In today’s world, where ping, friend and google have become verbs, organizations are recognizing the need to keep up with the changing times. Mind-boggling technological changes have altered the way we lead our lives and do businesses. We have moved from Internet, websites or text-based communications like email to Web 2.0 that enables enhanced interaction like podcasts, blogging, social networking sites to recent innovations in Web 3D like virtual worlds, social computing, etc. Such immersive technologies, especially immersive internet, are projected to get integrated with most business solutions by 2013, with a considerable installed base in Global 1000 organizations [1]. Gartner estimates that by 2012, 70% of organizations would have established their own virtual worlds [2]. Despite this excitement, statistics caution us about the appropriate application of such technological advances. For instance, 90% of these initiatives failed in 2008 [2]. The Gartner report diagnosed the failure of these past initiatives and estimated that future internal worlds will have greater success due to lower expectations, clearer objectives and better constraints.

How then does an organization balance the risk around the enterprise applications of such technologies and stay ahead of the curve? We propose that a well-thought out and programmatic application of immersive technologies to learning and development will help mitigate risks and stay ahead of competition.

IMMERSIVE TECHNOLOGIES
Before we progress towards a discussion on immersive technologies, it is important to define various terms used within the scope of immersive technologies.

- Virtual world refers to an electronic or computer-based simulated environment where complex physical spaces are visually recreated where people (represented by animated characters or avatars) can interact with each other and also with objects in the virtual environment [3, 4].

- Metaverse refers to a fictional virtual world, often used to describe a web 3D successor to the current internet.
An example of a metaverse is the popular second life (SL). Today, various organizations including IBM, Dell, Mazda and MTV have created virtual workspaces on the enterprise platform of SL. Here, employees can meet virtually, organize events such as conferences or celebrations, disseminate corporate communications, conduct training, simulate business processes and develop products or new ideas in collaboration with virtual/avatar versions of other employees.

- Simulation in this context means computer-mediated, multi-media engagements where realistic scenarios are simulated for the purpose of development, assessment, orientation, etc.

- Serious Games is another term that tends to overlap with simulations, especially when discussing serious games, educational games, business simulations, instructional games, game-sims, etc. [5]. A serious game is located in a specific context and is an artificially constructed, competitive activity with a specific goal, a set of rules and constraints [6].

- Certain massively multiplayer online role-playing games (MMORPGs) like The World of Warcraft illustrate this artificial construction beautifully, where the setting is entirely fantasy-based without much replication of the real physical world. What makes such games immersive and almost addictive is the business-world-like realism involved in the activities, alliances, competition and behavioral complexity in these games [5].

Given the lack of a universally-accepted typology of these experiences, we propose to use the blanket term immersive technologies to refer to all enterprise applications of technology that have some or all of the elements namely, computer-mediated (online/computer-based/virtual), interactive (immersive/engaging) and involving the use of avatars or other virtual representations of real people (in addition to virtual or artificial intelligence based people, objects, etc.).

**ORGANIZATIONAL APPLICATIONS OF IMMERSIVE TECHNOLOGIES**

The issue is not about whether immersive technologies are already being used, but about what their business applications are. Some applications for people-related activities are listed below.

- Branding or recruiting by providing visual, virtual and experiential representation of organizations and their work

- Sourcing, recruiting and selecting employees

- Role playing or trying out jobs or professions in advance of real life practice [7]

- Providing virtual meeting spaces for organization members and visitors with specific objectives in mind, for e.g., marketing a new product or holding a virtual conference
Virtual brainstorming and ideas/product development sessions

Providing a learning space virtually for traditional training/learning activities, including instructor-led sessions, self-directed learning and group learning [8]

Rehearsing skills or tasks learnt [9].

POTENTIAL BENEFITS OF USING IMMERSIVE TECHNOLOGIES IN BUSINESS
The rise of immersive technologies is related to the incredible practical benefits to organizations such as:

- Low costs, especially in terms of decreased infrastructure and travel expenses
- Connectivity for geographically dispersed individuals
- Innovative ways of bringing the organization to employee, investor, client or applicant
- Re-creation of work environment in high-fidelity with linkages to the organization’s intranet, active directory, phone systems, etc., at relatively low costs using avatars and virtual objects
- Cross-cultural applicability due to the quick adaptation enabled by motion capture, 3D animation and other related technologies; this can become critical as organizations become truly global in their composition and market reach
- Organizational branding and staying current with present and future generations of employees’ familiarity with these technologies.

IMMERSIVE TECHNOLOGIES APPLIED TO LEARNING AND DEVELOPMENT
Immersive technologies such as simulations to date have been widely used for specific training needs in professional and vocational domains such as military, surgical, medical and business training [8]. Their use for more sophisticated conceptual and higher-level cognitive learning has been limited. One of the key lessons from research is that motivation is critical for effective learning using games or simulations, but this motivation needs to be supported with feedback, reflection and active involvement for designed learning to occur [10]. Typically, motivation in such learning experiences is maintained because unlike most formal training or education experiences, learning is not linear – there are multiple paths to the end goal and this uncertainty keeps learners engaged [11]. Thus, matching learning outcomes to experience and learner motivation levels is important. While this is probably true of all learning experiences, it is particularly important with immersive technologies given that their perception for the large part so far, has been in the areas of violence-ridden videogames or social networking opportunities. The task ahead for developers of game-based learning engagements is to design purposeful, engaging and fun experiences, without losing sight of measuring/evaluating them against the learning objectives.

