenaNet 2008); and Jagex claims to have removed more than US\$2.6m-worth of in-game currency by account banning during 2007. Gold farmers also report this: having customer accounts banned when power levelling (Carless 2007), and having their own gold-farming accounts banned and having to start again (e.g. on a daily basis: Davis 2007b).
- Other patching: a number of the changes described above are introduced into an existing game by the distribution of "patches": sections of programming code that replace earlier sections. Other patches may seek to alter the trading system to prevent RMT-related actions. For instance, in 2006 and 2007, patches were introduced to both *Knight Online* and *World of Warcraft* which delayed delivery of payments when trading, making it easier to identify and block prohibited trades.
- Game redesign: the boundary between patching and redesign is fuzzy, but some game companies undertake quite fundamental changes to their games to seek to get rid of gold farmers. One example, described in more detail below, was the major change introduced to *Runescape* by Jagex in 2007.

Beyond these, further threats include:

- IP banning: companies may block logins from certain IP addresses they believe have been associated with prohibited actions. Such things can be worked around, but with some difficulty. For example, Blizzard bans all Chinese IP addresses from its North American and European servers (Zhe 2006).
- Blocking channels: shutting down particular sales or marketing channels used by gold farmers. In 2002, Mythic Entertainment (makers of *Dark Age of Camelot*) had all eBay listings for a gold-farming firm – Black Snow Interactive – removed (Dibbell 2003). This approach then grew such that, by 2007, eBay was delisting all gold farming auctions, reportedly because of pressure from game companies (Dibbell 2007). As another example, in 2005, *PC Gamer* magazine stopped carrying RMT adverts, reportedly because of pressure from gamers (Carless 2006).
- Legal action: game companies or others may file lawsuits against gold farmers if they believe a case is provable. In the most serious case, the gold-farming firm

would be put out of business. In 2008, Blizzard (makers of *World of Warcraft*) successfully won a legal injunction against In Game Dollar LLC (apparently run by a Florida-based individual) which operated the peons4hire web site. The web site was closed down (Duranske 2008). At the time of writing a one-year class action law suit against broker IGE was working its way through the Florida courts (*Virtually Blind* 2008).

Box 13: The Legality or Otherwise of Gold Farming

There is little doubt that gold farming violates the agreements and terms that most game companies set up for their MMORPGs. Players must agree to end user licence agreements (EULA) and terms of service (TOS)/terms of use (TOU) agreements before playing the game. Typical components of these include requirements not to exploit the game for commercial purposes (prohibiting all gold farming activity); not to use any automated code (prohibiting macroing or bots); not to share an account (prohibiting power-leveling); not to advertise any commercial service. At some point after 2003, most companies also moved to specifically claim rights to in-game currency and items, and to specifically prohibit real-money trading. Examples are given below:

Eve Online EULA:

"You may not transfer, sell or auction, or buy or accept any offer to transfer, sell or auction (or offer to do any of the foregoing), any content appearing within the Game environment, including without limitation characters, character attributes, items, currency, and objects, other than via a permitted Character Transfer as described in section 3 above. You may not encourage or induce any other person to participate in such a prohibited transaction. The buying, selling or auctioning (or any attempt at doing so) of characters, character attributes, items, currency, or objects, whether through online auctions (such as ebay), newsgroups, postings on message boards or any other means is prohibited by the EULA and a violation of CCP's proprietary rights in the Game."

World of Warcraft TOU:

"Blizzard owns, has licensed, or otherwise has rights to all of the content that appears in the Program. You agree that you have no right or title in or to any such content, including the virtual goods or currency appearing or originating in the Game, or any other attributes associated with the Account or stored on the Service. Blizzard does not recognize any virtual property transfers executed outside of the Game or the purported sale, gift or trade in the "real world" of anything related to the Game. Accordingly, you may not sell items for "real" money or otherwise exchange items for value outside of the Game."

It is not clear that these latter elements have been invoked in legal actions. For example, Blizzard's complaint against In Game Dollar LLC does invoke EULA/TOU terms. However, its specific grounds are unauthorised access of and disruption to Blizzard's computer service (under national and state Computer Fraud/Abuse Acts); interference with the EULA/TOU contracts between Blizzard and other players; and unfair competition under the state Business/Professional Code (Pappas & McGee 2007). It does not seek to test out the enforceability of the EULA/TOU contracts with the gold-farming defendant, nor the contentious issue of ownership of virtual items.

The latter has been challenged. Not surprisingly, those involved in gold farming claim that players own their virtual items (Carless 2006). The Chinese government is reported to have "sided with the players on the issue of ownership of virtual in-game goods" (Steinkuehler 2006:204). Indeed, Chinese players have successfully taken local firms to court to get virtual property returned to them (MacInnes & Hu 2007). And a South Korean judge has written a (personal not legal) opinion that "developers and publishers have no legal standing to ban RMT. Such bans are unfair insofar as they heavily infringe upon players' autonomy and their rights to the intangible value they have created." (Yoon 2004).

Nonetheless, Chinese and Korean judgements do not yet appear to have defended player gold-farming, and the US injunction against In Game Dollar does prohibit "engaging in the sale of World of Warcraft® virtual assets or power leveling services" (Selna 2008).

Whatever the actual legal position, the uncertainties about virtual property were enough in January 2007 – as noted above – to cause eBay to stop listing all MMORPG currency, items and accounts/characters (Zonk 2007). Then, in mid-2007, the South Korean government enacted the Advancement of Game Industry Act (Yoon 2007). This made real-money trading of in-game currency (though not in-game items) illegal⁵³.

The Incentive to Respond on Gold Farming

The incentives for game companies to take action on gold farming are not simple. On the positive side of the account, for pay-to-play games, companies earn revenue from gold farmer subscriptions, and other players may be more likely to play or keep playing (i.e. keep paying subscriptions) if they are able to buy currency, items and high-level characters⁵⁴. Put economically, gold farming is utility-maximising for both parties – gold farmer and player-buyer – otherwise, of course, it would not take place (Castronova 2002). Doing nothing about gold farming also costs nothing whereas doing something costs money in staff time and other resources.

Doing something may also produce unforeseen costs, as can be noted in the experience of Jagex. In 2007, in response to continuous complaints from players of *Runescape* about botting and gold farming, Jagex introduced a series of game changes that made these practices much more difficult. Bots do seem to have largely disappeared as a result. However, gold farming still continues. Methods have changed but currency exchange rates appear to be near their historic levels. All this cost Jagex a significant amount of money. Yet it has led many players to complain that the nature of game-play is now seriously degraded; causing them to rename the game *Ruinedscape*. Numbers logged as playing the game now appear lower, though this may be accounted for by removal of bots. Only time will tell whether this high-cost, high-risk strategy against real-money trading has worked. It does suggest that regular players may be very ready to complain about gold farming, but less ready to bear any personal cost for its removal; and that gold-farming actions may create unexpected disutilities.

For pay-to-play games, there is only one main item on the negative side for "legitimate" gold farming: when gold farmers' actions or the perceptions of those actions are such that players cancel their subscriptions⁵⁵. In economic terms, again,

⁵³ There is a political hinterland to this legislation. In an effort to prop up declining levels of business, Internet cafes and video arcades began running video "slot machines" that paid out not money but "tickets" that could be used for government cultural events and site visits (Koster 2006). However, the machines – particularly those running a game called "Sea Story" – were hacked to increase their payouts. The tickets also came to be used as an alternate currency that could be traded for real money. As a result, the "Sea Story" machines became incredibly popular; earning a reported US\$15bn per year for the café/arcade owners. With such vast earnings, corruption of public officials (politicians, bureaucrats and ministers for licences and/or to influence legislation), tax evasion, and reports of money laundering and the involvement of organised crime gangs, soon followed. The ban on virtual currency trading was one part of the government's reaction to the ensuing scandal and public pressure. MMORPGs, therefore, may not have been the target of the legislation and it is, at the time of writing, unclear to what extent they will in practice be caught in the crossfire.

⁵⁴ This is implicit within the comments of some players who have bought gold-farming services (Yee 2004), and more explicit in the explanations of players who cancelled subscriptions. Many did so because of the difficulty and/or dullness of raising their character's levels (Yee 2003).

⁵⁵ Castronova (2006) hypothesises that gold farming also adds to company costs by increasing the cost of customer services due to the number of gold-farming-related complaints that will be lodged. That does seem probable: Robischon (2007) reports that virtual item sale disputes took up 40% of Sony

gold-farming may increase the utility of producer and consumer but also have externalities that reduce the utility of a third party: other players (Castronova 2006) (see also Box 4). It is not clear that much has been researched and written on this specific issue: the actual economics, and the size and motivation of any gold-farming-related cancellations. However, reports from game companies (e.g. Ward 2008) provide some insight. Loss of "immersion" is reported as a problem: it is hard to keep imagining you are a medieval knight defending your kingdom if you're being bombarded by exhortations to visit various web site addresses. The perceived presence of bots or macroing in-game or of gold farmers monopolising a particular area ("spawn-hogging" or "spawn-camping") are also seen to damage immersion or game-play. Finally, players also complain about "kill-stealing": gold farmers monopolising a monster they were trying to kill, and "ninja-looting": gold farmers taking some resource or item while other players are occupied fighting the monsters that guard it (Steinkuehler 2006).

