A Typology of Technology Applications to Expedite Gaming Productivity

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This paper presents the results of a review and analysis of technology-based products and applications for United States gaming markets. The study revealed a marked interest by gaming decision-makers in technology-based tools that expedite gaming action or player productivity. A main contribution of this work is the identification and elaboration of a proposed typology of technology applications. Technologies are classified into two themes and nine sub-categories based on the way each technology serves the objective of enhancing wagering activity.

In this paper, the term *technology* is applied broadly in its sense of *applying science to doing things*. While the term *productivity* often refers to measures such as output per worker, for the purposes of this paper, *gaming productivity* refers to wagering action (play) per patron per interval. *Expediting* refers to advancing and facilitating gaming action so that players can be more productive because their play is faster, extends for a longer interval, and/or involves more dollars placed at risk (wagered) per period than otherwise would be expected.

Efforts at productivity improvement through technology are not isolated to the gaming setting. Productivity is a significant emphasis across the American economic landscape. For example, in the computer industry, Compaq Computer Corporation Chief Executive Eckhard Pfeiffer has captured the essence of this movement and technology's role therein with these words:

"For us to keep growing, we have to put in place state-of-the-art technology, make constant progress, and make constant improvements... If you stand still, you will fall behind" (Farrell, Mandel, & Weber, 1995).

Casinos, gaming parlors, racetracks, and other gaming establishments all must operate under the same mandate of harnessing technology for continuous productivity improvements. In doing so, the gaming industry imports and adapts ideas from other industries, often experimenting with tools in conventional retail areas before migrating them to the gaming floor. As a reflection of this, several examples in this study describe tools such as patron pagers that are more common in environments allied with gaming (e.g., hotels, restaurants) than in gaming itself. Similarly, some technology-driven gaming products such as multi-denominational slot machines (which were only approved by the Nevada Gaming Control Board in January 1997), have been in use within U.S. gaming settings for such a limited time that it is premature to draw conclusions about their sustained level of influence on gaming productivity.

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Determinations and conclusions expressed in this article derive from an examination of multiple gaming information sources. Books and other literature on gaming have addressed the productivity theme presented here. In addition to relevant gaming literature, resources relied upon included interviews with gaming regulators and enforcement persons; gaming seminars; tours of gaming manufacturers' facilities, and interviews with vendors, casino employees, and players.

U.S. gaming and hospitality technology conferences were also used as an important and ongoing research element. Over the four years involved in researching gaming technology trends for this work, the author attended the *World Gaming Congress & Expos* of Fall 1994, 1995, and 1996, the *Hospitality Industry Technology Expos* in 1995 and 1996; the *International Gaming Business Exhibitions* of Spring 1995, 1996, and 1997; and the first annual *GameTech* Conference in 1997. Conference activities to investigate gaming technology and applications always include discussing products and future plans with company executives, system managers, consultants, manufacturers, and distributors. When the conferences include exhibits, the research extends to viewing product demonstrations, studying product specifications, and discussing gaming products and services with salespersons and technicians.

How Expediting Play Works to the House Advantage

Promoting and facilitating play are important marketing activities within today's competitive gaming environment (Cook & Yale, 1994, pp. 15-16). In the past, gaming operations often could thrive using a "build it and they will come" product-oriented approach to business. However, in areas witnessing the rapid expansion of gaming, this approach no longer appears to be sufficient for success.

Expedited play can benefit the gaming operation because of the *casino advantage* or *house edge* (discussed below). The player also is well served in a recreation sense. John Allen Tharpe, gaming services officer for Los Angeles Imperial Bank, emphasizes that keeping the player playing: " .. is mutually beneficial to the player and the casino. *Continuous play* are key words. A manager doesn't want a player to get up from his spot, because he may never come back. By the same token it's good for the player. If someone's on a hot streak, a lot of casinos won't shut down a machine [so the player can attend to tasks and return]. So by bringing services to that player, casinos provide a benefit" (Motu, 1995, p.7).

