

# EFFECT OF NON-WORK RELATED INTERNET USAGE ON STIMULATING EMPLOYEE CREATIVITY IN THE SOFTWARE INDUSTRY

Sachitha I. P. Gunawardena and Sanath Jayasena

*Department of Computer Science and Engineering, University of Moratuwa, Katubedda, Moratuwa, Sri Lanka*

**Keywords:** Non-Work Related Computing, Non-Work Related Internet Usage, Creativity Stimulation, Software Industry.

**Abstract:** This study investigates the effect of non-work related Internet usage on stimulating employee creativity in the software industry. Drawing from past literature this research proposes six dimensions for measuring creativity stimulation, which include: accessibility to information, intrinsic motivation to execute ideas, curiosity and exploration, independent thinking, collaboration and breaking down technical barriers. A survey was conducted through distribution of a research questionnaire among a stratified random sample of knowledge workers employed in the software industry. The findings of the research were partially consistent with the initial predictions which stated a positive effect of non-work related Internet usage on creativity stimulation. In addition, the research results also provided an exploratory view on the nature of employees' non-work related Internet usage.

## 1 INTRODUCTION

With the rise of Internet usage in work environments, especially in the software industry, there is a rising trend of employees' engagement in non-work related Internet usage.

We define "Non-work related Internet usage" (NWRIU) as the use of organizational Internet resources by employees while at their workplace for purposes which are not directly related to their day to day work tasks. The abbreviation NWRIU is used throughout this paper to refer to this phenomenon.

Several studies (Block, 2001; Bock and Ling Ho, 2009; Lim, 2002; Oswalt, Elliott-Howard and Austin, 2003) point out the negative effects of NWRIU such as employee's productivity loss and risks of damaging lawsuits. On the other hand, some researchers have proposed that NWRIU can actually have positive effects such as stress relief, creativity stimulation and job satisfaction (Amabile, 1997; Anandarajan and Simmers, 2004; Boden, 1993; Csikzentmihalyi, 1996; Oravec, 2002). Despite these two contradictory views, there is still lack of research to delve deeper into how NWRIU affects stimulation of employee creativity. Even though productivity is an immediate concern with respect to

NWRIU, this research focuses only on the effects of NWRIU on stimulating employee creativity.

### 1.1 Research Objectives and the Scope

The main objective of this research is as follows:

- Determining the effect of NWRIU on stimulating employee creativity in the software industry.
- Other research objectives include the following:
- Identifying the extent and nature of NWRIU among employees and analyzing restrictions currently placed by organizations on employee Internet usage.

The scope of this research is the Sri Lankan software industry, which is rapidly growing with strengths being recognized globally. However, we believe the findings and implications would be widely applicable.

### 1.2 Importance of Creativity in the Software Industry

According to Sri Lanka Information and Communication Technology Association 2007 workforce survey (SLICTA, 2007), creative thinking

skills has been identified as one of the main skills that needs improvement in employees working on many IT job categories, as cited by most employers.

## 2 LITERATURE REVIEW

NWRIU has been explored to a reasonable extent by several researchers as it is a modern phenomenon. Lim (2002) has conducted a study on NWRIU, collecting data from 188 working adults in Singapore with access to the internet at the workplace. She states that while access to the Internet may not necessarily result in more people loitering around, the temptation to do so is certainly higher since the Internet makes such activities easier and more convenient.

IT knowledge workers are more likely to engage in a range of online activities for non-work-related purposes at work, rather than outside their workplace, especially since a major portion of their time is spent at work on a typical working day.

Previous researches show that significant differences are not shown across employee demographics with respect to NWRIU (Stanton, 2002; Ugrina, Pearson and Odom, 2007).

Since extensive and disruptive use of NWRIU can potentially lead to negative effects such as reduced employee productivity, legal liabilities for the employer and poor job performance, several researchers have conducted research on these negative aspects of non-work related Internet usage. For example, Bock and Ling Ho (2009) have analyzed the effect of NWRIU on job performance. Oswalt, Elliott-Howard and Austin (2003) discuss about certain legal and ethical issues faced by IT managers with respect to NWRIU in U.S. organizations.

