PAPER

SOCIALLY RESPONSIBLE INTRODUCTION OF

GAMING MACHINE TECHNOLOGY.

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Better to eat a dry crust of Bread with peace of mind than have a banquet in a house full of trouble. PROVERBS 17:1

OVERVIEW

The objectives of this dissertation are threefold:

1) To accentuate the importance of an appreciation of the implications of gaming machine technology.
2) To provide a basis for the consideration of prerequisite technical and other requirements for the introduction of gaming machines by regulators.
3) To assist manufacturers in preparing a game design philosophy by discussing fundamental issues of game design.

The primary conclusions follow:

1) There is a definite need for technical regulatory requirements on gaming devices.
2) Ensuring that gaming devices conform with a regulator's technical requirements is best achieved by an evaluation laboratory, either Government or privately controlled.

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3) Technology which capitalises on human emotions must be implemented with due consideration to the social implications and possible political and economic ramifications. As illustrated herein, gaming technology CAN be controlled and CAN be applied in a socially responsible manner.

INTRODUCTION

Machines on which one may game are known variously by different names in different contexts. In Australia they are often referred to as "Poker Machines" (Pokies), "Approved Amusement Devices" (AAD's), and "Video Gaming Machines", whilst in America and Canada they are typically known as either "Slot Machines" or "Video Lottery Terminals".

Regardless of the name by which the device is known, these machines all have the common characteristics that a player may place a small wager on either a game of pure chance, or a game of both chance and an application of the knowledge of game rules (e.g. Drawcard), but not pure skill or manual dexterity, and potentially win a prize either in cash or in kind. The prize schedule is, however, contrived in such a way that statistically there is a house advantage on the game.

Further, the modern gaming machines are generically similar in their physical design. They are microprocessor controlled, operate based on instructions coded into some form of game program storage media, and the game outcomes are based on the results of effectively random implementations of pseudo-random number generators.

Irrespective of how we label an electronic gaming machine and define its functionality, the quintessence of such a device is

gambling. Accordingly, the introduction of gaming machines remains a contentious issue with essentially two principal arguments for and against suggested. The two arguments for are firstly, the individual's rights to choose whether or not to gamble and secondly, the benefits to the community that will result from revenue derived from such gaming. The principal arguments against may be that such gaming is morally wrong in itself, and that it has an attendant criminal activity that outweighs any potential benefit derived from gaming revenue.

Whilst it is not the intent of this paper to provide a framework to counter crime, it should be noted that the second argument against gaming machines has been demonstrably addressed by various jurisdictions with considerable research and planning, by constructing an appropriate regulatory infrastructure to control the industry, the sites, the people, and the machines.

SOCIAL CONCERN

To address the primary argument against gaming, a 'social concern', which the wider community (at least in Australia) appear to embody, is suggested. That is, gaming is acceptable so long as it is contained to certain venues, does not result in criminal activity, either directly or indirectly and that the social cost does not outweigh the benefits derived from revenue. The social cost will constitute an small adverse social impact (eg compulsive gambling), which must be specifically addressed by the regulatory infrastructure (eg subsidisation of treatment or possible restraining orders to disallow compulsive gamblers from entry to a machine area). In making a determination as to the redress for compulsive gambling, the avoidance of financial impositions is suggested, as such impositions will tend to place further pressures upon an individual or family unit which will generally

tend to already be in financial difficulty.

MAKE HASTE SLOWLY

If the introduction of gaming is socially and NOT politically motivated (where it may take considerable time to persuade the public), care must be taken not to unduly expedite the process.

If one examines the implications of the introduction of gaming machines, it is evident that the decision to introduce gaming machines immediately may be construed as economically acceptable as the gathering of revenue would be immediate. The social and therefore, political acceptability may also be argued in the affirmative.

What may be observed by immediate introduction is acceptability in an operational time frame. However, it is suggested that one must look toward the long term implications of an operational decision. One may postulate that it is not possible to realise the objectives necessary to implement the social concern mentioned previously, in the short term. Further, it is suggested that our society is not one based on trust and loyalty but rather on the enforcement of laws to ensure the above. Where large sums of money are involved, the human attribute of greed cannot be ignored and therefore must be controlled. Hence, in a strategic time-frame, satisfying the operational goals may tend to be detrimental. Consequently, it is reiterated that considerable research and planning to the control the industry, the sites, the people, and the machines should be undertaken prior to implementation.

