ABSTRACT

Digital games have become a pervasive part of society and its total impact remains uncertain. This paper reports on the results from a survey carried out to discern the influence of gaming in the managers within a group of 12 companies within the realisation of the PRIME project. The analysis of the results provided input into the project vision and provided insight into all development activities. The gamers demonstrate to have an edge on various strategic and business issues.

INTRODUCTION

The economic, social and technological dynamics associated with the transition to the knowledge-driven economy are revolutionising processes of teaching and learning in organisations. Moving toward a knowledge-driven economy and society raises the issue of forming social or human capital, which becomes of paramount importance for the global competitiveness and well being of national societies and regions the world over. This places a significant burden upon e-learning, which has emerged as a strategic issue for organisations because of its potential to enhance their learning abilities. The increase in complexity and velocity of the work environment are major forces that have fuelled the demand for e-learning. The transition to a knowledge-driven economy underpinned by rapid technological change, the ever shortening product developmental cycles, lack of skilled personnel, enterprise resource planning, the migration towards value chain integration and the extended enterprise are also prominent drivers of e-learning. As companies digitally transform their businesses, knowledge and training become rapidly obsolete. As a result, “just-in-time” training becomes a basic survival need, and identification of cost-effective ways of reaching a diverse global workforce becomes critical. Managing organisational competency, providing employees with competency roadmaps, distributing latent knowledge within the organisation, aligning business objectives and learning outcomes, and extending learning to value chain partners are key business issues.

However, organisations are far from realising the full potential of the digital economy and e-learning. The current organisation of training is based to a large extent on off-site classroom based on “just in case” learning, misalignment with business objectives and outcomes, unknown competency gaps, ‘one size fits all’ philosophy and training departments in the back office, mean that corporate entities are far from achieving the benefits promised by e-learning. Organisational culture is critical to the inception, growth and success of e-learning in any organisation. Understanding of the different levels of culture and their functional influence in an organisation is an important prerequisite to the development of an e-learning strategic plan. An e-learning strategic plan that hasn’t addressed culture of the organisation in which it is to be implements has little viability.
The advent of Serious Games has been touted as the “killer application” that will unlock the full potential of e-learning. Studies in the United States of America (USA) have evaluated the impact on the next generation of managers taking decisions in Europe. The results clearly evidenced that serious games have indeed shaped their society by affecting the population’s attitude.

Providing Real Integration in a Multi-disciplinary Environment (PRIME) is a European IST project (FP6-016542) that aims to give business professionals in strategic manufacturing a serious game where they can experiment with new ideas and learn the effects of their decision making. An important initial step was the definition of the PRIME vision to shape all the development, innovation and training activities of the project. A necessary key input to the vision was the assessment if a European gamer generation existed and if there was an impact on the managerial fabric. To address this, a survey with 48 questions was devised to discern if digital games have shaped the younger generation that constitute the European managerial workforce. The paper reveals some interesting results, such as the predisposition to take calculated business risks is greater if amongst the respondents that were considered gamers, thereby reviving the lagging spirit of European entrepreneurship. Although the study shows that the gamer population is less than in the USA, similar trends in the way of thinking are evident in the data.

The remainder of the paper is structured into 4 main sections. The first immediate section presents a brief overview of the PRIME project. The following section explains the methodology used in the survey and the process of analyzing the results. In fourth section, the main results of the survey are covered. Finally in section five, some conclusions are drawn.

PRIME PROJECT
The main objective of the Providing Real Integration in a Multi-disciplinary Environment (PRIME) project is to augment existing work environments with a learning environment where individuals may gain experience and understanding concerning decision making in strategic manufacturing. PRIME proposes to achieve this by developing a serious game that provides the means for learning by experience within a soft-failure environment that foments risk taking without detrimental impact on the business. The experience garnered is based on strategic management, including multi-stakeholder negotiation and business connectivity. In addition, methodologies are to be developed to address the adoption barriers and facilitate the integration of PRIME within current work environments creating the notion of PRIME-Time.

In the past, serious gaming has been applied only partially into the business domain, providing semi-interactive case studies based on pre-written storylines, relying on discrete choices, and dealing essentially with training and/or coaching. The complexity of the collaboration, risk taking and negotiation activities intrinsic to work environments, in particular in the global manufacturing business context, raises interesting innovation challenges, which attracted the serious games approach.