While most business organizations continuously appear to perceive NWRIU as a purely negative aspect, the organizational management is focused on placing more and more restrictions on such Internet usage. As discussed by Anandarajan and Simmers (2004), it is important to note that personal web usage in the workplace is a complex issue with not only a potentially dysfunctional dimension, but also a potentially constructive one. Further, some researchers argue that the Internet provides a much needed diversion at work which can lead to creativity, flexibility, better collaboration, and foster a learning environment (Anandarajan and Simmers, 2004; Block, 2001; Greenfield, 2002; Oravec, 2002).

Based on previous literature, there is clearly a

wide debate on the disruptive and the constructive impact of NWRIU at work.

Together with these contradictory views, there is no adequate research on how NWRIU in particular affects employee creativity. Thus we review previous research on how Internet usage in a broad sense affects creativity stimulation.

### 2.1 Internet and Creativity Stimulation

Oravec (2002) suggests that allowing reasonable and humane amounts of online recreation can indeed have considerable advantages, which can serve to open blocked creative channels and possibly relieve stress as well.

Some researchers have discussed the use of Internet for stimulating creativity on an educational setting. Marshall (2001) in his study on creativity, imagination and the web, discusses about approaches that can be taken to improve education by making use of the web by encouraging creativity and imagination. Madden (2004) has conducted a large scale study that looks at U.S. artists and musicians use of the Internet and their views on copyright. According to the study the artists and musicians use the Internet to gain inspiration, build community with fans and fellow artists and pursue new commercial activity. The study reports that 52% of all online artists and 59% of paid online artists say they get ideas and inspiration for their work from searching online. Software industry being a creative industry similarly to music and fine arts, Madden's (2004) study provides background for extending similar research to be conducted on knowledge workers in the software industry.

The similarity between the features of the Internet and those characterizing creative individuals has encouraged Shoshani and Hazi (2007) to look for a theory that justifies the use of the Internet environment for enhancing creativity. They conducted their research using a sample that comprised teachers of fashion design from several Israeli high schools. Shoshani and Hazi (2007) came up with ten hypotheses pertaining to the enhancement of creativity via the Internet. These ten hypotheses were: multiculturalism, serendipity, cooperation, anonymity, exposure to varied audiovisual means, breaking down technical barriers, flexibility, constructivism, exposure to creative people, and freedom. Except for anonymity, exposure to varied audiovisual means and breaking down technical barriers, all other hypotheses were strongly supported by this study, where the research methodology followed was purely qualitative. Using

Shoshani and Hazi's (2007) study as a groundwork research study, a close review of literature was carried out on the factors that would potentially enable stimulation of creativity in an Internet environment.

### **2.1.1 Creativity and Accessibility to Information**

Csikszentmihalyi (2009) states the availability and accessibility of information and encouragement of novelty by organizations is an important systemic property for encouraging organizational creativity. Amabile (1997) has also expressed a similar view on accessibility of information and creativity, stating that domain-relevant skills are a core component for creativity.

### **2.1.2 Creativity Stimulation through Collaboration**

Online socialization can be viewed in two different aspects: exposure to multiculturalism and collaboration. Several researchers have noted the importance of these factors for enhancing creativity.

Robinson and Stern (1997) discuss about diverse stimuli as one of the six essential elements they consider as necessary for enhancing corporate creativity. Moreover, Eriksen and Beauvais (2000) empirically prove and propose a theory that explains how increased levels of diversity within and among members of teams increase creativity in team decision making and problem solving. Damanpour (1991) states organizational creativity decreases by restrictions on information flow and communication channels within the organization. Several other researchers have also discussed the importance of cooperation and creative dialogue for enhancing creativity (Isaksen, 1987; John-Steiner, 2000; Marshall, 2001; Osborn, 1991).

### **2.1.3 Creativity Stimulation through Curiosity and Exploration**

Several researchers state the importance of curiosity and exploration for creativity stimulation. Csikszentmihalyi (1996) points out that sustaining high levels of curiosity is the starting point of creativity. Boden (1993) discusses a similar view by stating that exploring environments and their limits are well-known paths to creativity.