For the long term benefit of the community and Government, if gaming is to be introduced, it must be implemented giving due consideration to all factors and not expedited due to political, social, or economic considerations. In particular, there are a number of aspects pertaining to the social impact which should be investigated.

CONTROLLING THE TECHNOLOGY

As a consequence of increasing 'social interaction' between man and machine, it is suggested that an understanding of the implications of a given technology are an important prerequisite to the introduction. One should ascertain if the technology can be controlled - politically, socially, economically, etc. The implications and control of gaming technology must be defined prior to its introduction.
Microprocessor based gaming machines may be introduced for either entertainment or 'hard core' gambling, they may be perceived to be for personal or community benefit (privately or 'publicly' owned organisation, e.g. hotel or club). Further, with today's data transfer technology it is possible for gamblers to overdraft their bank accounts without ever leaving the machine. Greed is an indelible facet of human nature which can have terrible consequences if not controlled. It is NOT the gaming technology, but the CONTROL of the technology which can be the difference between entertainment and financial devastation. As demonstrated throughout this paper, the former may be realised through a high return to the patrons, low wagers, relatively low prizes and NO credit betting.

A relationship of mutual causality exists between technology and society. This complex relationship leads to the creation of background conditions, immediate or first order effects, and

higher order effects.

For example, if the legislation is structured such that the implementation of gaming technology regulates an individual's utility function (that is, restriction of the financial quantity an individual may risk), the Government will not obtain the same quantity of taxation revenue as if the legislation were structured otherwise. The first order effect is that machine revenue, consequently taxation, is not maximised. However, if revenue from gaming taxation is maximised, a second order effect may be an escalation in financial difficulties experienced by some gambling members of the community. Which in turn may have a third order effect of a higher crime rate and/or increased costs for community welfare services. The net tangible/intangible benefits may therefore be less than the expectation when only first order effects are a variable in the equation.

To 'control' an individual's utility function, one must ultimately restrict the quantity of money that may be wagered on a given device in a given period of time. In achieving this goal, there are a number of factors which may be considered.

PERCENTAGE RETURN

The first item for consideration is the percentage return of the device. That is, the machine must have a theoretical and continuing actual return to the public of approximately, but not less than, a particular percentage, say X%.

"Theoretical" return is the return realised in theory, whilst the "continuing actual return" is the return realised in practice. In a game of chance, given a sufficient sample base (i.e. number of

games), the actual return will converge to the theoretical return.

Insofar as determining the expected return is concerned, for games of pure chance, such as Keno and Reel games (in general), the calculations are relatively straightforward and no variability exists. For games of chance and application of knowledge of game rules, such as Blackjack and Drawcard, however, the expected player return calculations are based on an assumed, usually optimum or near optimum, intuitive player strategy (the degree to which a player applies their knowledge of game rules). If the player plays outside the bounds of reasonable behaviour (eg. discards a Royal Flush in Drawcard) then the expected return for such individuals will vary from the required threshold. There is also a problem with such games in ensuring that the actual continuing return stays within the range defined by the minimum allowable return and the upper limit defined by the economic viability of the machine. That is, if a strategy that is more intuitive than optimum is used to calculate the expected player return for the 'average' player, there may be an optimum strategy that will lift the return above the upper limit of economic viability.

Whilst a detailed mathematical analysis of games is not within the scope of this paper, it should be mentioned that certain features such as true "Double-up" features (whilst theoretically having no affect on the percentage return) tend to reduce the actual return to the patron. Accordingly, the determination of an expected percentage return can be further complicated by practical limitations which must be imposed on theoretical determinations.

If we assume that (except for instances of large wins) a patron recycles their winnings, then it is suggested that the time duration for a patron to expend a given quantity of money is directly proportional to the percentage return as this determines

the number of games they may play. The time duration for the play of a single game is constituted by the duration of machine controlled game functions and the rate at which patrons initiate and make determinations pertaining to games.

If C_i coins are placed into a machine, and these coins are bet, T/O, then given a large enough sample, R% of these coins (that is, the theoretical percentage return of the machine) will be accumulated as a residual and wagered again (re-cycled). This process may be considered as being recursive with the limit being the quantity of the residual (amount collected by the patron) - it must be greater than zero. Hence, there is a quantitative relationship between initial coins wagered, percentage return and the sum of wagers (which invariably is related to the number of games played). This may be described by the polynomial:

$$\Sigma T/O = C_i + C_i.R + C_i.R^2 + C_i.R^3 + C_i.R^4 + \ldots + C_i.R^n$$

$$\Sigma T/O = C_i\ (R + R^2 + R^3 + R^4 + \ldots + R^n)$$

Where $C_i.R^n$ = the minimum residual, which will be either the coins collected C_o, or zero if all coins are wagered.