In a well-run gaming operation, the *casino advantage* means that over the long run, a volume of play that is relatively higher than the past level of play should result in increased gaming revenues and greater profits. The *casino advantage* is the average amount that statistical analysis predicts the house (gaming operation) will be ahead after a great number of wagers (Friedman, 1982, pp. 18-21; Ortiz, 1992, pp. 26-28). For example, the game twenty-one is estimated to have a *casino advantage* of from one to six percent. (Due to the number of possible permutations and to the element of skill involved in games like twenty-one, stating the house edge as a <u>range</u> is more realistic than stating it as a precise calculation.) Depending on the jurisdiction, number of coins played, etc., slot machines might be programmed for a *casino advantage* of from less than one percent to more than twenty-five percent.

To understand *casino advantage* relative to the terms *casino win* and *handle*, consider a player who buys $100 worth of chips and wagers one dollar per bet until all chips are gone. If the hypothetical *casino advantage* for games this individual played were *one percent*, the player would make 10,000 wagers before he or she lost (and the *casino won*) the entire $100 bankroll. (In this instance, the casino *handle* - or the total value of all wagers by this patron, is $10,000.) Of course, the player also could have stopped playing while ahead, or could have won a high pay-off jackpot, etc. This is the nature of wagering. The *casino advantage* factor is based on the law of large numbers. While one should not expect every first, third, fifth, etc., flip of a coin to be heads, and each alternate flip to be tails, the law of large numbers holds that, within hundreds of thousands, and ideally, millions of coin flips, heads will come up with the same frequency as tails. The *casino advantage* is the probability deviation in favor of the house that is part of each game. Thus, expressed in its simplest form, expediting play is intended to facilitate, even accelerate, the constant cycling of player action toward large numbers of wagers in order to place the gaming operation at the greatest win advantage relative to players, and to reap relatively increased casino win (or track win, or lottery win, etc.)

The Typology

While tools and technologies to expedite play find incarnations in a wide variety of applications, a typology with two key categories or themes emerged as fundamental at this time:

Theme 1. Technologies Supporting Services to Keep Players Playing
Theme 2. Game Technologies Promoting Optimum Play

Two additional themes arose from this review and are worthy of note due to their relationship with the two above. A third productivity theme, then, is gaming inducements within game machine hardware and software (e.g., auditory and visual effects, as well as games with bonus rewards). A fourth prospective theme is advanced player-tracking and player-rating systems. These assist gaming operators in identifying differential levels of play by individual players, enabling operators to reward players accordingly. However, as these latter two themes more accurately can be characterized as <u>encouraging</u> play rather than <u>expediting</u> play, they are considered outside the scope of this classification and are not pursued further in this work.

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The balance of this paper is devoted to providing detail of the nine subcategories under the typology's two dominant themes of 1) *technologies supporting services to keep players playing* and 2) *game technologies promoting optimum play.*

Theme One — Technologies Supporting Services to Keep Players Playing

Once a potential player is in a gaming operation, gaming managers have a well-deserved reputation for taking strides to provide *technologies supporting services to keep players playing.* Access and service are the aims of such equipment as bartop video games, and of such labor as attendants for beverage, change, and game maintenance services. Improving on these and extending into other critical service areas is the subject of theme one. As identified in this investigation, four fundamental types of technology-driven service accommodations to expedite play are listed in Table 1: A) services on-demand B) streamlined funds provision C) facilitating exchange processes, and D) avoiding lines.

Table 1. Theme One--Technologies Supporting Services To Keep Players Playing

Service Accommodation	Example Tools
1-A On-Call Services	Two-way communications via game machines
1-B Fast Funding	Remote ATM, credit, check cashing, & ID systems
1-C Simplified Transactions	Electronic - "Card of the Realm"
1-D Line-Time Avoidance	Automated check-in/out; guest pagers

On-Call Services. In the past, services for guests on the casino floor came available *ad hoc* as roving attendants circulated around their assigned gaming areas to provide beverages, change, game machine maintenance, and so on. Today, rather than wait for a service person to happen by, increasingly, players can initiate service

requests directly by transmitting a signal through the gaming system on which they are playing. The transmitting machine self-identifies its type and floor location, typically sending the signal either to a manual or automated central dispatch. For the most swift response, newer systems can route the signal to vibrate the call device worn by the appropriate casino employee (i.e., change, maintenance) in closest proximity to the player.