### **2.1.4 Creativity Stimulation through Independent Thinking**

Linda Naiman founder of "Creativity at Work" (2006) organization notes that creativity is fostered in organizational cultures that value independent thinking, risk taking and learning. Further, independent thinking is stated as a creativity stimulating factor by Stephens (2004) in her '20 Ways to Encourage Children's Resourcefulness and Creativity'. This can be applied to adult creativity stimulation in an online environment as well.

### **2.1.5 Creativity Stimulation and Intrinsic Motivation**

According to Amabile (1997) there are three basic ingredients to creativity: domain skills, creative thinking skills and intrinsic motivation. Intrinsic motivation is therefore one of the key ingredients for creativity. Morris (2005) stresses the importance of organizational encouragement of creativity for developing employee intrinsic motivation. Adams (2005) also identifies organizational support as a crucial factor that bolsters intrinsic motivation. He points out that intrinsic motivation increases when people are aware that those around them are excited and where there is information sharing and collaboration.

### **2.1.6 Creativity Stimulation by Breaking Down Technical Barriers**

Breaking down technical barriers is also considered as a creativity stimulator by Shoshani and Hazi (2007), where increased exposure to technical aspects is considered likely to encourage creative outcomes. Most of the knowledge workers working in the software industry can be considered as technically savvy. However, there are certain non-technical job roles such as sales and marketing, project management and technical writing. Therefore, the nature and extent of exposure to technical aspects for job related tasks would vary with the employee's job role. Even though most knowledge workers in the software industry would have a natural technical exposure, there can be variation in such technical exposure with their nature of Internet usage for non-work purposes.

## **2.2 Organizational Culture and Creativity**

The software industry is relatively new in Sri Lanka.

However, the local software development companies have developed different organizational cultures that would vary from one software development company to another especially with the scale of the company and attitude of the management. The organizational culture would play a major role with respect to certain aspects of creativity stimulation, such as independent thinking and curiosity and exploration.

Cameron and Quinn (1999) researched what makes organizations effective and successful. Based on the Competing Values Framework they developed the Organizational Culture Assessment Instrument (OCAI) that distinguishes four culture types: Clan Culture, Adhocracy Culture, Market Culture, and Hierarchy Culture. Organizational encouragement towards creativity would vary based on the organizational culture type.

### 2.3 Personality and Creativity

As noted by some researchers, even through creativity can be learnt and stimulated, a portion of creativity would be innate (Amabile, 1997; Csikzentmihalyi, 1996). This would be exhibited through their individual personality traits.

As the research into the relationship between personality traits and creativity continues to grow a more complete picture has developed. Within the framework of the Big Five model of personality some consistent traits have emerged (Batey and Furnham, 2006). Out of the Big Five model personality traits 'openness to experience' has been shown to be consistently related to a whole host of different assessments of creativity (Batey, Furnham and Safiullina, 2010). Some of the terms used in Myers-Briggs Type Indicator (MBTI) assessment to determine the independent thinker type personality include: logical, independent, self-confident, nonconformist and visionary (Myers, 1995). These assessment factors provide some background on assessing an individual's personality with respect to independent thinking ability.

Building upon the literature that has been reviewed, this research proposes six dimensions of creativity stimulation to be assessed for the impact from NWRIU.

## 3 RESEARCH METHODOLOGY

A two stage research design was followed. First, an initial exploratory study was conducted on the research topic due to the low amount of research on

this specific research area. The exploratory study helped to gather the needed preliminary information for carrying out a fully fledged study. An initial small scale questionnaire was distributed online among 20 respondents from 10 Sri Lankan software companies who were personally known to the researcher, during the exploratory study stage.

Following the exploratory study, the core research was conducted based on hypothesis testing. This hypothesis testing approach was selected since the research required explanation of the nature of certain relationships between different variables. Predominantly a quantitative research methodology was followed, where the research variable measurement was done through historical data and analytical surveys mainly based on a Likert scale.