Hence, the greater the return, the greater the theoretical turnover, which implies a greater number of games and a higher perception of "value for money".

The minimum return from gaming machines is a fairly contentious issue in that low returns may be perceived as "rip offs", while very high returns can affect the economic viability of the machines. The objective is therefore to provide entertainment whilst at the same time ensure the viability of the machine.

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It is suggested that patrons play the machines until a threshold of losing is reached, or a set period of time elapses. That is, most people will play until they have spent their money (unless, perhaps, a jackpot occurs), or until the self imposed time limit they have set themselves expires. Nevertheless, if the patron's money is expended prior to the self imposed time limit elapsing, it is not unreasonable to assume the patron will obtain additional money to wager if that money is readily available.

Consequently, to control the financial loss to the patron and provide entertainment, it is advisable to provide a relatively high percentage return. As theoretically demonstrated above, the higher the return, the greater the number of theoretical possible plays for a given quantity of money wagered. A figure of between **85% and 90%** has been proven throughout many jurisdictions to achieve this goal.

The actual time frame for theoretical return to be practically realised varies from game to game and is dependent on the "machine cycle" (total possible number of ALL combinations for that game). For simplicity, let us assume that an arbitrary game (game XYZ) has a machine cycle of 100, only one prize of $8.50, and a 1 in 100 chance of getting that prize, say. Ergo, assuming a 10c bet, the theoretical percentage return is 85%. For one gaming machine offering game XYZ the percentage return would be realised, on average, after 100 games. For four gaming machines offering game XYZ one might expect to realise the return by averaging the data of 25 games on each device. The time taken to realise the percentage return for a given game type is dependent on the number of games played, which could be taken over one or many devices operating the same game.

Now, as the games are based on an effective implementation of a random number generator the patron has an equally likely chance of obtaining a particular combination for EACH and EVERY game played on a machine. Hence, in the above example (game of XYZ), the prize could occur at any time between the first and one-hundredth game (or later - it shall suffice to say that there is an associated standard deviation with a statistical mean). The prize may occur multiple times, it may not occur at all. The game in our example will have periods where the return is high, and conversely where the return is low. Nevertheless, if all the samples are averaged it will be found that for every hundred games played, approximately $8.50 is won (85% return).

Consequently, due to the random nature of a game, simply having a high percentage return will not, in practice, always return X% (85 in our example) of wagers in the relatively short time a patron is present at a machine. Some will win large amounts, others will collect nothing. Though on average, patrons will be seen to obtain 'value for money' and the social impact through rapid loss of monies by the patron is minimised. A patron who plays to make a profit rather than for entertainment, should stop playing if and when a small profit has been made as they will, statistically, always loose 100 - X% of monies wagered.

A high percentage return alone does not provide sufficient protection to the patron. That is, it is still possible to have a game offering a high theoretical percentage return though giving a perception of being a "rip-off" to the majority of patrons. Logically such a game, at least in extreme circumstances, would become unpopular after a typical educational period transpired. Nevertheless, this assumption should be discarded and one should look toward imposing requirements on the prize scale and the theoretical probability of winning combinations occurring.

GAME VOLATILITY

The probability of winning combinations and the associated prizes offered affect what is termed the "volatility" of the game. Quite simply, after N games, we can be sure of the theoretical return within a certain percentage range. To illustrate:

Game ABC	after 100 000 games	returns 85%	+/- 20%
	after 9 000 000 games	returns 85%	+/- 0.25%
Game DEF	after 100 000 games	returns 85%	+/- 5%
	after 4 000 000 games	returns 85%	+/- 0.25%

From the above it is noted that both games are eventually expected to return approximately 85%. However, assuming 95% confidence limits one can be 95% certain that after 100 000 games the percentage return of game ABC lies between 65% and 105%, whilst game DEF lies between 80% and 90%. Game ABC will tend to be erratic in the short term possibly having lengthy periods where the patron's money is 'gobbled-up' (patron may complain) and then periods where high prizes are required to be paid by the operator (the operator may complain). Obviously, game DEF presents a compromise, that is a far smaller risk to both the patron and the operator in the short and long term. Consequently, game DEF would offer a relatively higher degree of viability for a small site which may experience some financially difficulty in carrying a game such as ABC during periods where the player return may exceed 100%.