For sending requests, keypads integrated into game machines are today's prevalent guest interface devices. The fact that keypads are not yet in more widespread use may be attributable to their current rudimentary stage of development. For example, some keypads consist of a simple cluster of three buttons inscribed, respectively: *beverage, change,* and *mechanic,* with their use expected to be self-explanatory. However, forms of the service keypad are fast-evolving, including designs that resemble a telephone keypad with a menu of coded choices.

Fast Funding. For players in need of greater financial assistance than changing dollars to quarters, an evolving array of products supports fast funding. These technologies mean that players no longer must leave their games for purposes such as obtaining cash, credit authorization, or markers. Gaming technology author Luther Martell (1995, p.21) notes that, because profits come from gaming and other spending, "the more opportunities gaming industry management can create for customers to access money, the more customers will spend". Assistant Controller Rob Erwin of Louisiana

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riverboat, the Boomtown Belle Casino Westbank, adds the following:

"Making money accessible to players is what it's all about, it's the nature of the business. You have to be able to provide funds so customers can very easily do what they came to do" (Martell, 1995, p. 25).

For larger operations, the mobilized automated teller machine (ATM) is cost-beneficial, and also is the most popular and safest approach for game-side access to money. Emerging systems involve a wireless hand-held unit. Designed to retain the personal touch in the transaction, a casino person brings the unit out to the player, who then swipes his or her bank card through the ATM and keys in a personal identification number. When the transaction is authorized and complete, the casino employee provides the player with cash or chips. Play then can continue without the player ever leaving the game.

Also popular but more risky and expensive to employ (including fees to patrons and uncollectibles) are credit-card advance [1] and personal check cashing systems. For credit card cash advances, portable, high radio-frequency systems link game-side players with their cash accounts via existing telephone communications systems. Even on riverboats (though most players bring cash) electronic requests for funds can travel back to a land-base via cellular phone, transacting normally from that point. Comdata, Inc., Vice President of sales Don Leyrer summarizes the results on gaming productivity of one such verification system in use within a major Las Vegas casino; "There's growth in the overall transaction level and they're dispensing a higher dollar amount" (Motu, 1995, p. 6).

Gaming time also is enhanced when gaming operators can conduct security checks at game-side with speed. For this, operators must minimize the time required for verifying an individual's identity. A technology known as graphical ID systems can provide an integrated solution for player identification and fraud avoidance with the convergence of three technologies: mega-data base management systems, imaging, and mass storage. From a scan of an individual's driver's license or/and other existing, captured, and solicited documentation, graphical I.D. systems compile a data base of photo, signature, and financial information. Later, when a player (or employee) needs services that require positive identification, the I.D. system retrieves the relevant information. With this technology, the pit boss can verify ID or a signature, perform player (gaming) ratings, and issue payment checks or markers using a terminal and printer, while neither the pit boss nor the player leaves the immediate gaming area (Poirier, 1995, p. 25).

Simplified Transactions. Among the ways that *Foxwoods* mega casino in Connecticut keeps players at the tables is by streamlining the exchange entity, which is money. What began for *Foxwoods* as a simple signature card is now their *Wampum Card*, a picture ID and credit/debit card that can be used as cash, both in gaming machines and at table games. With the *Wampum Card*, casino managers have an opportunity to bring transaction convenience and customer service to a new level, yet the entire process of preparing each *Wampum Card* takes less than two minutes. By the time the patron walks to the pit area, all 12 items of customer information can be recorded in the central processing system, which then makes the customer data available throughout the gaming property.

Another tool for keeping players playing and out of lines is a not-so-new technology that is relatively new in gaming applications; paging devices *for players*.

The *Wampum Card* also tracks each patron's accumulated premium, bonus, and other "points" in the form of *Wampum* that can be applied towards purchases throughout the casino complex. The cards track and report play statistics, allowing players to win instant comps based on their game activities, encouraging even more play. Today's *Wampum Card* represents an early phase of a projected cashless environment wherein patrons use the *Wampum Card* as an all-purpose transaction debit card for all expenditures in both the resort and in the local community. The card also will link to major bank card companies via electronic data interchange technologies to aid credit transactions. The bottom line is that "*Foxwoods* customers are more likely to stay at the gaming tables longer than at other casinos" (Langen, 1993 n.p.).