Reports on account banning in *Final Fantasy XI*, suggest 46% were for actual farming (building up currency in-game for later sale); 40% were for use of macros; 6% were for hogging/camping; 5% were for actual real-money trading; and 3% were of resubscriptions by players previously-banned for RMT (Square Enix 2007). Reports from gold farmers do include admissions of spawn-camping, kill-stealing and killing regular players to keep them away in order to meet quotas (Jin 2006e, Yee 2006).

Beyond specific in-game perceived experience of gold farming, players also have out-game sensibilities; either that it is "not fair" that some players should use gold farming to shortcut the time-consuming, arduous road to wealth and high levels; or less explicitly because the shortcuts highlight just how much time they themselves have been investing/wasting⁵⁶. Gold farmers are also blamed by players for various in-game effects – inflation, deflation, oversupply of items (see Box 5). These effects seem largely seen as negative because they reduce either the purchasing or earning power of players. Kaminski (2006) reports that players divide approximately into thirds – one third don't object to gold farming and may participate in it; one third don't care; and one third are against it.⁵⁷ Of the latter, more seem concerned about the perception of fairness/cheating than perceived damage to the game.⁵⁸

Given the core role played by perception – "The real problem is the perception of gold farming, not the fact of gold farming" (Davis 2007d) – the incentives may be more for the game companies to be seen to be doing something than to actually be doing something. They do, for example, seem less concerned about covert than overt gold farming activities (Kazemi 2007). Despite this, it seems unlikely that the many

Online Entertainment's customer service time but that this fell by 30% following the introduction of their RMT system, Station Exchange in 2005.

⁵⁶ One interesting counter-argument is that all players are putting time and effort in; regular players invest that direct in the virtual world; players who trade with gold farmers are investing that in their real-world jobs, for which they are paid, and then transferring their pay as an investment into the virtual world.

⁵⁷ Kaminski's player sample (n=26) is small but these figures chime exactly with those of Castronova (2006) drawn from discussions with games industry managers who cite one-third of players participating in RMT, one-third against it, and one-third falling into neither camp.

⁵⁸ For other player testimony see, for example, "The Chinese farmers have utterly ruined the economy and unbalanced any sense of fairness in the game." (He 2005); also Dibbell (2003), Yee (2004), Bell (2006), Yee (2006), Orie (2007) plus NoGold (2008).

reports of account banning are shams; and the legal actions certainly are not. Either the cost-benefit balance of taking action swings in the latter's favour, or game companies are motivated by more than simple financials. Given most company staff are also players, they may also be swayed by some of the "moral" or immersion arguments about game integrity.

In summary, online game companies seem to have started life with an "Ignore It" strategy which changed at some point – particularly during 2005-2007 – to the "Fight It" strategy of patches, bans and legal actions described above. Alongside these two are three other strategies that game companies have adopted:

- **Permit It:** this has involved game companies formally supporting the creation of third-party player-to-player real-money trading portals. Examples include PlaySpan (set up in the US by non-resident Indians and with offices in India, China and Korea) and, forthcoming at the time of writing, RealityBridge.
- **Host It:** instead of outsourcing the trading portal, the game company hosts it. This was the approach taken by Sony Online Entertainment, which set up "Station Exchange" as a trading mechanism for two of the servers hosting their game *Everquest 2*, taking a 10% commission and making more than US\$250,000 in its first year (Robischon 2007).
- **Become It:** though relatively little known in Western online gaming, Asian gaming has made significant use of the free-play, item-pay model in which gamers pay little or nothing to join the online game, but then pay real-money (typically deducted from pre-paid cards) to buy items in-game (e.g. *ZT Online* – Egan 2008). Other games provide their own power-leveilling services. For example, Origin, who operate *Ultima Online*, sell level-85 characters ready-made for US\$29.99. In the case of either selling items or selling high-level accounts, the game companies are earning money from exactly what the gold farmers do.

For developing country gold farmers, the Ignore It strategy will work best. Permit It/Host It strategy impacts will depend on what is and is not permitted. As discussed next, the impact of Fight It is debatable. Become It looks, at least on the surface, to be the most threatening – it takes us back to Figure 7's five forces model, with the threat that gold farmers' activities will be entirely substituted by the game companies.

The Impact of Game Company Actions

Game companies claim that their actions reduce the extent of gold farming and other RMT-related activities (e.g. Zonk 2007). There is reasonable data on what game companies say they are doing about gold farming. There is less about what they are actually doing and why they are doing it. And there is even less about the impact of their actions on gold farmers. So we know about the threat in theory, but very little about the threat in practice.

There are a few tidbits we can cite:

- As mentioned already, gold farmers do report having their accounts banned, and having to start again with low-level accounts (Davis 2007b, Dibbell 2007).
- One Chinese manager reports losing thousands of dollars-worth of virtual stock each time he had a "close-down" by the game company (of which he had had five) (Lim 2007).
- In-game experience and reports from other players do indicate fewer bots, less spawn-camping and kill-stealing after anti-RMT campaigns (Orii 2007).

- Out-game one can see web sites that have closed down (e.g. peons4hire.com), or the removal of certain games (e.g. *Runescape* during 2008) from gold-farming portals⁵⁹.

However, against these morsels we have two opposing items, albeit of less direct evidence:

- Currency rates: as discussed in Section B2, in-game currencies have deflated fairly steadily against real-world currencies since the mid-2000s. All other things being equal, one would have expected effective anti-gold farmer actions to reduce supply and thus drive the currency price up. That this has not happened suggests gold farmer numbers/supply may not have greatly decreased as a result of game company actions.
- Business processes: gold farmers have constantly proven themselves to be highly innovative. Not just in exploiting emergent game loopholes and bugs but in metamorphosis: "rolling with the punches" and changing their processes as conditions change. For example, when Blizzard banned non-US IP addresses from its US game servers, Chinese firms rented US proxy servers and got contacts in the US to pay subscriptions via their credit cards so they could continue to have access (Zhe 2006). When Blizzard began focusing on player-to-player trades, gold farmers started listing cheap items at very high prices in *World of Warcraft's* auction system as a way to move money between characters (Torres 2007). Since one-sided trading of large quantities of currency between players became impossible in *Runescape* in 2007, gold farmers now take over the player's character and provide the gold in that way (e.g. PCGamerUSA 2008). As with virus writers and anti-virus software, then, the sense is that gold farmers find ways to work around most roadblocks and that the game of cat-and-mouse will continue forever.

From the limited available data, it seems that gold farmers face a series of ongoing threats of varying severity. Understanding, avoiding, and mitigating these threats are probably a central part of daily activity for gold farmers. Porter's models above encompass some aspects – threats to demand, threats by government, threats of game company substitution. However, in general, those models do not easily find a place to classify the majority of threats; most likely because the models are intended for mainstream industries not the type of "shadow industry" that gold farming represents.

Although the threats are real and do demand reactions from gold-farming firms, the level of this reaction is not entirely certain. Other than legal action, it may be that the impact is more at the level of nuisance and accepted cost rather than fatal intrusion into the lives of gold-farming firms. Nonetheless, threats will help to shape the competitive strategy of those firms – shaping the research they seek to do; shaping their choice of low-cost vs. niche vs. differentiation strategy (most currently appear to choose the former); shaping their reinvestments; and, ultimately, shaping their continuation in the sub-sector.

⁵⁹ There have also been declines in the level of Google searches for some in-game currency since the mid-2000s. For example, see Google Trends for "wow gold" or "ffxi gil"; though what this indicates is ambiguous.

E. Developmental Analysis of Gold Farming

Much gold farming takes place in developing countries. How, then, can we analyse this phenomenon in development terms? In many ways, we already have – the general mapping and the analysis from the perspectives of economics, industrial sociology and enterprise – all these could easily fit under a "developmental perspective".

We could extend these into various fractions of development studies; for example:

- **Economic analysis:** from the field evidence of farmers and firms, this activity does not merely substitute one form of employment for another, it has also in places reduced the number of unemployed (e.g. Thompson 2005, Jin 2006). It is therefore increasing national income. Those earning money from foreign players are also undertaking the equivalent of exports, thus impacting the country's balance of trade. The nature of those employed is mixed but, by channelling income to the unemployed and to rural migrants, gold-farming may have some income equity, even poverty reduction, impacts.
- **Social analysis:** alongside negative characterisations about addiction, there are also positive anecdotes about the wider impact of gold farming. Jin (2006f), for example, reports gold farming providing work for unemployed gang members, as a result of which crime is perceived to have fallen. This chimes with Bilich's (2006) description of a project that uses gamesplaying to entice youngsters off the streets in Argentina.
- **ICT4D analysis:** a key issue in the information-and-communication-technologies-for-development (ICT4D) sub-sector of development studies has been the sustainability of telecentres: Internet-connected PCs set up in small towns and villages. Often telecentres face problems of financial sustainability because they adopt a consumption model focused on helping citizens to consume Internet-based information, rather than a production model focused on helping citizens create new ICT-based employment (Heeks 2008b). Gold farming presents two things. First, a current model for earning money via an Internet-connected PC. Second, an example of a possible future model in which Internet-connected workers in developing countries produce a wide range of virtual goods and services. For both these reasons, the ICT4D field should be taking a keen interest in gold farming.