In considering the statistical number of games which must be played before the percentage return is realised with some degree of confidence, one must not become so involved in the mathematics so as to loose sight of the practicalities. That is, with reference to the above illustration, if patrons play 500 000 games

a year on average and the expected market life of game DEF is five years, then it is at 2 500 000 games and not 4 000 000 that one must determine confidence limits pertaining to the theoretical return. Consequently, a game which initially appears to be acceptable in theory, may not be so attractive in practice.

PRIZE SCALES

In considering how a paytable should be structured to ensure that the minimum percentage return is realised within a limited duration of time (number of games), one must be cognisant of the fact that the prize associated with a particular winning combination tends to be inversely proportional to the probability of occurrence of that combination. That is, low probability, high prize; high probability, low prize. Whilst it may seem ideal to require that a pay-scale be constructed to ensure that small prizes are paid very regularly, it is suggested that such a game would tend to fall from public grace as rapidly as the game which only paid a very large prize (and nothing else) on rare occasions. Requirements in this regard must be structured to ensure that the excitement of the "big win" is not lost whilst at the same time retaining the patron's interest and minimising the financial impact on any single player by offering small wins with a reasonably frequent occurrence.

As a final note on paytables, any consequential effects from the structure or maximum prize should be considered. Whilst the maximum prize is kept to a fairly low level, say below $2000, there is arguably greater incentive for a patron to rob a cash register than de-fraud a machine. However, as the maximum prize increases (especially if machines constitute a linked progressive bank), the incentive for and hence, probability of, crime relating to gaming machines also increases.

Thus far, percentage returns, probability of prizes, prizes and payscales have been discussed as being critical aspects of a game which need to receive consideration insofar as the financial impact issue is concerned. The final issue pertaining to the game design which must be considered is that of wagering.

WAGERS

Limiting the size of wagers and the manner in which wagers are placed, can play an important role in controlling the financial impact on a individual. Such limits are desirable in that they limit the potential impact of the industry on individuals, and they help to maintain the public's perception of the industry as a controlled recreational activity. Wager limitations can be placed on either or both the number of coins wagered, or the actual value of coins wagered, on each game, or by virtue of the allowable machine denominations. In this regard it is practical to have a fixed coin limit on all games and on all machines and achieve wager limitations by the allowable machine denominations. This is because such a fixed coin limit would not necessitate machine and/or software variations for each approved machine type for no other reason than to accommodate wager limits on machines with different denominations.

Hence, in instances where one coin equates to one credit, a limit is set on the maximum number of credits which may be wagered per game which, in conjunction with the set monetary value of a coin/token constitute the maximum allowable wager for that device. Needless to say, the time required to expend a fixed quantity of money decreases with the increased wager. Patrons expending money rapidly rather than at a leisurely pace dictated in part by a restricted wager, may on the surface be preferred by the operator and consequently the Government. However, in such a situation,

the gaming establishment becomes nothing more than that - a gambling house (additionally the second order effects, etcetera, must be taken into consideration). It may be preferable for the operator to utilise the machines as a facility to attract patrons to the establishment, and through low cost entertainment provided by the machines, retain the patrons for lengthy periods during which they may be expected to expend money elsewhere; on food, drink, or entertainment for example. Both the operator and the Government then benefit directly and indirectly from the machines, and again the machines are seen to be entertaining.

If a ceiling on wagers is established, the issue of how that wager is made becomes paramount. Previously, insertion of coins was alluded to, though the use of paper note acceptors, player cards, or credit cards may have the same efficacy.

COIN WAGERS

Coins must be inserted one at a time, which takes time, can result in coins jamming or being miscounted (rapid feed tends to be a problem), presents logistical problems in counting and distribution and ties up a good deal of operator's capital (both in machine coin hoppers and cash-boxes) which could be invested and earning interest. Nevertheless, the fact that patrons enjoy the look, feel, and sound of coin (especially when collecting from the machine) cannot be disputed. Generally one coin equates to one credit which is either transferred to a credit meter or directly to the game. However, "tokenised" games are emerging in popularity whereby one coin may equate to multiple credits. For example, a 5c machine may only accept dollar coins and a dollar coin equates to 20 credits on the machine.