Line-Time Avoidance. Expediting play also can be indirect by freeing patron time for gaming. Technology tools can support keeping time available for play that otherwise might have been occupied by doing something (like waiting in line for service) that is less productive from the "house" viewpoint, than continuing play.

In his address to the World Congress of the International Hotel Association, Rick Stanfield (1995), Vice President of Administration of Opreyland, USA, said

that long lines typically are problems because we fail to adequately plan, to train, and to change outdated practices. To illustrate, he called attention to large U.S. lodging operations that already are equipped to keep guests out of lengthy lines, but fail to do so. They have automated property management systems, automated credit verification, and usually obtain guests' credit card information in advance of check-in. Yet many patrons still face long lines at the front desk because managers are not leveraging these tools by, for instance, *integrating existing* technologies, and training employees explicitly to encourage guests to *use* self-serve in-room, lobby kiosk, and remote check-in/out services (Stanfield, 1995).

Internet wagering will do more to entice persons to go "out" to physical gaming operations.

Another tool for keeping players playing and out of lines is a not-so-new technology that is relatively new in gaming applications; paging devices *for players*. Scenario -A group of slot players would like a table for six in the prime rib room. Dilemma - Even with reservations, patrons might have a twenty minute wait. Without reservations; ...a very long wait. Instead of taking players out of play to await seating, some casinos temporarily equip a member of the party with a guest pager device. Players then can continue play, confident that they will be called when their table (or game, automobile, room, etc.) is ready.

In addition to supporting play productivity, research shows that guests given a pager actually "will wait a longer interval of time before being seated because they feel more obligated," committed, or cared for (JTech, 1995). Also, anecdotally, patron reaction suggests that being provided a pager can represent a symbol of importance; a significant step above the powerless, herded response many have to being asked to "wait in the lounge until we call you." Thus, guest pagers applied in gaming environments potentially can serve as tools in supporting relatively more play, AND a positive guest experience. While many gaming operations do not have guest rooms or gourmet rooms, the concept of truly exploiting the technologies that are readily available to shorten line-time is appropriate for alleviating patron down-time in *any* gaming setting, whether at the riverboat's cage (bank), the racetrack's windows, or the card club's snack bar.

Theme Two — Game Technologies Promoting Optimum Play

Gaming machines and game environments continue to undergo redesign for greater player productivity. Table 2 lists five foci of game efficiencies that come under the second player productivity theme: *game technologies promoting optimum play*. The sub-categories are: A)locations of gaming systems B)concentration of game choices within a single machine C)player controls over game mechanisms D) wager-in-out options, and E)other game technology aspects that streamline play.

Table 2. Theme Two—Game Technologies Promoting Optimum Play

Game Technology Aspects		Example Elements
A	More Places to Play	Home; Retail; Airlines; Thruways
B	More Games per Machine	Multi-games; Simulcasting; Picture-in-picture
C	More Autonomy	Dealer speed; Self-serve games
D	Quicker *Wager In-Out* Options	Bill changers; Debit cards; Hopperless machines
E	Streamlined Play	Push-buttons; Blackjack productivity; Prompts

More Places to Play. The number and types of places one finds gaming systems is expanding rapidly. In addition to enhanced access to a greater number of persons, behind this growth is relatively easier access, relatively more frequent exposure, and relatively greater opportunity for casual or impulse play. The tourism industry also is cultivating a new generation of game-players by creating game-embedded attractions for children to enjoy, with or without adult accompaniment. Simple game arcades are unfolding into extensions and hybrids around the world, yielding up-market, high-tech amusement arcades and amusement theme parks. As in adult forms of gaming, these child and family-oriented games can involve playing for tangible prizes (Williams, 1994, p. 72+).

The swiftly-growing global network of personal computers known as the Internet represents an enormous potential gaming access vehicle. While the U.S. gaming industry discussion acknowledges that Internet gaming could expedite play, many regulatory and policy controversies remain to be sorted out if it is to be authorized in the U.S.; challenges ranging from protecting players, to being able to track, regulate, and tax operators. In the gaming industry, the debate rages on as to what might be the overall financial effect on play, and which gaming providers might benefit most. For example, many believe that those with Internet presence will prosper, but others believe that Internet wagering will do more to entice persons to go "out" to physical gaming operations. Ira Sternberg, spokesman for the Aztar Corporation which operates casinos in Las Vegas and Atlantic City, believes that the Internet will promote play by introducing potential players in a non-threatening environment. "And once people are hooked, there's no substitute for the 'real' ... casino experience" (Parets, 1995, p. 104).