These and other fractions of development studies provide avenues for future research on gold farming. In the remainder of this section, though, the particular focus will be at the micro-level of individual gold farmers' lives.

E1. Working Lives and Livelihoods of Gold Farmers

Labels can be powerful, and Julian Dibbell's (2003) early foray into this field with the term "virtual sweatshop" probably helped to cement or at least crystallise the view that gold farming was an exploitative and oppressive activity. The work was characterised as repetitive and very badly paid with long working hours. This view has then been reproduced in many subsequent writings, though almost always in the absence of data. To find the testimony of gold farmers themselves and actual field evidence, one must shovel aside a mound of opinionation.

When one does that, the picture is more positive, though still mixed. We can look at a set of issues:

- Wages. As noted in Section A3, wages are, unsurprisingly, low by Northern standards. The average wage in China calculated above – US\$145 per month – works out at something like 50 cents per hour; less than one-tenth the US federal minimum wage. On the other hand, the salary comparator column in Table 2 indicates that gold farming pay is as good, and often better, than alternative sources of local employment. And, reflecting the unusual nature of the sub-sector, some farmers are reported playing for no wages in exchange for free game time, suggesting compensation for some gold farmers may be made up from more than just money (Jin 2006).
- Work content. Some workers find their work boring and repetitive. One is quoted, "You try going back and forth clicking the same thing for 12 hours a day, six or seven days a week, then you will see if it's a game or not" (He 2005). Others find it "torturing having to 'camp' the same spots for long periods of time" (Yee 2006). But Jin (2006) – who field-surveyed a number of farmers – reported "Most of the gold farmers I talked to love the job. In the gold farms, you can see they are enthusiastic about their job and they got a sense of achievement from it".⁶⁰ Similarly some of those interviewed by Dibbell (2007) were positive: "there's not a big difference between play and work".⁶¹ Hence, the terminology "playbourer" to describe this job; a categorisation reinforced by the finding that some workers relax after work by playing on their own game account (*ibid.*).
- In-game exclusion. Where Asian gold farmers share game worlds with Western gamers, they can feel a sense of exclusion: "Many Chinese gold farmers are troubled by their conflicts with foreign gamers. They cannot really fit in the gamer communities on foreign servers where they work/play because of language, cultural and social barriers." (Jin 2006). One is quoted as saying that name-calling by US players gives him a "sense of inferiority" (Jin 2006c). Another describes interactions with US players: "they treat me bad ... They keep calling me farmer, China dog and such. I do not have any problems with other players except American players, they non-stop racist me." (Bell 2006).
- Empowerment. Jin (2006) reports, "the game world can be a space of empowerment and compensation for them. In contrast to their impoverished real lives, their virtual lives give them access to power, status and wealth which they can hardly imagine in real life." What real-world impacts this perceived empowerment has are uncertain although we know that top gamers do achieve respect and admiration of their real-world peers, so there may be some spillover.

⁶⁰ Though some differentiate their work content, preferring the relative freedom of gold farming against the need to play someone else's character when power-lelling (Dibbell 2007).

⁶¹ Castronova (2002) discusses this from an economic perspective (see Lehdonvirta 2005). A most-basic perspective would say that real-world work is a source of disutility (which requires compensation) but that leisure activities are a source of utility (and therefore would be paid for). From this perspective, gameplay is a utility—disutility hybrid because it is paid for by players but it also compensates those players by producing virtual goods (currency, items, higher-level characters) that have a real-world value. Thus players can talk of "play" in disutility terms: "it was more like work than fun" (Yee 2006b: 69) Gold farming, too, becomes a utility—disutility hybrid because, for producers, it is a supposed-utility/leisure time activity that is compensated by real wages. Purchasers, meanwhile, are willing to pay money to forego a supposed utility/leisure time activity. The explanation for these conundrums lies partly in the differential value that different people give to leisure time, and the differential utility of different in-game activities (e.g. "grinding" vs. other gameplay).

Equally, we do not know if virtual-world empowerment has real-world effects on the individuals; e.g. making them better able to address real-world challenges.

- Alternatives. Jin (2006) reports, "Most of the gold farmers I met do not have better alternatives. ... They were either unemployed or had worse job before they found this job." In terms of the three key groups identified, the main alternatives are: manual labour (rural migrants), unemployment (urban unemployed youth), and their studies! (students). We have already seen wages can be as good or better than the alternative. And work content? Even for those who feel they have boring, repetitive tasks the alternative might be the perceived ennui of unemployment or the monotony of factory work.

The bottom line here seems to be the reference point. By and large, when Westerners compare the working lives of gold farmers to their own, they come up negative. By and large, when gold farmers compare their working lives to the immediate alternatives, they come up positive or neutral. Jin (2006) sums it up:

"This is a paradox that the term "sweatshop" cannot convey: in the gold farms exploitation is entangled with empowerment and productivity is entangled with pleasure."

As in other parts of this paper, the available data has driven a rather eclectic coverage of issues above. However this is starting to make feasible the analysis of the development impact of gold farming in terms of the livelihoods framework; widely used in development. A relatively easy entry point would be measurement of impacts of employment in gold farming on the five elements of the livelihoods assets pentagon (see Figure 8; Heeks 2006). Even here, there are many gaps – we know something about physical capital, financial capital, political capital and human capital; but there are still blanks in all of these and there appears nothing written about gold farmers' social capital: their networks and relations.

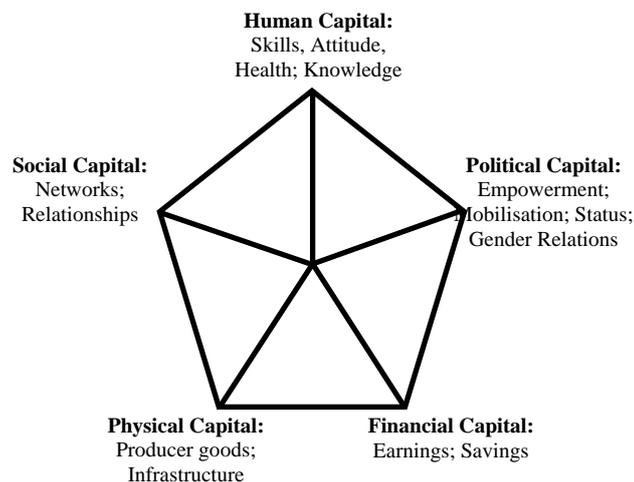


Figure 8: Impact Assessment Framework Based on Livelihood Assets

One further downside of the data so far gathered is its cross-sectional nature. But what about dynamics and chronologies of individual gold farmers? If we know relatively little about the working lives of gold farmers, we know even less about their career aspirations and trajectories. Those reported to be students are typically using

this as a temporary source of part-time income prior to graduation, and will potentially move off into quite different employment.

For the others – the rural migrants and the urban unemployed – it is not clear how long they work as gold farmers. The most likely pattern is that individuals work as gold farmers for several years but shift from one gold farm to another, possibly from one city to another, every few months or every year (Barboza 2005, Jin 2006e, Jin 2006f).

It is not clear why they shift and whether they see gold farming as a journey to some other destination. It is certainly conceivable that they do: those involved in basic IT work in developing countries sometimes hold the belief that it will be an entry point to more highly-skilled work such as programming (Heeks 2008c). Wang (2008) gives some small credence to this in reporting a gold farmer who sees his work giving him not only valuable work experience but, in particular, valuable IT skills.

F. Other Sociological Analysis of Gold Farming

Having already investigated gold farming from the perspective of industrial sociology, this penultimate section brings together a couple of different perspectives that might loosely be herded under the sociology label.

F1. Perception and Discourse

Given the virtuality of the environment and, hence, the fact that almost the entire games-playing population – at least in industrialised countries – will never have met a gold farmer, then perception tends to outrank reality in framing the discourse on gold farming. We already saw indications of this in Section D4, and saw that Western perceptions of gold farmers have been largely negative. Aspects of those perceptions include (developed from Chan 2006):

- Homogenisation: a generalised assumption that all gold farmers are from China; that all players with poor English are gold farmers
- Alienisation: the assumption that gold farmers are different from and "other than" regular players.
- Moralisation: defining gold farming as morally wrong for the game (unfair allowing players to take shortcuts), and as morally wrong for the gold farmers (they are oppressed and exploited).
- Criminalisation: associating gold farmers with criminal activity. Examples include stories of theft (Lastowka 2006), potential links to money-laundering (Symantec 2007), potential links to organised crime (Neff 2007), and accusations that gold farmers are being forced to work against their will by "down-and-dirty bands"! (ARD-TV 2006).