PRIME is committed to create an innovative system and methodologies that enable the following breakthroughs:

- Allowing safe experimentations for decision-making about radical innovations or major changes without the associated risks in real life.
- Empowering the managers with more confidence to embark on an innovation process in the “real world”, thus after all enhancing the innovation culture of the enterprise.
- Increasing the adaptability and flexibility of the enterprise in a multidisciplinary, multi-stakeholder collaborative environment.

As such, PRIME will strongly contribute to generate and sustain a new empowered management community motivated to achieve and go beyond the i2010 objectives:
The European competitiveness through “training” of professionals in various expected or unexpected scenarios so that they are better prepared to face similar situations whenever they should happen in real life;

The economic growth by allowing optimisation of business operations through simulation and evaluation of alternative scenarios on one hand and through continuous training of involved professionals on the other hand, thus increasing the European innovation culture;

The sustainability of business profitability and employment by empowering all the stakeholders to a more specific use of knowledge and risk taking attitude enabled by PRIME.

So the project aim can be summed up in the sentence: “taking a 30 year old professional and transforming her or him into one with a 50 year old’s experience without the drudgery of twenty years of business mishaps and successes”.

**METHODOLOGY**

To assess the game culture and its impact in the European managerial fabric, a small study was carried out using a questionnaire consisting of 48 questions.

Each topic was qualified by a sentence to which the respondents were asked to state their opinion using a Likert scale between 1 and 7. The lower-end of the scale corresponds to when the respondent has a negative response to the question, whilst the upper-end of the scale indicates that the respondent has a positive response to the question. The questions were carefully structured on a qualitative approach since the objective was to capture the users’ perception of the issues raised and not their quantitative assessment. An example of one of the questions and how the respondent could answer is illustrated in Figure 1.

![Figure 1: Topic concerning Participative Policy Making](image)

The 48 questions targeted at identifying the gamers in the population of respondents and determining their perspective and understanding towards various business topics. The questionnaire had an additional eight questions to characterize the respondent in terms of their age, gender, cultural background, nationality and to identify the forms of training available to them.

The total number of valid responses after pre-processing was 184, which 121 were collected by the developers and 63 were collected by the end-user partners. The distribution of the responses collected is summarized in Table 1.

The main aim of the survey was to validate if the scenario portrayed in the Got Game (Beck and Wade 2004) concerning the US would also be verifiable in Europe. The result is a resounding affirmative answer, but a more extensive survey would be necessary to strengthen the results achieved.

The questionnaire was designed so some questions could be aggregated into categories to summate the responses, thus increasing the statistical reliability of the response. In the case of these summated responses, the analysis was done in two steps:

- **First:** process the answer to a single question to determine if the respondent agreed or not with the statement contained within the question. The differentiation was done according to the following two groups:
Gamer and Non-Gamer

All the categories of the topics rely on the characterization of the population according to the following two dimensions (Figure 2):

- **Gamer nature.** A respondent is either a gamer or a non-gamer. A gamer is someone who grew playing digital games or is someone that currently plays digital games regularly.
- **Age.** Two groups were considered, the younger generation and the older generation with 30 years of age being the pivotal age. The age of 30 was chosen taking into account the perspective of the manager lifetime.

The gender was not considered because there was not sufficient number of respondents with the female gender to warrant a differentiation in the analysis. Although there was a total of 41 female respondents, only one was a gamer.
As noted, the younger generation of the respondents has a gap of 18% between the gamers and non-gamers, whilst the older generation exhibits a gap of 62%. Further research is needed to determine the reason, but the result corroborates that a gamer generation exists and it is relatively new.

RESULT ANALYSIS

The survey was structured into the following dimensions: Competition, Ambition, Social, Leadership, Risk Taking, Loyalty, Performance, Work Practice and Training. In addition, a set of questions addressing specific issues were also placed in the survey. However, for the purpose of the paper, only the main dimensions are addressed in the following subsections.