Potentially, the ultimate gaming location convenience is TV-based home gaming.

As recently as early 1995, it simply was not possible to play blackjack for "real" money on the Internet. This is changing rapidly. For example, Internet Off-shore Casinos, operates a legal gaming web site from a Caribbean base. Also, the tiny country, Liechtenstein, offers a weekly InterLotto drawing through the Internet. With minimum jackpots hovering at one million dollars, and their claim that they will pay winners a full 65 percent of players' stake money, Liechtenstein's Internet prize

pool payout level may be the world's highest. Centrebet is among several thriving Internet gaming companies in Australia. As the largest sports betting organization in Australia, Centerbet claims that from mid 1995 to mid 1997, they have been signing up an average seven Internet accounts daily, of which on average 1.75 are offshore clients, generally U.S. players (Kelly, 1997). Meanwhile, from Monte Carlo to U.S. Indian gaming, reportedly, a variety of plans are in place for more Internet-distributed "virtual" casinos.

While regulators decide on Internet gaming issues, supporting play with other approaches to expanding play locations appears to be changing from a "come and get it" orientation, to "play here." Game operators are reaching into more and more places that people would visit anyway, as opposed to remaining only in "gaming sites." Lottery play opportunities, for instance, are permeating residential neighborhoods, popping-up in operations from the corner mini-mart to local department stores. Gaming is now available on U.S. roadways and in public buildings; indeed, lottery ticket systems are in place on both the New York State Thruway and at the

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Pentagon (Doocey, 1994, p. 51; Doocey, 1995a, p. 38). Potentially, the ultimate gaming location convenience is TV-based home gaming. This already is in place to a very limited degree in several U.S. jurisdictions, particularly for off-track race betting.

Tourists also might gamble in-flight. British Atlantic Airways is considering installing casino video games in the back of their airline seats, and Virgin Atlantic already supports play aloft. The U.S. Department of Transportation (D.O.T.) currently does not permit in-flight gambling on flights within, coming to, or departing from the U.S. However, since the D.O.T. lacks the authority to prohibit gaming on flights between foreign airports, Northwest Airlines has experimented with offering gaming on some such flights (In-flight, 1995, pp. 84, 88).

More Entertainment Options per Machine. Supporting play means anticipating that players may want to play a variety of games, and to have games and other entertainment available continuously. To make it unnecessary to leave and "shop" in another area or property in order to change games or continue playing, developers are offering a convergence of gaming opportunities within individual game boxes (machines). For instance, in many new slot and video game machine models, players can explore, browse, and experiment with selections from a library of game variations in the same box, while never leaving their seats (See Fig. 1). Players might choose from a menu of six, ten, or more games, including various versions of poker, keno, blackjack, and slots. One slot machine series, for instance, offers a system with six popular video poker games and two eight-line slot games. Another firm offers 100 separate games from which operators can choose in composing and re-composing the ten games to combine on a single machine for the player.

Figure 1. *IGT Game King*

IGT's GAME KING touch screen, video, multi-game machine enjoys great popularity among casino patrons. Photo courtesy of, and with permission of, International Game Technology, Reno, NV.

Providing *casino games* at race tracks as well as in race and sports books promotes play by those who may enjoy the track or sporting atmosphere, but would prefer, at least some of the time, to play poker, keno, etc. With emerging systems, track and off-track bettors can bet a dog or horse race on the same terminal on which they might play video poker. Also, track managers who install gaming machines are expediting play by providing opportunities for race bettors to continue play during lulls between racing action (Doocey, 1995b, p. 30; More tracks, 1995, p. 21).