Box 14: Gold Farmers/Gold Frauders

Some writers and some game companies appear to be deliberately seeking to conflate the notion of gold farmers (as defined in this paper) and gold frauders (those seeking to defraud players or companies) (Davis 2008). For example:

"Real-money trading companies hack into and steal legitimate accounts, often by distributing keystroke-logging malware to steal passwords. In fact, simply purchasing gold from these companies may open you up to a later hacking attempt. These hacked accounts are then stripped clean of any valuable in-game items and/or used for botting." (ArenaNet 2008)

As Davis (2008) points out, there is limited evidence for this conflation. Five conclusions appear likely:

- Online gaming generally is a target for fraudsters (e.g. Leyden 2008, McMillan 2008).
- Some real-money trading web sites are fraudulent. Brown (2008), for example, identifies some that had targeted her company.
- Some real-money trading web sites are not fraudulent. One player who spent US\$100 per week on in-game currency reported buying from various gold-farming sites, and never having been defrauded (Aiken 2007).
- Game companies have problems with fraud that they associate with gold farming, e.g. the use of charge-backs. Those involved will take out an account for some time, then claim a refund from the credit card company. On top of the lost account income, game companies may also lose out when the credit card firm fines them for excessive charge-back levels: Sony Online Entertainment stated it had suffered nearly US\$1m in such fines in a six-month period in 2007 (Zenko 2008; see also Seiler 2007). The actual association with gold farming is undetermined.
- Gold-farming firm web sites themselves suffer from fraud. See Box 12 for further details.

At most, then, the evidence points to only a very uncertain and very partial connection between gold-farming firms and fraud. As elsewhere, the (sometimes-engineered) perception very likely runs well ahead of the reality.

One can readily identify flip sides to all of these perceptions:

- Homogenisation: gold farmers have been reported from at least five other developing countries, some transitional economies, and from industrialised countries (see Sections A3 and C1). The issue of language quality might call to mind a saying about pots and kettles given the illiterate, ungrammatical in-game chat of many Western gamers.
- Alienisation: at least in virtual terms, everyone in-game is "other"; everyone is a foreigner in a strange land. Some players report playing alongside gold farmers and including them in their chat and activities once they get to know them (Yee 2006).
- Moralisation: what about the morality of providing income, employment and livelihoods for some of world's poorest?⁶² Failing that, how about a bit more attention to the morality of purchasers as opposed to the morality of producers?
- Criminalisation: field studies of gold farmers suggest no criminal links (Jin 2006), and – as described in Box 12 – gold-farming firms themselves have been the target for fraudsters.

⁶² For a bit of gold-farmer "fight back" on this issue, see Wang (2008).

Box 15: Asian Problems with Gold Farmers

The stereotype of gold farming as a battle between Western game companies/players vs. Chinese gold farmers is undermined by the presence of Western gold farmers. It is also undermined by the problem Asian game firms report with local gold farmers. Korean NCSoft's *Lineage* was the origin of much gold farming, and NCSoft has banned hundreds of thousands of accounts for gold farming (Steinkuehler 2006). China-based Giant Interactive was the subject of a law suit from investors who claim statistics in its IPO (initial public offering) prospectus were exaggerated by inclusion of thousands of gold farmer accounts in its *ZT Online* game (Scheidt 2007)

"Wider society" also has a view. In South Korea, thanks to the promotion of e-sports, the view of gaming generally seems positive but, as reflected in the 2007 anti-RMT legislation, the view of gold farming seems less positive. In China, newspaper articles on gold farming "usually condemn it as another example of youth corrupted by bad hobby." (Jin 2006b).

So why do the negative perceptions appear to dominate? Chan (2006) feels this demonstrates "how racial meanings can be insidiously re-mapped in cyberspace"⁶³, and Jin (2006) sees this as triggered by a sense of virtual immigration: "Chinese gold farmers are in some sense a new kind of immigrant workers, disembodied through the Internet, then reembodyed on a foreign territory as the mythical warriors, magicians or priests – virtual bodies that are the bread earners for real bodies."

Yee (2006) then draws these two ideas together by insightfully demonstrating parallels between reactions to gold farmers, and the treatment of Chinese immigrant labour working laundry shops during the California gold rush of the mid-to-late 19th century: the same repetitive work in front of a machine; the same association with gold. And similar tropes of associating East Asians with disease and pestilence that justified the need for their extermination⁶⁴ – ethnic-cleansing either from real American soil or from the virtual American soil of game servers:

"The contemporary narrative starts to feel too much like the historical one - Chinese immigrant workers being harassed and murdered by Westerners who feel they alone can arbitrate what constitutes acceptable labor." (*ibid.*: 6)

More generally, one can revisit the list of threats described above in Section D4 and see parallels with treatment of legal and illegal immigrants in the real-world: being sworn at (abuse); being reported to the police (reporting); having their places of work raided or attacked (disruption); having rules and systems changed in order to disfavour them (patching/redesign)⁶⁵; removal of right of abode, removal of citizenship rights, and deportation (account banning); prosecution (legal action); violent attack and murder (character attacks and killing).

⁶³ In *Lineage II*, gold farmers often chose to play as girl dwarves (as a race these were particularly good at money-making). This group came to be associated with gold farmers, meaning it was less often chosen by regular players. A "virtual racism" arose such that regular players would then harass or refuse to group-play with girl dwarves (Steinkuehler 2006).

⁶⁴ For example, videos of gold-farmer killings talk of "extermination" and of removing the "cancer" of gold farmers (Steinkuehler 2006).

⁶⁵ Pre-handover Hong Kong residents who thought they would be treated as full British citizens but, instead, found they only had second-class status could consider themselves well and truly nerfed.

A further parallel that might also be investigated comes from the view that immigrants are subject to attack from those groups in a local society that are themselves exploited, partly because they compete for the same resources (Boeri et al 2002). The point of similar competition is clear in the problems of spawn-camping: gold farmers are thereby seen to deny regular players access to in-game resources. It is for future research to ask whether those latter players are themselves being exploited e.g. by the game companies or, more accurately, whether they feel exploited or otherwise feel some anger (perhaps due to perceptions of addiction or time-wasting or the "do it now!" mentality that is reinforced by frequent use of ICTs) that is then redirected towards gold farmers.

Box 16: Parallels with the Drugs Trade

The addictive potential of MMOGs is reflected in the morphed names that players give them, such as "Evercrack" (e.g. Frankel 2002) and "World of Warcrack" (e.g. Batchelder 2005). Can we then make the jump from this to see parallels between drugs trading and real-money trading? The virtuality of the latter, and the more limited necessity for repeat purchases do create differences. However, there are equally a number of similarities:

- Supply chains and profits. The main supply chains of both drugs trade and gold farming start with poor producers in developing countries, and product that is sold via intermediaries to "users". These are urban consumers in developing countries (often ignored in the Western media), and consumers throughout industrialised countries. Intermediaries take the lion's share of profits in both sectors (though they can be disintermediated in gold farming in a way they cannot in the drugs trade). Distribution of income is probably not as skewed. Figures from Chossudovsky (2004), for example, suggest heroin farmers in Asia receive about 1% of the final selling price. Figures in Section B1 suggest gold farmers in Asia receive a minimum of 14% of the final selling price. Other parallels include the competition between industrialised country operations working their way upstream, and developing country operations working their way downstream in the value chain.
- Unequal treatment of buyers and sellers. As in the drugs trade, the "bad guys" in gold farming are seen to be the producers; yet little thought is given to the "hundreds of thousands of players in wealthier quarters of the globe [who] are actually the ones fueling the market." (Anderson 2007). This is reflected in implementation of threats. For example, on GuildWars, ArenaNet bans the accounts of gold sellers but only temporarily suspends the accounts of buyers (ArenaNet 2008). More generally, Dibbell (2007) reports game companies tend to act against the producers not the buyers. As with the drugs trade, both parties are held in opprobrium by others, and buyers may not publicise their purchases for fear of the social stigma attached (is "Goldaholics Anonymous" just around the corner?).
- Money laundering. Real-money traders launder in-game currency through different gaming accounts in order to make the trail harder for game companies to follow (Lee 2005). Some brokers are claimed to help launder in-game currency developed by macroing or duping; again to muddy the trail and make the currency appear at the end as if it has been produced in-game in a normal manner. And, buyers are often paid in small amounts, possibly to reduce the risks of detection, just as drug dealers pay lots of small amounts into legitimate bank accounts to avoid detection (Bell 2006).
- Informational characteristics. Just like RMT, the drugs trade involves information uncertainties (e.g. about the true identity of trading partners (are they police informants or under-cover?); about surveillance of the trade; about the true intentions of trading partners (are they here to trade or to rob?); about the purity and content of what is being traded) and information asymmetries (those upstream in a trade typically know more than those downstream). As a result drugs trading is very risky. In this case, issues of trust and reputation (plus issues of transportation logistics, cost and risk) have led to the emergence of intermediaries; to buyers repeat trading with a seller they come to trust; and to interchange of reputational information. As noted in Section B4, RMT has imitated only some of this pattern.
- Addiction. As reflected in the morphed names above, there is a lot of analysis about the addictive behaviour of some games players (Yee 2002, Orzack & Orzack 2006, Golub & Lingley 2008). Whether players could become addicted to buying in-game currency and items looks unresearched. But there is a possibility: as noted above, Aiken (2007) reports a player spending US\$100 per

week on currency purchase in *World of Warcraft*. Yunwu (2007) reports a *ZhengTu Online* player drawn into repeated purchases of in-game items through the addictive nature of the outcome. And Jin (2006) raises the intriguing point that gold farmers may get addicted to their work.