### 3.1 Theoretical Framework

The main independent variable identified for the study was NWRIU, where the nature and the extent of usage were analyzed as per the dimensions of the independent variable. The main dependent variable identified for the study was "employee creativity stimulation", where six dimensions of the dependent variable were identified. Dimensions considered for the creativity stimulation variable were limited based on the survey results of the exploratory study, in order to maintain the research study within an acceptable scope.

Figure 1 displays the research variables and the related dimensions considered for the theoretical framework:

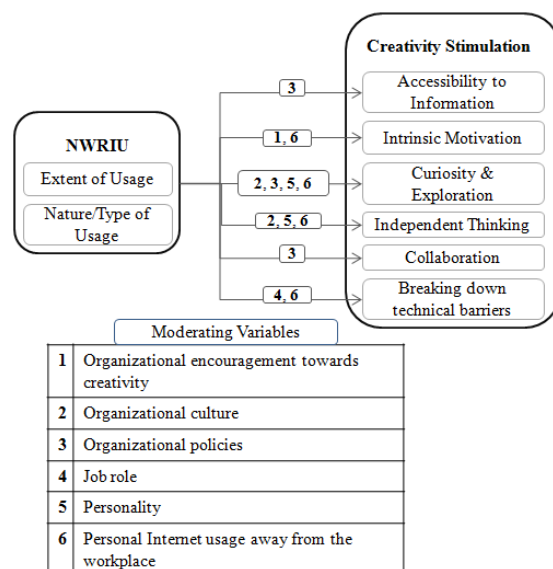


Figure 1: Conceptual model.

The independent variable NWRIU was considered to have a relationship with each of the creativity stimulation dimensions. Moderating variables were identified for each of these relationships based on previous literature as well as logical reasoning.

The moderating variable identified for the relationship between NWRIU and accessibility to information is organizational policies.

According to Amabile (1997) intrinsic motivation is one of the three basic ingredients to creativity which include domain skills, creative thinking skills and intrinsic motivation. However, encouragement of creativity by the organization as discussed by Csikszentmihalyi (2009) would be a moderating variable for this relationship between NWRIU and intrinsic motivation, since a supportive environment would be required for the development of intrinsic motivation. Further, personal Internet usage away from the workplace is also considered as a moderating variable for this relationship which would help to consider the unique contribution of NWRIU at work, since the research study focuses only on NWRIU at work.

Personality of the employee, organizational culture, organizational policies and Internet usage away from work were identified as the moderating variables for the relationship between NWRIU and curiosity and exploration.

Organizational culture can potentially affect the independent thinking habits of employees and also there is a portion of innate independent thinking habits that could be present through an employee's personality. Therefore, organizational culture, personality and Internet usage away from the workplace have been considered as the moderating variables for the relationship between NWRIU and independent thinking. Internet usage away from the workplace is also considered as a moderating variable for this relationship, since the research study focuses only on the NWRIU at work.

Online social media was considered as an intervening variable which acts as a function of NWRIU for the relationship with the dependent variable dimension 'collaboration'. The moderating variable identified for this relationship is organizational policies.

Job role is noted as a moderating variable for the relationship between NWRIU and breaking down technical barriers because an employee's natural technical exposure could differ based on the job role. Personal Internet usage away from the workplace was also considered as a moderating variable for this relationship.

Based on the theoretical framework the following set of hypotheses was developed for this research:

**H1<sub>A</sub>:** There is a positive relationship between NWRIU and accessibility to information.

**H2<sub>A</sub>:** There is a positive relationship between NWRIU and intrinsic motivation to execute ideas.

**H3<sub>A</sub>:** There is a positive relationship between NWRIU and curiosity and exploration.

**H4<sub>A</sub>:** There is a relationship between NWRIU and independent thinking.

**H5<sub>A</sub>:** There is a positive relationship between online social media usage and collaboration.

**H6<sub>A</sub>:** There is a positive relationship between NWRIU and breaking down technical barriers.

**H7<sub>A</sub>:** There is a positive relationship between NWRIU and creativity stimulation.

A questionnaire was developed based on the theoretical framework and the derived hypotheses statements and it was distributed among a sample of 192 respondents, drawn from 30 software development companies in Sri Lanka. The sample size held a confidence level of 95% and a confidence interval of 7%.