There are obvious advantages in multiple credit per coin (such as reduced movement of coin and associated logistical and reliability /wear problems). Further, no adverse impact is expected regardless of whether or not patrons are able to collect less than the base coin value of the machine via change devices (such as is found in drink vending machines for example) or by way of validated tickets. As mentioned previously, the determination of an expected percentage return can be complicated by practical limitations which must be imposed on theoretical determinations. In this instance, the payscale of a game may encompass prizes of 1, 2, 5, etc, credits. It is this lower end of the prize scale which generally constitutes a significant proportion of a game's theoretical return. Now, if these small prizes cannot be collected, will the continuing actual return approximate a game's theoretical return. The proposed answer is in the affirmative. Ergo, the machine is not actually "robbing" the patron, rather the patron is forced to play off the balance of coins less than the machine denomination. From previous discussion (reference the mathematical relationship between return and theoretical turnover), it is ascertained that forcing additional play will have the effect of retaining patrons at machines longer.

NOTE WAGERS

Like coins, there are logistical and other problems associated with notes. In addition, the collection of monies from a machine may present a problem in that ticket printers or "hand-payments" by attendants may be necessary. Further, notes do not appear to have the same degree of patron appeal as do coins. However, notes may be perceived as advantageous with respect to how a wager is made in that multiple credits can be transferred at one time. For example a $10 note can equate to 100 instant credits on a 10c machine.

With both coins and notes, a patron is required to make a physical effort to feed the machine, an effort which involves real money. It is tangible, the patron can feel and see the money when they have it and are left with an empty purse/wallet when it is expended. Also, a conscious effort must be made to obtain more. It is suggested that the implication of using real money to wager is that; because the presence and absence thereof is tangible, the possibility of a patron continually wagering more and more is reduced. That is, an earlier assumption that the patron plays until a pre-allocated quantity of money is expended, is realised.

CARD WAGERS

Player cards are a form of debit card which can only be used at a particular installation where the machines are networked to a central database. Generally a monetary amount and an individual account number are included in some format on the patron's card. The patron presents a cashier with real money, who then places an equal amount of virtual money on a card. A number of problems associated with inserting real money into machines is eliminated by the use of player cards. The virtual money is generally equated to a credit amount (dependent on the machine denomination) and transferred to the machine, in total, in an instant after a number of cross-checks have been performed on card validity, etc.

The player card deals primarily in virtual money, as the only time the patron may see actual money is when they make an initial and subsequent deposit or cash-in any residual credits on a card. The perception of what is and is not real begins to cloud. Though this may not be an issue if it is solely the pre-allocated wager

and not vast sums of money that is placed on the card.

Using a player card to go into debt or utilising a credit card (from a bank, etc) is NOT advisable due to the possible social impact. It is suggested that the highly publicised abuse of credit cards and high incidences of bankruptcies as a consequence support this claim. It appears that certain members of the population have difficulty equating virtual concepts to "real-life". This weakness (if it may be referred to as such) **should not** be exploited by gaming technology.

It must be noted, that no amount of control over a gaming machine will prevent a patron approaching an Automatic Teller Machine (ATM) and crediting their account with a withdrawal for the purposes of gambling. However, there is a limit to the amount of money able to be withdrawn and therefore a limit to the debt. Further, the patron must make a conscious effort to make the transaction at the ATM. Hence, the greater the remoteness of the ATM from a gaming area the lesser the chance that the patron will return to wager more money, as one would hope that during the elapsed time a re-consideration of exactly what the patron was in the process of undertaking would be constituted.

Finally on the subject of virtual transactions and notes (perhaps to a lesser extent), it is suggested that the possibility to launder money is far greater with card than with coin. Further, databases on patrons containing information such as name, address, and amount wagered are a necessary part of cashless transactions. It is conceivable that such information may be of interest to companies attempting to establish the credit-worthiness of persons (a gambler may be seen as a risk), and hence privacy of data may be an issue. Further, the Government/operator may be able to ascertain probable cases of problem gambling from records held and take appropriate action.

MAKING THE BET

Once credits are transferred to the game, by whatever means, they must be wagered to play a game. A final way to affect the period of time required for a game cycle, and subsequently influence the quantity of money wagered is the manner in which a wager is placed. This may constitute a number of forms, some derivatives of which are listed in descending order with respect to the process time involved:

(a) Bet one coin at a time followed by pulling a handle.
(b) Bet one coin at a time followed by pressing a PLAY button.
(c) Press a play button which corresponds to the amount to be wagered and the game is automatically initiated.

A number of the combinations listed above, and/or other methodologies, could be implemented virtually on a touch screen, or a light pen could be utilised.

ENFORCING THE CONTROLS

It has been illustrated, that a gambling machine and a gaming/entertainment device can be differentiated by technological requirements placed thereon and that these requirements can regulate an individual's utility function by limiting the financial risk in which they may engage. Thus, there is a definite need for regulatory requirements on gaming devices.