- Methadone. We could argue the introduction of daily-repeatable, currency-earning quests into *World of Warcraft* in 2007 represented the equivalent of methadone for those addicted to buying gold: an in-game source that was less dangerous and could be more readily controlled by the authorities.
- Trade-related violence. There are claims that denial of service attacks on the main Korean RMT web sites were undertaken by Chinese gamers seeking to extort virtual items from those sites (Davis 2007e). However, no hard evidence is provided on this speculation nor about any other violence in relation to gold farming. There is the much-quoted story of the murder of Zhu Caoyuan in a dispute with another player over the real-money sale of a jointly-won sword in *Legend of Mir 3* (Li 2005), but that relates to the superset element of RMT that excludes gold farming.
- Arguments for legalisation. There are arguments for the legalisation of the drugs trade (e.g. Mowlam 2002, Kallen 2005). One can make the same arguments for gold farming and note that game companies have themselves done this. As often-mentioned in this paper, Sony Online Entertainment did it in creating the Station Exchange for *Everquest 2*, and it is central to *Second Life*.

Given these parallels, and given the much greater body of academic work undertaken on the drugs trade, that body could provide the basis for frameworks and comparisons with gold farming.

F2. The Real and The Virtual

We can draw out a plane of opinions about the virtual world and the extent and cause of differences between it and the real world (Figure 9, developed from Rowe (1990) and Miles (1996)). Focusing on the latter dimension, one can chart two extremes on the continuum:

- Transformism: takes a mainly technologically-deterministic perspective to argue that features of the technology will create a transformed environment online in which the "old rules" do not apply (e.g. Benkler 2006:1 who talks of a technology-enabled "radical transformation"). In general, this is associated with the optimistic perspective that sees the virtual world will not only be different from the real world, it will be better.
- Structuralism: takes a mainly socially-deterministic perspective to argue that social structures will ensure replication of the real world within the virtual world (e.g. Wang 2006:1 who states "virtual gaming economies embody and reproduce real patterns of capitalist structures of labor"). In general, this is associated with the pessimistic perspective that sees the virtual world will be the same as the real world in its negative aspects such as inequity and exploitation.

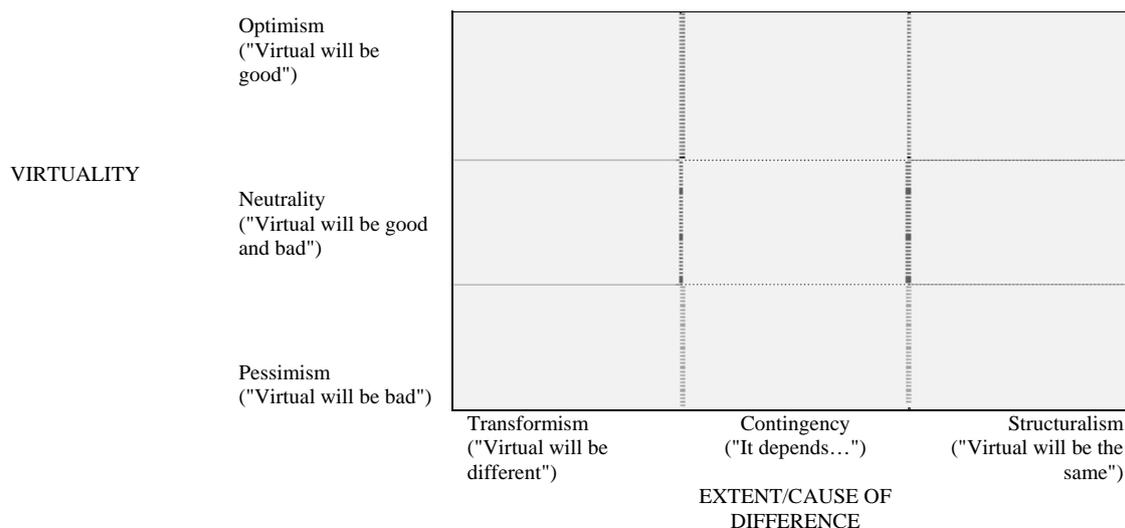


Figure 9: Views on Real vs. Virtual World Differences

In terms of evidence for difference and change, we can find some evidence in favour of transformism. For instance, playbouring represents an entirely new set of income-generating occupations that did not previously exist. The anonymity or morphing of identity possible in gameplay and trading are new. And the impacts of information failures and value-chain intermediation are different from those likely to be observed in a non-virtual environment.

Yet there is also evidence pushing the other way. Many features of economic, enterprise and sociological analysis identified patterns in gold farming found in other sectors. More persuasively, and as noted above, Yee (2006) describes how institutional structures of racism found in the real world have been "re-mapped" into the virtual world. As also analysed above, the whole activity of gold farming replicates real-world patterns of capitalist development: the commoditisation and division of labour seen for thousands of years, and the globalisation and offshoring seen for tens if not hundreds of years.⁶⁶

Overall, then, the stronger weight of current evidence perhaps leans towards the notion that gold farming – while it certainly represents a new sector and a new income

⁶⁶ Wang (2006) argues the nature of both production and consumption derive from the way in which we determine the value of commodities, and that we do this in the same way whether the commodity is real or virtual (following Castronova's (2002) work explaining that consumers perceive virtual goods to have real value). So virtualisation may transform "the *medium* in which capital is exchanged, labor is sold, production is organized, and value is created. But a new medium does not mean new forms of capital or labor relations." (p14). Her arguments seem less convincing when she further argues that the playbourers are alienated from work that is "repetitive, controlled and monotonous". As discussed elsewhere, this is not a description that seems to fit many of those interviewed. She also argues the purchaser "is alienated from the commodity (gaming points) that s/he purchases" because "they are not aware or do not need to be aware of the labor process that takes place in low wage countries for the sale of the purchased points" (p8). Again, given the publicity about "Chinese gold farmers", purchasers may not need to be aware, but they most likely are aware. From this, then, we find (only) partial support for the structuralist view.

and employment opportunity for developing countries with new features – largely serves to reproduce existing real-world institutional forces and social relations.

We can understand this a bit more fully using Orlikowski's (1992) formulation of the relation between technology, social structure (the institutional context), and human agency as summarised in Figure 10.

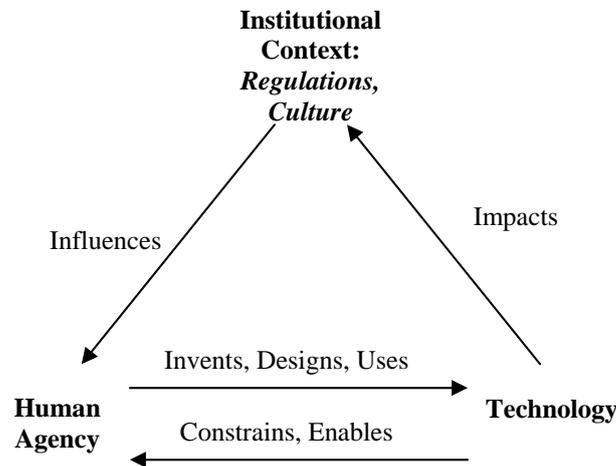


Figure 10: Relations Between Technology, Agency and Structure

We can read this as a self-reproducing cycle. For example, the institutions of most societies involved with games are such that they support the search for profit. In creating the technology of the game worlds, game designers are influenced by this institutional context to create an imitative in-game context. These two contexts, in turn, influence the agency of (at least some) players to use the technology in a profit-seeking manner.

However, we could also read the interrelations – quoting Steinkuehler (2006) – as the "mangle of play": a unpredictable mixer of technology, agency and context into which players, playbourers and other stakeholders are thrown. Hence, the need for continuing research as the field evolves and keeps throwing up unanticipated outcomes.

G. Summary and Conclusions: The Gold-Farming Research Agenda

So ... what has been learned from this salmagundi of a paper? We begin with a summary, followed by discussion about future gold-farming research.

G1. Summary

In basic terms, gold-farming is a sizeable phenomenon. The rather wobbly-legged best guesses for 2008 are that 400,000 gold farmers earning an average US\$145 per month produced a global market worth US\$500m; but we could easily more than double the latter to over US\$1bn. There are probably 5-10m consumers of gold farming services. The main uncertainty of estimation relates to the gold-farming market in East Asia, which appears much larger than that in the US/EU. That uncertainty in part arises because gold farming operates at four levels – local, national, regional and global. We should encompass all four but, to date, the focus has been almost entirely on the global trade.

The "pre-history" of gold farming dates from the 1980s, and we can structure it in terms of capitalist development, starting with "subsistence" production and moving through barter, commoditisation and monetisation until we reach the type of petty commodity production found at the turn of the 21st century. Gold farming proper then started in earnest in 2001-2002, really took off in 2003-2004, and entered something of a black hole phase in data terms during 2007-2008. We can likewise structure this as a move from petty to capitalist commodity production involving wage labour, automation, and globalisation/offshoring, particularly to Asia.

A guesstimated 80-85% of gold farming takes place in China, probably mainly in the urban areas of coastal provinces due to the presence of local gamers, ICT infrastructure, and overseas connections. It probably helps reduce unemployment and poverty, and improve national balance of trade and income equity. It may help reduce crime and provide a model for telecentre and cybercafé financial sustainability.

Gold farming seems to represent an efficient use of capital in job-creation terms (estimated at less than US\$800 per job), with wages representing at most 50% of revenue. The main jobs created are those of in-game "playbourers" who are predominantly male and 18-25 years old, pushed into the sector by the lack of alternative employment. Most are paid on a piecework or quota basis but with food and accommodation thrown in. Most work 12-hour shifts, 7 days per week and can be considered semi-skilled or skilled labour.