**Competition**

For this topic, the two statements were used:

- Q12 In your life, to what extent do you identify with the following statement: “winning is everything”
- Q13 In your life, to what extent do you identify with the following statement: “competition is a law of nature”

The results are depicted in Figure 3, which clearly demonstrate that the gamer generation are more competitive than the non-gamers. The competitiveness gap becomes more noticeable in the gamers of the older generation.
The gamer generation shows evidence of being more competitive, which can account for the initial slight divergence between the gamer and non-gamer concerning how much an individual cares for the organization they work for, as reflected in Figure 4. However, as the graph demonstrates, the non-gamer generation keeps its loyalty consistent between the generation, whilst the gamer generation becomes more involved and motivated towards the organization seeing themselves as part of a greater whole.

**Ambition**

The Ambition topic is captured by the following three statements:

- **Q16** In my personal and professional life, I categorise my goals in short, intermediate and long term
- **Q17** I am driven to succeed and accomplish the goals I set out for myself
- **Q47** It is important to receive a high salary and good benefits
The results are depicted in Figure 5, which demonstrate that there is negligible difference between gamers and non-gamers, albeit the gamers have a 3% more ambition.

![Figure 5 – Ambition](image)

However, when analyzing Q17 alone, the Figure 6 presents the results, which indicate that a gamer maintains their drive to accomplish goals, whilst the non-gamers reduce their drive.

![Figure 6 – Responses to “I am driven to succeed and accomplish the goals I set out for myself”](image)

Social

The Social topic is captured by the following four statements:

- Q18 Gamers are isolated, introverted and unsociable
- Q21 I have a great need of human relationships
- Q22 I enjoy the challenges of inter-cultural relationships
- Q23 I get upset easily and many things annoy me
The results are depicted in Figure 7, which demonstrate that gamers are somewhat more sociable than non-gamers. However, the gamer generation keeps their sociability whilst the non-gamers become less sociable with age and experience.

![Figure 7 – Social dimension](image)

**Risk Taking**

The Risk Taking topic is captured by the following two statements:

- **Q39** The best rewards come to those who take risks
- **Q40** Taking measured risks is the best way to get ahead

The analysis yielded that the responses from the end-users were skewed, since they demonstrated a population that is conservative towards risk taking, independently if their background was of a gamer or not. Therefore, the results depicted in Figure 8 only represent the developer population.

![Figure 8 – Risk taking dimension](image)
As can be verified by the graphic, both the gamers and non-gamers of the younger generation (<=30 years of age) share the same opinion concerning risk taking. However, the gamers have a more positive approach to risk taking than the non-gamers.

The results become more interesting as the population ages, with the gamers actually reversing their outlook on the topic of risk taking and actually considering that measured risks are necessary to ensure sustainable competitiveness. However, the non-gamers reflect an even more conservative outlook on risk taking.

Other Specific Topics

As an example of the additional specific topics that are not part of a particular group, consider:

**Q34** To remain competitive, European manufacturing needs radical innovation, even if the associated risk is high

The results are collated into Figure 9, which reflects that the gamers are more aware that sustained competitiveness can only be achieved by adopting radical innovation.

![Graph showing responses to topic Q34](image)

**CONCLUSIONS**

The results of the survey demonstrate that the gamer generation is not as prominent in Europe as in the United States, but present nonetheless. The managers, who experienced an upbringing with the influence of digital games, demonstrated an advantage over those that did not share the same background. Throughout all the statements aimed at capturing a respondent’s thoughts and motivation on particular topics, the gamers revealed an edge and advantage over those without gaming experience. However, it was not the purpose of the survey to understand the motivation behind the particular responses.

The survey allowed the PRIME consortium to identify the potential of using a serious game as a training tool for managers in strategic manufacturing. The results also permitted to identify potential barriers to take into account when deploying the PRIME serious game. A clear example is the risk taking factor, which both gamers and non-gamers of end-users alike are extremely conservative. This understanding was factored into the adoption methodologies to facilitate the integration of PRIME serious game into existing work environments.
Although the survey presented interesting results of relevance to the consortium and the response sample is representative of the managers belonging to the partner’s organizations, the analysis cannot be extended to the entire population. However, the results clearly demonstrate a trend that would justify further research to validate if the trend affects the broader population.

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