Long avoided, simulcasting at racetracks of live races *from* other tracks at last is growing as a means to capitalize on its potential productivity. In this way, participating sites can offer races from multiple tracks as a means to enlarge their race card and extend their racing period. With simulcasting systems, track visitors can bet both day and evening, regardless of when the local races run. They can play live local races during the day's race program, then wager on evening harness and quarter horse races that are simulcast to the players' site from other tracks. Simulcasting also can extend play beyond the local race season by making it possible for players to wager on races simulcast from other areas and even other nations during their seasons (McQueen, 1995, p. 60). Finally, to stack play, picture-in-picture video game systems can show players the parade of entrants and betting information for one simulcast race at the same time that the players are able to view the actual race portion of another race.

Catering to the demand for all-in-one entertainment are game machines with picture-in picture video displays that feature regular television programming. These emerging systems can permit players to view television shows or to enjoy closed circuit special events and personal messaging while they continue their gaming activities on the same machine. Players then do not need to exit the play area to view their favorite programs or events. Expectations are that players will continue to play longer than they would in the absence of the television based on the phenomenon of TV viewing that gave rise to the term"coach potato;" that many seem content to linger for hours as long as the TV is on.

More Autonomy. In addition to opportunities to play in more locations and to play more engaging systems, players are being offered greater autonomy in play. Examples can be seen in the ways and degree to which players can *interact with* and *control* some game aspects. That is, some new slot and video game systems offer players an array of choices in bet levels. Some also provide players a degree of control in adjusting the volume of game sound effects. Some video poker systems permit players to select the speed with which video card games are dealt. Although results are not yet in on their popularity, the multi-denominational slot machines recently authorized in Nevada fit into this category of permitting players to take some control of the game at hand. Once they use the bill-changer to insert their wager, players can specify in what denomination they wish to play; nickels, dollars, etc. And, as noted in the previous segment, some gaming machines allow players to change from one game of chance to another at will, without seeking a new machine.

A different concept of control is the way a game itself is executed. To play poker, a player no longer must sit in on a live poker game. Increasingly, table games (i.e., poker, blackjack, craps) and other games such as keno, bingo, and even roulette - are reaching the market in the form of *player-operated game machines*. That is, they are player-operated like slot machines, but the game is not slots. (Still the archetype is slot machines, followed by video poker.) Where authorized, player-

operated games often enjoy great popularity. They promote play productivity because, for example, legions play video poker who apparently feel intimidated about playing a live version of the same type of game at a table surrounded by other players and a dealer (Gros, 1995, p. 18; Yoshihashi, 1995, p. A1). In fact, in casinos, player-operated games are trending from providing less than 40 percent of casino revenue prior to 1980, to contributing 60 percent in 1994 (McFadden,1995, p.1).

Technology also is offering players control over the interface of an instant ticket lottery wager. To place a lottery bet, players no longer must purchase a ticket via a face-to-face transaction with a sales clerk. Skyrocketing play is attributable to self-serve instant-ticket vending machines (ITVM), simple machines that accept money and dispense lottery tickets. Already successful in Australia and Mexico, ITVMs are used or being tested for instant games (not yet on-line lottery games) by state lotteries in 24 U.S. states. Implementing these terminals, states have seen success in expanding distribution of lottery tickets, both in outlets where on-line counter sales of lottery tickets already existed, and in heretofore non-lottery outlets including fast-food restaurants (Doocey, 1995a).

Quicker Wager In-Out Options. A number of technology-driven strategies are enhancing gaming productivity by avoiding the need to feed coins into gaming machines. Among the technologies in place that permit players to by-pass coin-in are bill changers and debit cards. In addition to expediting play, these technologies mean that operators neither have to tie up capital in an inventory of the appropriate types of coins for coin-in, nor must they staff change persons to deliver coins.

Where cash play is permitted, including a *bill changer* or *currency acceptor* in or on gaming machines as a wager input option allows players to execute coin-in with legal tender bills rather than coins. (Most changers are flexible about bill denominations.) Currency changers can enhance player productivity by sparing players the need to locate the appropriate type and number of coins. These systems also eliminate the player's need to tote a tub of coins, and avoid the time-consuming activity of inserting multiple, individual coins for multi-coin wagers. Instead, with a bill changer, the requested wager sum automatically is deducted from the currency-in credit total. For example, a player may insert into the $.25 video poker machine's currency acceptor a ten dollar bill as a pool against which to wager ($10.00 credit). If the player then keys in a five-coin bet

Going to the next level of coinless operation are Australian operators with entirely coinless machines.