How we view this depends on the benchmark. Pay and conditions are poor by Western standards but as good or better than the alternatives that gold farmers face: in wage, in work content, and in other ways. We may not know how gold farmers' careers progress but we can say that most enjoy their work and that the oft-applied "virtual sweatshop" label is at best partial and at worst inappropriate.

The entrepreneurs (almost all men) who start up gold farms are pulled into the sub-sector by some mix of existing game- and/or gold-farming-knowledge plus the lure of profits. They have created tens of thousands of enterprises that are, in many ways, typical of developing countries – they are principally micro-enterprises employing less than 10 staff, and they are informally-financed. However, they are likely more entrepreneurial than the norm – more likely to grow, less likely to require government intervention, and more likely to survive. They might even build their internal technological capabilities and develop into higher-level game industry or IT sector enterprises.

In all but the smallest firms, gold farmers work alongside managers, researchers, technical support and customer relations staff. The presence of such staff and web sales portals creates fixed and/or indivisible costs that provide some basis for scale economies. The apparent lack of domination by medium- and large-scale firms means, though, there must also be scale diseconomies, such as the costs of "being noticed" by government and game companies. These two stakeholders – alongside ICT suppliers, fansites and regular players – sit outside the main value chain, which consists of gold farmers, gold-farming firms, brokers/exchanges (not present for all sales), and the player-buyers.

The sub-sector has taken off because a demand with more money than time met a supply with more time than money. Until roughly 2006, a lot of this took place via brokers and there was both the potential and reality of super-profits. From mid-2005 to mid-2008, however, in-game currencies devalued an average of 75% against the US dollar. The continuing survival of the sub-sector probably relies on a disappearance of those super-profits, increased productivity, and disintermediation so that many firms now sell direct to consumers. As a result of these plus new entrants and the anti-gold-farming actions of game companies, power within the gold-farming value chain has in recent years become more dispersed, and has shifted somewhat away from brokers and somewhat towards game companies.

Continuing survival of the sub-sector also relies on overcoming some severe information failures – absence, uncertainty, asymmetry, and communication problems. These have produced many examples of both opportunism and adverse selection, with trading bringing uncertainty, risk and negative consequences. As expected, these seem likely to have suppressed real-money trading well below its "natural" level, and to have induced sellers into (potentially-hollow) assertions about their trustworthiness. Because of its virtuality, though, real-money trading has seen only a little of the localisation and intermediation one might otherwise expect in the presence of such information failures.

Thirdly, continuing survival of gold farming relies on dealing with the many threats it faces. Some of these are business-generic such as ease of entry intensifying competition, or rising labour costs. Others are business-specific but just a low-level nuisance such as character killing or account and IP banning or fraud. Others still – patching, game redesign and marketing channel blocks – require constant innovation to stay one step ahead. And a final category is much more serious such as game company substitution or legal action by governments or game companies. Game companies probably take such action through a mix of economic, moral and personal in-game experience rationales. But one must recognise that gold farming brings

benefits to these companies, while action against gold farming brings both anticipated and perhaps unanticipated costs.

Perception outranks reality in the discourse on gold farming, and – at least in the West – those perceptions have been largely negative, serving to homogenise, alienise, criminalise and moralise about gold farmers. That this has happened despite counter-evidence supports the idea that racial stereotypes and views about immigrant labour are remapped into cyberspace. It also supports the structuralist argument that institutional forces in the real world are reproduced in new, virtual fields like gold farming. There is some contra-flow, suggesting the sub-sector's virtuality has produced new outcomes; for example in relation to intermediaries. While this falls short of an argument that technology has transformed social structures and behaviours, it means the mix of technology, structure and agency is unpredictable, and one we must keep researching: a topic to which this paper now turns.

G2. Gold-Farming Research

Above all, from the paper, one can see the many, many blank spaces on the gold-farming data map. These all demonstrate the potential for a research agenda on gold farming. But what might that research agenda be? The priorities will, of course, depend on the researcher – varied angles were deliberately selected for this paper since every researcher takes their own route through a field. So the following list of research priorities will have a personal flavour:

- *What is happening here?* First, never mind the high-concept work, some basic, reliable facts and figures would help – pay, working conditions, worker demographics, locations, ownership, and all the hundred other fundamental elements found in Section A and throughout the paper – could get a boost from just a few weeks of fieldwork in China.
- *What is the micro-impact of gold farming?* That kind of fieldwork could fairly easily be extended to feed knowledge about the impact of gold farming on individual workers; framed using either a quick-and-dirty livelihoods assets model (see Section E1), or more comprehensively using the overall sustainable livelihoods framework (DFID 1999).
- *What is the meso-impact of gold farming?* The fieldwork could also take a set of foundational enterprise measures, and help us understand quantitatively about income, expenditure and profits; and qualitatively about capabilities and enterprise strategies (see Section D and Heeks 2008).
- *What is the macro-impact of gold farming?* From the research just suggested, the fieldwork ought to be able to provide a foundation sufficient for scale-up to inform some macroeconomics: numbers employed; impact on unemployment and poverty reduction; contribution to balance of trade (see Section E). That would be a starting point for sub-sectoral strategy.
- *What strategy for existing gold farming?* The second leg for a strategy would be more thorough enterprise analysis building on Section D: some qualitative dynamics to help us understand capability-building and progression of enterprises, entrepreneurs, and workers; and competitive analysis based (say) on Porter's five forces model. Together with the livelihoods and macroeconomic analysis, that should help answer the question for developing nations: is this sub-sector worth supporting? And it will begin to answer the question: how should this sub-sector

be supported, if at all? That answer can be elaborated by more detailed work on the challenges facing enterprise entry, growth and survival; a SWOT-type analysis might cover this.

- *What strategy for new gold-farming countries?* If – and it is still an "if" – gold-farming appears to have developmental benefits, then other developing countries may be interested. Analysis of critical success factors for those who have developed the sub-sector can help inform those other countries; Porter's diamond from Section D4 can form the foundation for such analysis, though will likely need to be modified.
- *What can we learn across "shadow industries"?* Most of the real-world parallels in the paper are with other "shadow industries" – informal and often illegal activities such as artisanal mining and the drugs trade. As noted in the Introduction, gold farming represents one of the first ICT-based examples in developing countries but this type of liminal employment seems likely to grow as the ICT infrastructure spreads. What, then, can be learned from other shadow industries for the future of ICT-based employment?⁶⁷

But will it be worth exploring these and the other blank spaces on the map?

Put another way, why undertake gold-farming research: what can it teach us? At a basic and descriptive level, it can illuminate a sliver of our modern world. From a pragmatic perspective, we can find out whether or not gold farming is worth supporting as a socio-economic strategy for developing countries. In conceptual terms, it can add in a small way to our understanding of globalisation and of development. More specifically, it can be utilised to flesh out or revise some particular conceptual models: information failures, international value chains and competitive forces would be three potential examples.

Most specifically, this research can tell us about virtual worlds. We can learn more about the economics of the virtual, the sociology of the virtual, and the growing and reciprocating infections between the virtual and the real. In particular, as ICTs spread to developing countries, we can build knowledge on the relation between the virtual and the pressing needs and non-Western realities we find in those countries.

And most intriguingly, gold farming appears to be anything but a here-today, gone-tomorrow blip. Far from it, gold farming may actually be a glimpse into a much, much larger future; one in which our work, our commerce and our lives are not just online but immersed in the new virtual worlds of cyberspace. Could it then be one more eddy in a current towards a new model for international development: network-based development or, more simply, "development 2.0"? If so, the call for research on gold farming is all the more urgent and important.

One final point. Credible analysis of gold farming can only be undertaken by researchers who play the games, and have engaged in real-money trading. With that, back to Azeroth for some more "research time".

⁶⁷ There are, of course, many other research questions we could pose, building on foundations laid in the paper: To what extent are there scale economies in gold farming? What is the reality and impact of information failures? Where does power lie in the gold-farming value chain? What is the balance of, and interconnection between, the real and the virtual in gold farming? And so on.

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Appendices

Appendix 1: Evidence Sources on Gold Farming

There has been little academic research on the overall subject of computer games and developing countries (Heeks 2008d). Within that overall field, there appear to have been no academic journal articles on gold farming (based on a mid-2008 search on ABI-Inform, Business Source Premier, Expanded Academic ASAP, and Google).

Box 17: The Restricted Geography of Material on Gold Farming

It would seem reasonable to say that the (great) majority of material written on gold farming is about China. That leaves a lot of blanks on the map. Has anyone ever written about gold farming in Africa? Is that because there is no gold farming? To take another example, what about Brazil? There is plenty of MMOG-playing in Brazil (e.g. <http://forum.rpgkidz.com/>, <http://arenammo.com.br/forums/>) and where there are MMOGs, there are gold farmers. So ... there is much work still to be done on non-East Asian gold farming.