The entire questionnaire consists of six sections. The questionnaire predominantly consists of close ended questions which are designed to be answered on a Likert scale, with a few open ended questions which were introduced to gather additional descriptive data.

The research questionnaire is available on <https://sites.google.com/site/nwriuresearch/>.

### 3.2 Variable Aggregation

Standard average was used for most of the variables. However, standard weighted average was used for variable aggregation on employee creativity stimulation, since the importance of its six dimensions varied from one dimension to another. Thus, the weights were assigned to the dimensions of the creativity stimulation variable as noted in Table 1.

Table 1: Variable aggregation for creativity stimulation.

Dimension for Creativity Stimulation Variable	Assigned Weight
Curiosity and exploration	1.0
Independent thinking	1.0
Intrinsic motivation to execute ideas	1.0
Accessibility to information	1.0
Collaboration	1.0
Breaking down technical barriers	0.5

As illustrated in this table, the dimension “breaking down technical barriers” was assigned a half weightage since it was not well supported by literature, compared to the other dimensions. However all other dimensions considered for creativity stimulation were well supported by past literature, hence these dimensions were assigned equal weightages.

### 3.3 Sample Design

The target population that was considered for the study included all knowledge workers employed in the Sri Lankan software industry which was around 8,375. Based on the proportionate stratified random sampling approach, subjects were drawn in proportion to their original numbers in the population.

Strata were first defined based on the scale of the software company of the employee and then again stratified based on the job category of the employee as noted in the 2007 ICTA Workforce Survey report (SLICTA, 2007).

The sample stratification carried out for the sample of 192 is illustrated in Table 2.

Table 2: Stratification for sample size of 192.

STRATIFICATION FOR SAMPLE SIZE OF 192		Company Scale			Total
		Large Scale	Medium Scale	Small Scale	
Job Role	Database Administration & Development	9	2	3	14
	Digital Media & Animation	1	0	1	2
	Business Analysis & Systems Integration	11	3	0	14
	Systems & Network Administration	4	2	1	7
	Programming & Software Engineering	45	11	7	63
	Project & Programme Management	6	2	1	9
	Management Information Systems/IT Management	5	2	1	8
	Sales & Marketing	4	1	0	5
	Technical Support	20	6	4	30
	Technical Writing	3	0	0	3
	Web Development	4	2	1	7
	Testing & Quality Assurance	17	5	3	25
	Solutions and Technical Architect	3	1	1	5
<b>Total</b>		<b>132</b>	<b>37</b>	<b>23</b>	<b>192</b>

## 4 DATA ANALYSIS

Data analysis was carried out using SPSS (Version 17.0) statistical software. Brief analysis was carried out on NWRIU patterns and the restrictions currently placed by organizations on employee NWRIU.

### 4.1 Profile of the Sample

The gender composition of the sample consisted of 136 males and 56 females which account to a 70: 30 proportion. Most of the survey respondents belonged to the age groups of 21-25 or 26-30 and major portion of the respondents included employees having an undergraduate degree or post-graduate level qualifications. Most of the survey respondents had either 1-2 years of work experience or 3-5 years of work experience. 34 respondents had 6-10 years of work experience and 7 respondents had over 11 years of work experience. The profile of the sample which is in line with the ICTA workforce survey report (SLICTA, 2007) statistics confirms that a representative sample has been gathered with respect to most of the demographic factors.

### 4.2 Analysis of NWRIU

The survey respondents reported that they use Internet for non-work related purposes for 1.3 hours per day on average, on a typical working day. This appears to vary among the respondents from a minimum time period of 0.25 hours to 4 hours per day. These employees reported that they work for 9.1 hours per day on average. Table 3 shows what the survey respondents reported as the NWRIU activities that they engaged in regularly at their workplace:

Table 3: Popular NWRIU activities.

NWRIU Activity	% of respondents reporting regular usage
Personal emailing	79.7%
Online news viewing	78.6%
Instant messaging	77.1%
Random surfing	72.9%
Online viewing of journals/books and other publications	69.8%

### 4.3 Restrictions on NWRIU

Based on the data collected, it was noticed that the

online activities such as social networking, video sharing, music and audio sharing, online video/music entertainment and online gaming were activities that the respondents reported as they would like to engage in, but which were restricted by their organizations.