LEADERSHIP DEVELOPMENT IN THE METAVERSE
Online interactive methodologies have gained acceptance in certain areas of organizational science and practice such as assessments
used in employee selection, organizational socialization (e.g., by means of Realistic Job Previews or RJs) and customer service initiatives (e.g., call center employee training). However, not many such alternative modalities of learning have been used in the field of employee development, certainly not in senior leadership positions.

The decision to try virtual worlds as vehicles to deliver developmental experiences for leaders is based on the following reasons:

- Leadership skills like everything else are developed through practice. Some leadership behaviors such as persuading an unwilling client or negotiating a merger, are high-impact and high-risk enough to require a finessed approach. However, we cannot expect this finesse to develop ‘on-the-job’ due to the risks and low base-rates involved. Practicing such behaviors in a relatively safe, virtual environment provides leaders practice equivalent to what pilots get when they train using flight simulators, room to learn and make mistakes without real-world consequences.

- Geographical distances preclude leaders from large, global organizations to interact and learn together. Virtual worlds provide them a space for collaboration and learning.

- The prevailing ‘holy grail’ of leadership development interventions is a paradigm called action learning, in which employees work on a real-world business problem for several weeks, applying new learnings and trying out new behaviors in an effort to produce results that matter as well as experience behavior change in themselves [13]. This effort is intensive in terms of time, risk, infrastructure, cost and effort. To the extent that virtual worlds provide a way to achieve the same outcomes with reduced expenditure in these areas, they might be worth investing in.

Implied in the reasons stated above is the assumption that the virtual world vehicle provides at least as much benefit as other modes of learning. In order to test the assumption as well as to further advance the evaluation of game-based learning, we propose an evaluation based on classic research design principles from social science as well as emerging analytical approaches such as Multi-Facet Rasch measurement and the study of individual and group trajectories of development over time [14, 15].

**EVALUATION OF GAME-BASED LEARNING**

Although immersive technologies have been applied for a while for training/development requirements, there isn’t much systematic research or empirical evidence around their efficacy [5, 16]. Connolly, Stansfield and Hainey have developed a framework for evaluating games-based learning that may be extended as appropriate to other immersive technologies-based learning as well [17].

While the framework developed by Connolly, Stansfield and Hainey is useful, it is somewhat limited when it comes to being applied for ongoing development versus skills-training, for instance. The ‘learner/instructor attitudes’ in the Connolly et al., model for instance, refers narrowly to attitudes towards the subject being taught or games in general [Fig. 1].
Emerging evidence suggests a whole host of learner attributes that impact learning and more importantly, transfer of learning into their work contexts. Examples of these attributes include self-efficacy, goal-orientation, motivation to learn and motivation to transfer learning, etc.

Moreover, we can obtain far richer evaluation information from immersive technologies than traditional paper-based or even current online tests or development aides. Each mouse click, instant message or online communication, every virtual action and interaction can be tracked and used for unobtrusive, almost anthropology-like analysis. Categorizing and tracking these stimuli into a framework such as Connolly et al.’s would provide some structure in the evaluation of game-based learning.

We thus propose a simple framework as depicted in Figure 2 for evaluating the effectiveness of our pilot effort in using virtual worlds to enhance leader development.

CONCLUSION
It is not an exaggeration to say that the world of learning and development will be changed by the use of immersive technologies. We have described one approach to leverage the use of virtual worlds in a typically high-cost, high-touch, high-risk initiative such as senior leader development. While data around the efficacy of this pilot is still unavailable, all signs point to its promise in delivering at least some advantages over currently available methods. In order to test this assumption, we have proposed an evaluation framework based on sound research design principles which can be generalized to almost any learning intervention, but which is critical in establishing the efficacy of the proposed vehicle for leader development.

REFERENCES
2. Stevens, H. and Pettey, C. (2008), Gartner press release: Gartner says 90 per cent of corporate virtual world projects fail within 18 months; Success requires clear objectives, focus on users and realistic expectations. Retrieved August 10, 2010,
36


Author’s Profile

AARTI SHYAMSUNDER PhD is an Associate Principal at the Infosys Leadership Institute, where she supports the development of senior leaders across Infosys. An organizational psychologist by training, she is involved in developing leadership assessments and developmental roadmaps, conducting program evaluation as well as research. She may be contacted at aarti.shyamsunder@infosys.com.

CHITRA SARMMA is a Principal – Leadership Development, at the Infosys Leadership Institute. Besides supporting individual leaders in their development, her work focuses on improving client relationships, exploring using virtual worlds in leadership development and Content Leadership. She may be contacted at chitra.sarma@infosys.com.