($1.25), the credit meter simply would indicate a remaining player credit of $8.75. (This example does not account for any potential credit outcome of the wager).

Until as recently as the early 1990s, currency acceptor systems largely were avoided because of their unreliability and lack of security. However, according to Mr. Bill Wood, President and CEO of Coin Bill Validator Inc., with rapid improvements in a short duration, the inclusion rate of imbedded currency acceptors in all new U.S. games sold as of 1994 was almost 100 percent (Motu, 1994, p. 16). Overall, Charles Lombardo, Vice President of slots for Bally's Las Vegas Casino

notes that bill acceptors both speed play and "help encourage more game play because they make it easier" (Albertson, 1994, pp.19-20).

In U.S. casinos, gaming machines may be coinless for entering the wager, but when regulations permit, most resort to coins for pay-outs because most players still seem to expect and prefer the feedback that clanging coins provide. In mid 1997, however, hopperless or "ticket" slot machines began appearing in a number of local taverns in Southern Nevada. These machines use bill changers for wager input, and instead of coins dropping into the hopper for coin-out, on demand they print a receipt of the player's balance. The ticket may be taken to one of the operation's cashiers to be verified and redeemed for cash. According to Freddy Keck, co-owner of a tavern with several hopperless machines; "it's just tourists in the tourist casinos who're interested in the coin noise. To them it's a novelty." In contrast, those who play in his establishment are local residents for whom gambling is a frequent and unremarkable recreation. His "locals" like the new hopperless systems because they prefer the paper receipt to handling, toting, and redeeming coins. To paraphrase Freddy, locals don't really care about the coin feedback; they just want to *play the game* (Keck, 1997).

Systems also are being introduced to shorten down-time associated with player arguments.

To be truly efficient in gaming machine play, why not be cashless *both* for placing the wager and for cashing out? Gaming machines that operate with debit cards respond to this question. One model is the *Request Card*, a special plastic card available *on request* to members of the *Emperor's Players Club* at Caesars Palace (Las Vegas). A player deposits money in an account with a cashier and selects a personal identification number (PIN). The cashier transfers the credit balance electronically to the *Request Card*. The player then inserts the *Request Card* into a machine's club card slot, and the value is moved to the player's machine by electronic funds transfer. The player then replaces the *Request Card* with the regular *Emperor's Card* that tracks and rewards play. To cash out, players return to the cashier. Along with the aforementioned advantages of coinless systems, managers and players see the greatest advantage of this system as security. Players feel more comfortable to stay and play because they need not carry large sums of money during their hours, or days, of play.

Going to the next level of coinless operation are Australian operators with entirely coinless machines. They report experiencing tremendous play levels when relying on electronic player club cards that serve as in-house bank cards. Software introduced at the 1997 Australasian Gaming Expo by Australia's Olympic Video Gaming Company extends this convenience by assigning game wins automatically but with some fanfare as credits to the player's machine. Mr. John Anthony, National Sales Manager Olympic exclaims: "Technology breakthroughs such as where credits go straight back into the gaming machine where the player collects them for the new game have helped the industry move forward. We can reward the player at the time of their excitement — not afterwards. If players collect their winnings as credits, they'll play the games more" (Kelly, 1997).

When players play longer, faster, and/or more dollars because the value of a win automatically is returned to credit for further play, this variation on coinless technology truly is expediting play.

Streamlined Play. Once players are at the games with money to spend and plenty of game options and autonomy, streamlining the mechanics and procedures of the games could ply play still further. Streamlining by pruning dead time or unproductive motions from various phases of play is a particular focus for getting more play into each time interval.

One efficiency shift is in gaming machine design. For example, with slot machines, the *one-armed bandit* machine of old is fading from view. Although a newer slot machine may have a handle, it no longer has a mechanical connection. Instead, a *push-button* triggers a rapidly-executed, electronic round of play. The effective difference in expediting play between the handle and today's push-button alternative is dramatic. Averaging play at a rate of five games per minute pulling a handle would result in 300 games an hour. If instead the player uses the push-button, the number of games can double this rate of play, from 300 to 600 games each hour (McFadden, 1995, p. 25).