#### 4.4 Job Role and the Nature of NWRIU

Certain noteworthy variations were identified among the NWRIU patterns and the employee job roles, especially with respect to online activities such as presentation sharing, online forum participation and downloading software.

#### 4.5 Hypothesis Testing

Pearson correlation and Pearson partial correlation statistical models were used for the hypothesis testing. The findings of the research were partially consistent with the initial predictions which stated a positive effect of NWRIU on creativity stimulation. A positive effect of NWRIU was substantiated for creativity stimulation as a whole and for the dimensions: curiosity and exploration, collaboration and breaking down technical barriers as illustrated in Table 2.

Table 4: Hypothesis testing results.

H <sub>A</sub>	Sig. (2-tailed)	Correlation	H <sub>A</sub> Accepted
H1 <sub>A</sub>	0.265	0.081	False
H2 <sub>A</sub>	0.051	0.141	False
H3 <sub>A</sub>	0.003	0.215	True
H4 <sub>A</sub>	0.157	0.103	False
H5 <sub>A</sub>	0.002	0.221	True
H6 <sub>A</sub>	0.042	0.148	True
H7 <sub>A</sub>	0.001	0.243	True

## 5 DISCUSSION

The descriptive analysis conducted on NWRIU provided a brief exploration on the extent and the nature of NWRIU among the employees in the software companies. The findings indicated that personal emailing, online news viewing, instant messaging and random surfing were some of the frequently used online activities for non-work purposes at the workplace. Social networking, online music/video sharing and entertainment and online gaming on the other hand are some of the online activities that the respondents stated as they are

willing to use, but that they are unable to engage in them due to organizational restrictions. It is important to note that these online activities are mostly restricted by large scale software companies.

Nearly 40% of the respondents reported that their organizations have written policies that discourage the use of Internet for non-work purposes during work hours, even though Internet access was not technically restricted. However, irrespective of the employees' knowledge of these policies and practices, positive correlations were identified with NWRIU and certain creativity stimulation factors. Around 50% of the respondents reported personal use of Internet away from the workplace for more than 1 hour on a daily basis and even during the weekends. However, the range of online activities used was rather limited compared to the range of online activities used at the workplace where employees would spend the majority of their active time on a daily basis.

Based on the hypothesis testing that was carried out, hypothesis 3, hypothesis 5, hypothesis 6 and hypothesis 7 were substantiated. However, significant evidence was not present to reject the null hypothesis for the other hypotheses. Therefore, it was only confirmed that the following creativity stimulation dimensions were positively affected by NWRIU: curiosity and exploration, collaboration and breaking down technical barriers. Since hypothesis 7 was also substantiated, it was verified that NWRIU had a positive correlation with creativity stimulation as explained by the six dimensions that were modelled in the theoretical framework.

## 6 IMPLICATIONS FOR PRACTICE

Overall, the present research extends the literature in several ways and provides a number of implications for the management of software development companies. Since a statistically significant positive relationship was identified between NWRIU and creativity stimulation as a whole, it may be wise for the organizational management to conduct a review on current organizational policies and restrictions on the use of Internet for non-work purposes. For every restriction there needs to be a justifiable reason, i.e. privacy, security, legality, or productivity. Variations were identified between the job role of the employees and their nature of NWRIU. Therefore, it would be desirable for the

organizational management to distinguish between departments and employees based on the job roles, when policies and practices are defined for managing the use of organizational Internet resources.

Most survey respondents reported frequent use of online activities such as random surfing, online viewing of news and journals and downloading software, which are potentially curiosity driven and exploratory in nature. If restrictions on such online activities are placed on the employees' machines due to justifiable reasons such as security risks, it might be desirable for the management to provide separate server machines or commonly available public machines for the employees to engage in such online activities. However, if such facilities are provided, it would be wise for the organizational management to monitor them for potential abuse and misuse.