What literature there is, can broadly be divided into four camps:

- Academic work on related/superset topics. There are journal articles – lots of them – about online gaming but they do not deal centrally with gold farming. Academic work of relevance, though, derives from perspectives that include:
 - Economic: Castronova (2006) analyses the impact of real-money trading on virtual economies, thus encompassing an interest in gold farming. Castronova is generally credited with launching the academic analysis of virtual economies, and there is academic work on this topic (e.g. see: <http://www.virtual-economy.org>) that sometime mentions gold farming.
 - Psychological: writers such as Richard Bartle and Nick Yee have helped propel the psychological analysis of online game-play. Writing in this tradition has occasionally touched on gold farming; e.g. Steinkuehler (2006), and Yee (2005) and Yee (2006), though neither of the latter two is a refereed journal article.
 - Sociological: Wang's (2006 & 2007b) work, for example, seeks to analyse online gaming from – respectively – a Marxist and a Weberian perspective, and includes illustrations related to gold farming. Again, neither item is a refereed journal article.
- Informed comment on gold farming. The key example here is the discussions on TerraNova (<http://terranova.blogs.com/>), a commented blog created from a community of virtual world scholars and practitioners. It rarely draws explicitly on theoretical perspectives but the content is (largely) intelligent and credible, and it can be seen as a point of passage for most key work on virtual worlds. As Figure 11 indicates⁶⁸, gold farming really took off as an area for discussion in 2005.⁶⁹ Another valuable blog is <http://playnoevil.com>. Into this category, we would also place more descriptive overview pieces, typically placed into magazine-type outlets (e.g. Dibbell 2003, Weir 2004, Lee 2005, Bell 2006, Chan

⁶⁸ 2008 figures are extrapolated from those present at the time of writing

⁶⁹ Its peaking in 2006 suggests, for this blog, a modish "been there, done that" sense except that, as described, there has been no "done that" in academic terms for gold farming, nor any sense that the activity itself is fading.

2006, and Jin 2006). (Depending on their authorship and intent, these can easily shade into either the more academic or more mainstream media categories.)

- Mainstream media reportage on gold farming. Mirroring the discussion on TerraNova, the mainstream media woke up to gold farming in 2005 and 2006, leading to a series of newspaper articles and TV/radio items. These populist outputs give the sense of always looking for an angle, a story to tell, rather than being objective reflections. However, some do include primary data that is of value. Examples include Barboza (2005), Thompson (2005), Honge (2006) and Dibbell (2007).
- Comment and opinion on gold farming. This forms the vast majority of material on gold farming but its quantitative weight is typically counterbalanced by its qualitative flimsiness. As noted, gold farming stirs strong emotions – many players are vehemently against it; others derive their livelihoods from it and so seek to defend it. Add in the negative qualities the blogosphere can show, and you are left having to consign almost all of this material into the bin marked "Rumour, Guesswork and Lies".

In summary, out of all the writing, there are only two refereed papers which touch on gold farming in any serious way. The vast, vast majority of what has been written is unrefereed, leading to all the dangers of an analytical house built on sand.

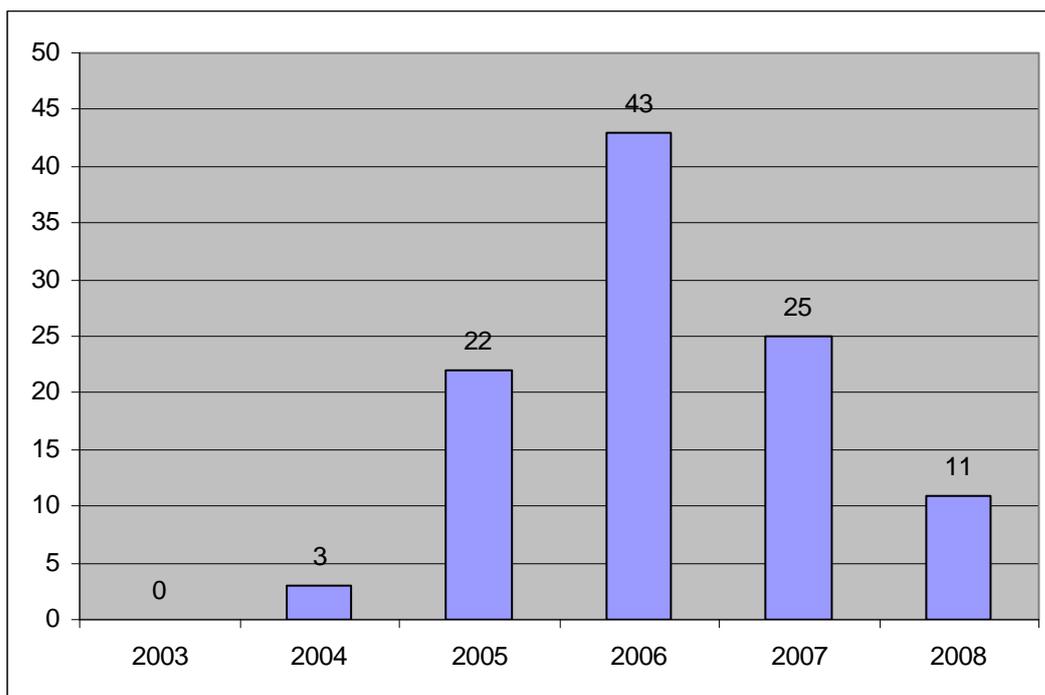


Figure 11: Mentions of "Gold Farmers" on TerraNova Blog

Other useful sources of background evidence about gold farming include:

- http://www.alexa.com/site/ds/top_500 - analytical tool that can provide traffic information on gold-farming web sites including main countries using those sites.
- <http://www.archive.org/web/web.php> - allows viewing archive history of gold-farming web sites to see what services, prices, viewpoints were present during the history of those sites.

- <http://www.gamasutra.com> - news and analysis about online games.
- <http://www.gamrates.com/> - short-term trends and comparisons of in-game currency exchange rates.
- <http://www.mmobux.com/> - discussion and comparison of gold-selling firms/web sites.
- <http://www.mmogchart.com/> - data and charts on online game subscription levels.
- <http://mmogdata.voig.com/Charts.html> - similar to mmogchart but with slightly broader coverage.
- <http://www.mmoom.net/en/> - an RMT site that provides useful cross-sectional comparison of currency prices, and listing of traders.
- <http://www.nickyee.com> - survey work on online games.
- <http://www.nogold.org/google-adsense-rmt-blacklist/> - notwithstanding its anti-gold-farming stance, this site provides quite a useful union list of gold farming sites.

Appendix 2: Currency Deflation

Table 7 shows data on changes to in-game currency exchange rates vis-à-vis the US dollar over a three-year period.

<i>Game</i>	<i>June 2005 rate</i>	<i>June 2008 rate</i>	<i>Devaluation</i>	<i>Unit (US\$ per)</i>	<i>2008 subscriptions</i>
<i>World of Warcraft</i>	10	2	80%	100 gold	10m
<i>Runescape</i>	10	4.5	55%	1m gp	1.2m
<i>Lineage II</i>	5	0.8	84%	1m adena	1m
<i>Final Fantasy XI</i>	24	33	-38%	1m gil	500,000
<i>EVE Online</i>	3	0.42	86%	10m ISK	235,000
<i>Everquest II</i>	150	11.5	92%	10 plat	200,000
<i>Everquest</i>	40	10	75%	100k plat	175,000
<i>Star Wars Galaxies</i>	5	1	80%	1m credits	100,000

Source: GameUSD (2005) for the June 2005 figures, checked with historical search of IGE web site: http://web.archive.org/web/*/http://www.ige.com; averaging across several gold-farming web sites for the June 2008 figures.

Table 7: Change in Exchange Rate of In-Game Currencies to US\$ Over Time

Notes:

- A simple average from the eight games is 64% devaluation. A weighted average based on subscription levels (Woodcock 2008) is 74% devaluation.
- The *Final Fantasy XI* figures are intriguing given that Square Enix, the game developer, has put such a lot of very strong effort into curbing gold farming within the game. However, the starting point is sensitive. For example, roll the start point back a few months to the end of 2004, and the price of 1m gil was US\$64, showing a significant devaluation to June 2008.
- Over a longer period, 2001-2008, the *Everquest* currency has devalued more than 99% (from US\$1,500 per 100k platinum in 2001) (early data from Concernedeq 2006b).

Appendix 3: Web Traffic Analysis

Figure 12 shows a comparison of web traffic on various major gold-farming web sites during the period mid-2007 to mid-2008, comparing IGE with sites apparently set up by gold-farming firms. The data indicates, first, that IGE does not stand head-and-shoulders above the rest of the market and, second, that – at least on this proxy for income – business is spread around different actors.