Ensuring that gaming devices conform with a regulator's requirements is best achieved by an evaluation laboratory, either Government or privately controlled.

The importance of placing controls on gaming devices to limit financial impact has been addressed, however, it is equally important that the regulators ensure those controls are not violated. Whilst the greater accessibility of machines to the general public, results in a greater likelihood of machine being played; it should also be noted that greater accessibility implies a greater distribution of gaming machines which implies a logistical problem of increasing proportions insofar as one central agency monitoring the machines is concerned. Consequently, to limit possible financial impact through nefarious operations on the public, operator, or Government (there are many scenarios) the gaming devices should be regularly validated by electronic (e.g. machine network/monitoring system) and manual inspection.

DEVICE ACCESSIBILITY

A further control on financial impact, apart from the technology of the gaming device, is accessibility. Ultimately, there is no risk, if there are no machines or access to machines is prohibited; a philosophy which applies to minors in those jurisdictions where gaming is permitted.

Two questions to be addressed are; how accessible is the machine site to the general public, and once at the site how accessible are the machines.

Obviously, the gaming machine site isolated from a population centre, requires a greater effort by the patron to visit that site, ergo, the expectation of frequent visitations is reduced. The converse is also true, in that greater site accessibility can equate to a higher proportion of visitations by an individual. Further, the time available for wagering at a remote location can

be limited due to factors such as accommodation, or bus time-tables, whereas these would not be limiting factors for a site at the end of the street, say, unless restriction on hours of site or at least machine operation were in place.

Accessibility to adult patrons may be restricted if there are simply insufficient machines available, or if access to machines is restricted by rules, such as a membership class (of a club for example). Furthermore, a large number of visitors to a site does not necessarily constitute high activity on gaming machines, this is more dependent on the nature of the site. For example, a large number of visitors to a casino may constitute high machine activity as the casino's sole attraction is gaming, while a large number of visitors to a golf course may constitute limited machine play due to the possibility that for the majority of time patrons are at the site, they are on the course and not in the clubhouse (where the machines are situated).

SOURCE OF WEALTH

It is all very good that the introduction of gaming machines generates wealth for the Government, the site, benefits the tourism and hospitality industries, generates employment and provides benefits which overflow to other sectors, such as the building industry. However, one cannot create something from nothing. The money required to achieve these benefits must originate from a primary source: the patron. The patron may simply redirect money to gaming which would otherwise have been spent on other forms of recreation/entertainment or perhaps the money expended at a gaming establishment is an additional expense (second order effects). If the money is significantly redirected such that the gaming industry flourishes at the expense of another industry the net economic gain to the community/economy may be

minimal. If however, money wagered by an individual is an additional expense, the degree to which that expense is incurred and the implications of incurring the expense must be considered. There are indeed many issues to be addressed in ensuring, not that the "means justify the end", rather the means are adequately controlled so that no justification is necessary.

CONCLUSION

A patron approaches an illuminated chrome device with messages flashing and tunes blazing. A coin is extracted from the pocket, and the machine is "fed".

Optical and magnetic sensors determine the coin's validity, a solenoid diverts it to a cash-box as the sensor on the coin hopper is registering that the hopper is full. The game software exits from the attract mode routine and enters game mode. The patron reaches over and pulls the handle, cautiously listening for every gear click. Suddenly there is a "clunk" and the reels begin to spin. Unknown to the patron, a micro-switch at the base of the handle gear lever has been activated, which sets the microprocessor controlled stepper motors spinning. As the reels come to rest in precise positions as determined by the pseudo-random number generator and validated by the shaft encoders on the reel spools, the patron excitement increases.

An air of disappointment may come over the patron, or occasionally a sum is won and the process is repeated until all the coins are spent - maybe next time - or perhaps the machine was deserted by the patron after paying a handsome win. Perhaps the patron enjoyed the time spent, the highs and lows, and the company of friends without incurring a significant financial loss. The issue of "gambling machines" or "entertainment devices" is largely the

responsibility of the controlling authority.

This paper has attempted to emphasise some key issues in the "social consideration" of the emerging reality of gaming machine technology and provide a framework on which regulatory authorities may construct technical requirements to ensure a socially responsible gaming industry.

Technology which capitalises on human emotions must be implemented with due consideration to the social implications and possible political and economic ramifications. It is not so much the technology, but the control and application thereof which is paramount and as illustrated herein, the gaming technology CAN be controlled and CAN be applied in a socially responsible manner.

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