Employers can initiate online competitions (e.g. online gaming contests) in order to promote constructive NWRIU. Quarterly rewards can be provided for interesting and valuable serendipitous findings that employees may come across through their online explorations. It would be valuable for the organization to publish success stories on valuable serendipitous findings of the employees, in order to raise awareness among the other employees and to promote constructive NWRIU.

This research highlights the importance of online social media in promoting creative collaboration among the employees. However, it was identified that some of the useful online social media aspects such as online collaborative software and presentation sharing were rarely used by the employees. But instant messaging and personal emailing were reported by the respondents as frequently used. It would be wise for the organizational management to promote a broader awareness on online social media among their employees, since it has become one of the most commonly spoken topics nowadays. Thus, providing opportunities for employees to familiarize on online social media features through non-work related means might in fact be advantageous for a software development company. Moreover, this research substantiates a positive effect of NWRIU on breaking down technical barriers. Hence, software development companies may benefit from promoting competitions on exploring new online technologies.

Recognizing the potential success in stimulation of creativity, organizations may consider allowing certain amount of NWRIU in a workday instead of totally banning it. However, it should be noted that

employee creativity stimulation would mainly be beneficial for employees who engage in non-routine work, where there will be opportunities to introduce change and experiment with novel ideas. Since knowledge workers in the software industry have been considered for this research, it is reasonable to presume these employees engage in non-routine work. However, there may be exceptions and it would be wise for the organizational management to consider the nature of work of their employees while allowing for NWRIU at the workplace.

## 7 LIMITATIONS AND FUTURE RESEARCH

There are a few limitations in this research that provide opportunities for future studies. Firstly, as an initial exploration to validate the effect of NWRIU on creativity stimulation only six dimensions were considered for creativity stimulation in this research. The factors which have been considered in the research are identified through the literature survey, interviews and an initial exploratory study. Future research can examine and compare the effects on NWRIU on other creativity stimulation dimensions together with those suggested in this research to generate more implications for the academics and the employers. Secondly, it should be noted that the information obtained from respondents through interviews and questionnaires being self-reported data could be biased to some extent. Hence, it would pave the way for conducting further research with a focus on more quantitative data collection. Thirdly, only a brief review was conducted on the restrictions placed by software companies on certain online activities which are used for non-work purposes. However, future research can be conducted with a focus on a detailed analysis of such restrictions and their potential implications. Present research was mainly focused on NWRIU in general. However, the findings of this research indicated potential variations across the usage of different online activities and different job roles of the employees. Thus, it would be interesting to conduct future research on specific online activities used by employees working on different job roles for non-work purposes. Such extended research would provide deeper insights on the potential implications of the noted variations. The scope of this research was the Sri Lankan software industry; while findings are useful in a wider context, it would still be



worthwhile to extend the study to different geographies and cultures.

## 8 CONCLUSIONS

The findings of this research indicated statistically significant positive effects of NWRIU on creativity stimulation factors such as curiosity and exploration, collaboration, breaking down technical barriers and creativity stimulation as a whole. The findings of the research were consistent with some of the previous studies on similar areas of research. The research results verified Shoshani and Hazi's (2007) findings which stated that multiculturalism, exposure to creative people and breaking down technical barriers were positively influenced by the use of Internet. In the present research factors such as exposure to creative people and multiculturalism were considered through the variable dimension – collaboration. The present research findings were also parallel to the results of the large scale survey carried out by Madden (2004), which found out that internet has greatly improved connections between artists, art communities and audiences enabling creative collaboration. Thus, the present research findings confirmed a similar finding with respect to the employees in the software development companies on the effect of NWRIU in enabling creative collaboration.

This research provides a conclusion that NWRIU positively affects employee creativity stimulation in the software industry. With the growing interest in effective approaches to manage NWRIU, the present research and its findings provide valuable insights to both academics and employers of software organizations. Several recommendations have been proposed by this research for the management of software development companies. Therefore, it would be desirable for managers to carefully weigh the costs and the long-term benefits of designing policies and tactics to manage NWRIU at the workplace, in view of the potential positive effects such as creativity stimulation.

## ACKNOWLEDGEMENTS

The authors wish to acknowledge the support provided by the University of Moratuwa and the LK Domain Registry for this work.