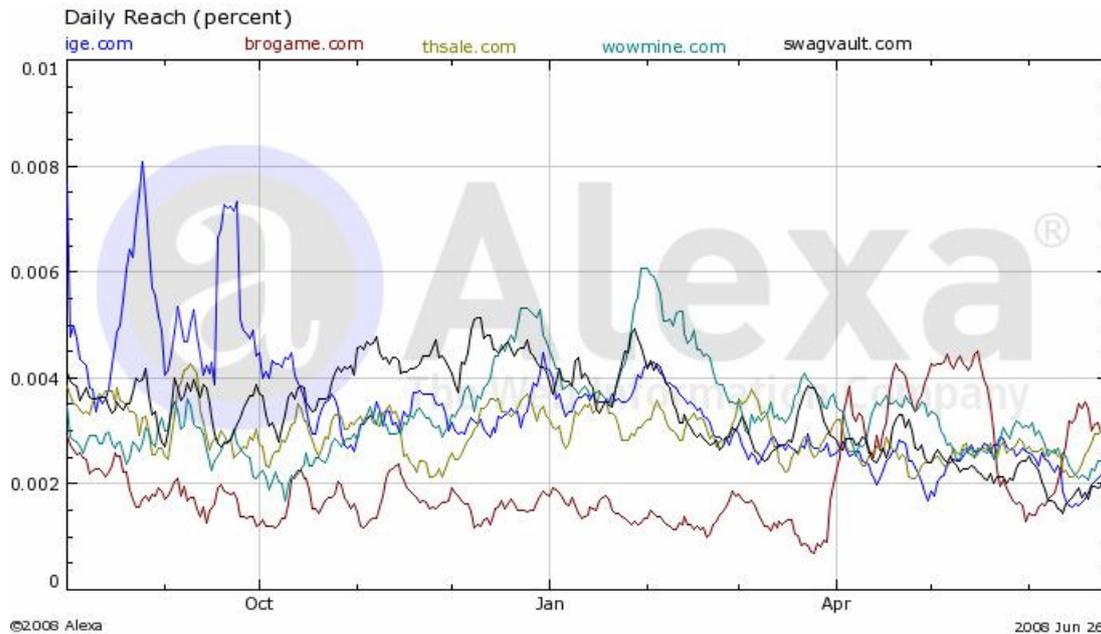


Figure 12: Comparative Web Traffic on Key Gold-Farming Sites

Figure 13 shows a comparison of web traffic between various gold brokers or exchanges during the period mid-2007 and mid-2008. This again suggests nothing like a monopoly for IGE (note markeedragon traffic is boosted by its forums and other non-trading content, and randyrun's by a mid-2008 marketing campaign).

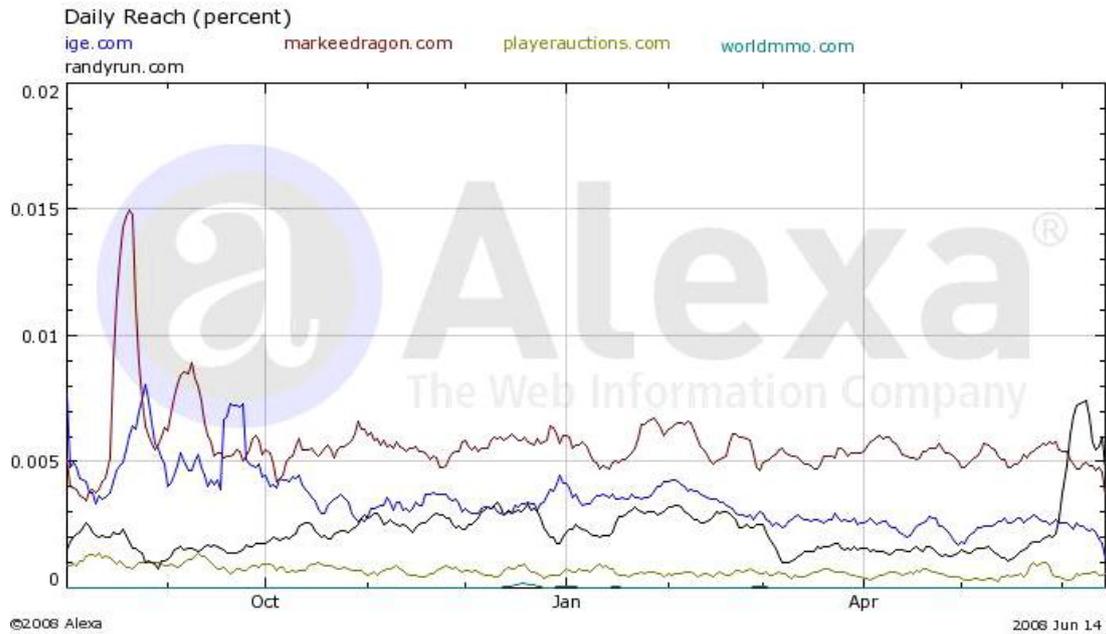


Figure 13: Comparative Web Traffic on Key Gold-Farming Exchanges/Brokerages

Finally, Figure 14 shows traffic levels in five of the seven trading sites listed as most reliable by www.mmobux.com (of the two others, one – RandyRun – is shown above; the other – avatarforce – registered very low traffic levels). Comparing the data here with that of the Figure 12, we can see that OffGamers has traffic levels akin to those of IGE, but the others show that reliability does not bring high traffic. All five gold-farming firms in Figure 12 have higher traffic – typically significantly higher traffic – than five (including avatarforce) of the seven most-reliable traders.

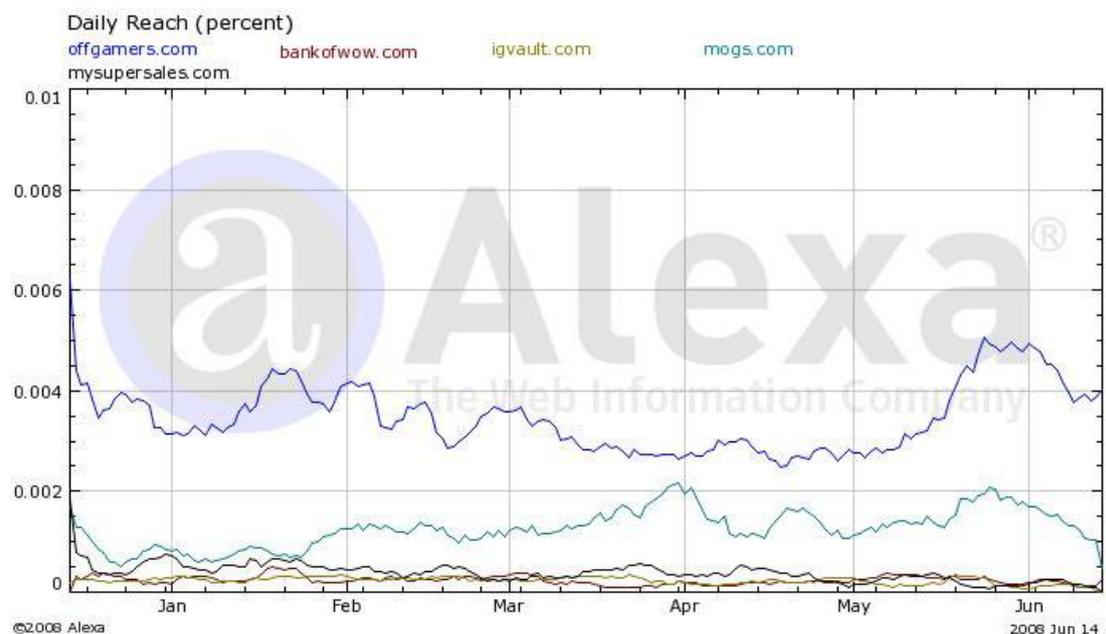


Figure 14: Comparative Web Traffic on Key Reliable Gold-Farming Sites

Glossary

- Avatar: on-screen representation of a player's character.
- Botting: creating and playing automated game characters that simulate the activities of a human-controlled character.
- Duping: "Duping refers to the practice of exploiting a bug in a video game to illegitimately create duplicates of unique items or currency in a persistent online game, such as an MMOG" (Wikipedia 2008).
- Grinding: repeatedly undertaking some in-game activity; typically in order to advance game levels.
- Hacking: altering the program code of the game, typically to gain some advantage.
- Kill-Stealing: only possible in some games, this is attacking and killing a monster that another player has already started to attack so that some or all of the in-game items dropped by the dead monster are captured. This is something high-level gold-farming characters are sometimes accused of.
- Macroing: setting up complex sequences of commands that are triggered from a single command. For example, a macro could be created to perform a repetitive series of in-game actions, such as fishing or fighting a monster.
- MMOG: massively-multiplayer online game – a game played by many people over the Internet.
- MMORPG: massively-multiplayer online role-playing game – an MMOG that specifically requires one to play the role of a character in a fictional game world; the two main settings being quasi-medieval and outer space.
- MUD: multi-user dungeon – a text or simple-graphics-based predecessor to MMOGs; typically restricted to the local area network of a single mainframe or minicomputer.
- Nerfing: altering a game so that some particular item or activity is reduced in value or power. It is claimed this is sometimes done to undercut gold-farmer activities.
- Ninja-Looting: taking a resource wanted by other players who are tied up with fighting a monster in the same area that was "protecting" that resource. This is something gold-farming characters are sometimes accused of.
- NPC: non-player character – typically divided into monsters, which one kills, and others, with whom one may trade, or get quests, or get information.
- Patching: actions by a game company to alter the programming code of the game to change various features of the game.
- Playbourer: a neologism for those whose paid work involves playing in-game.
- Power-Levelling: playing a character in order to increase its game levels.
- Quests: in-game tasks, typically set by non-player characters, the completion of which will lead to various rewards including experience points (xp) that help increase a character's level.
- Scamming: cheating other players in the game.
- Spawn-Camping (Spawn-Hogging): once a resource is removed (e.g. ore is mined) or a monster is killed in-game, after a certain time it will "re-spawn"; i.e. reappear in the game. Gold farmers are sometimes accused of remaining in the same place waiting to grab the re-spawn immediately it appears, preventing other players from doing so.