A different streamlining strategy involves software-based systems that replace the physical card usually required in gaming player clubs. To play these machines as a club member, instead of inserting the club card to be eligible for game premiums (cards which also are easily forgotten and stolen), players enter their I.D. number and PIN through a keypad on the gaming machine. One such cardless player's club is *Gambler's Bonus,* from a division of Alliance Gaming, Inc. By mid 1997, *Gambler's Bonus* already was networked across 110 small neighborhood taverns and retailers in Southern Nevada, encouraging play by making club play both convenient and rewarding across many outlets.

Another approach to streamlining play is to overcome the inherent lulls in certain games. For example, to trim dead time from the game cycle of live blackjack, intelligent card scanners can scan the dealer's own face-down cards and signal when he or she has dealt blackjack or "21". If a blackjack dealer <u>does</u> have "21", say promoters, why (essentially) waste play time going through the motions of completing the game when the time use is unproductive to the player and the house? Based on actual casino operations, one such system reportedly increased the number of hands played by approximately five percent, increasing table profitability (Peripheral, 1995). Promoters also claim that these devices deter dealer/player collusion, and thus "can increase hold by 2% by making cheating next to impossible" (Grogan, 1995, p. 30; McFadden, 1995, p. 25).

Systems also are being introduced to shorten down-time associated with player arguments. One approach is diskless, tapeless instant replay video that continuously films table games. Without waiting for security to locate surveillance footage, the system is used to provide instantaneous replays of up to several minutes of recent play. Another quite revolutionary set of technologies currently being adapted in a joint venture involving a U.S. and a European firm is a system to assure blackjack and baccarat game accuracy and security. The system involves special playing tables and microprocessor-embedded game chips that send radio waves to the game's computer. When fully-configured, the system will eliminate time that ordinarily might be lost to play or pay-off disputes, because the computer will show exactly what was played, what was paid, and what was bet in each player position (Poirier, 1995, p. 9).

Finally, other interface accouterments aid play efficiency and attractiveness by a variety of means. New touch-screen video systems that are more responsive than earlier models promise to boost the pace of play up a notch. Also, sometimes players need coaching on system use, as could be the case for those who are new to video poker, or those who are accustomed to conducting race-betting transactions at the race window rather than on self-serve terminals. To prompt play in such cases, new on-line, self-service terminal systems include bet-guiding prompts designed to help players make choices and to complete each bet quickly, freeing them to bet again. As another avenue to facilitate play, several systems, including racetrack betting systems, now are available in the U.S. that allow users to choose from several languages (e.g., English, Spanish) as the interface language for menus and prompts.

Summary

This investigation of existing and emerging gaming products, services, and technologies revealed that a recurring theme for gaming operators is technologies to expedite play. Because a gaming operation's house advantage should find its most favorable expression in huge numbers of wagers, ultimately more play should result in more profit. Until recently, gaming settings often necessitated that would-be players come to a particular place to gamble, wait idly for services, and remain subject to imposed gaming processes and tempos. This is changing as today's gaming managers are implementing technologies and products which, collectively, permit - and in some cases nurture - fulfilling traditional play needs and desires locally, quickly, and with added services for players.

This paper has distilled these means of expediting play into a typology consisting of two inter-related themes. Under the first theme, *technologies supporting services to keep players playing*, four technology sub-categories are proposed: more effectively accommodating hospitality services; seamlessly facilitating bank withdrawal and credit transactions on the gaming floor; simplifying other transactions; and keeping players out of unproductive queues. Under the second main theme, *game technologies promoting optimum play*, the sub-categories focus on removing from play as much dead-time as possible, as well as on expanding game locations, game choices, player control over game operations, and wagering alternatives to individual coins. The extent to which gaming managers can expedite play activity to a level beyond what it otherwise might have been, is the potential profit edge offered by the technology applications within this typology.

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Endnote

[1] Per Nevada Revised Statute 463.3557, Nevada banks may not authorize the transfer of money from a customer's credit card *directly* to a table game or gaming machine. However, the transaction is not considered direct when it is handled by a casino employee, even one standing nearby. Since a very controversial April 1997 regulatory change, Atlantic City casino players now are permitted to obtain credit *directly* from their credit cards at game-side (Carretta, 1997; Gale, 1997).