## REFERENCES

- Adams, K., 2005. The Sources of Innovation and Creativity, *A Paper Commissioned by the National Center on Education and the Economy for the New Commission on the Skills of the American Workforce*, [online]. Available at: <[http://www.skillscommission.org/pdf/commissioned\\_papers/Sources%20of%20Innovation%20and%20Creativity.pdf](http://www.skillscommission.org/pdf/commissioned_papers/Sources%20of%20Innovation%20and%20Creativity.pdf)> [Accessed 8 May 2010].
- Amabile, T. M., 1997. Motivating Creativity in Organizations: On Doing What You Love and Loving What You Do. *California Management Review*, 40(1), pp.39-58.
- Anandarajan, M. and Simmers, C., 2004. *Personal web usage in the workplace: A guide to effective human resource management*. Hershey, PA: Information Science Publishing.
- Batey, M. and Furnham, A., 2006. Creativity, intelligence and personality: A critical review of the scattered literature. *Genetic, Social, and General Psychology Monographs*, 132, pp.355-429.
- Batey, M., Furnham, A. F. and Safiullina, X., 2010. Intelligence, General Knowledge and Personality as Predictors of Creativity. *Learning and Individual Differences*, 20, pp.532-535.
- Block, W., 2001. Cyberslacking, business ethics and managerial economics. *Journal of Business Ethics*, 33(3), pp.225-231.
- Bock, G. and Ling Ho, S., 2009. Non-Work Related Computing (NWRC). *Communications of the ACM*, 52(4), pp.124-128.
- Boden, M., 1993. *The Creative Mind*. London: Abacus.
- Cameron k. and Quinn R., 1999. *Diagnosing and changing organizational culture*. San Francisco: Jossey-Bass.
- Creativity at Work, 2006. *Creativity at Work: Articles & Tips*. [online] Available at: <[http://www.creativityatwork.com/articlesContent/what\\_is.htm](http://www.creativityatwork.com/articlesContent/what_is.htm)> [Accessed 30 April 2010].
- Csikszentmihalyi, M., 1996. *Creativity: Flow and the psychology of discovery and invention*. New York: Harper Perennial.
- Csikszentmihalyi, M., 2009. *A systems perspective on creativity and its implications for measurement*. [online] European Commission. Available at: <<http://ec.europa.eu/education/lifelong-learning-policy/doc/creativity/report/system.pdf>> [Accessed 12 February 2010].
- Damanpour, F., 1991. Organizational innovation: a meta-analysis of effects of determinants and moderators. *The Academy of Management Journal*, 34(3), pp.555-590.
- Eriksen, M. and Beauvais, L.L., 2000. Team diversity, cognition, and creativity. In: M. M. Beyerlein, ed. 2000. *Team Development*. New York: Elsevier Science Inc., pp. 53-78.
- Greenfield, D. N. and Davis, R. A., 2002. Lost in cyberspace: The web @ work. *CyberPsychology and Behavior*, 5(4), pp.347-353.

- Isaksen, S.G., 1987. *Frontiers of Creativity Research: Beyond the basics*. New York: Bearly Limited in Buffalo.
- John-Steiner, V., 2000. *Creative Collaboration*. Oxford, UK: Oxford University Press.
- Lim, V. K. G., 2002. The IT way of loafing on the job: Cyberloafing, neutralizing and organizational justice. *Journal of Organizational Behavior*, 23, pp.675–694.
- Madden, M., 2004. *Artists, Musicians and the Internet*. [online] Pew Internet & American Life Project. Available at:<  
[http://www.pewinternet.org/~media/Files/Reports/2004/PIP\\_Artists.Musicians\\_Report.pdf.pdf](http://www.pewinternet.org/~media/Files/Reports/2004/PIP_Artists.Musicians_Report.pdf.pdf) > [Accessed 24 January 2010].
- Marshall, G., 2001. Creativity, Imagination and the World-Wide Web. *Educational Technology & Society*, 4(2), pp.91-96.
- Morris, W., 2005. *A Survey of Organisational Creativity*. [online] Jeffrey Paul Baumgartner Group. Available at:<  
<http://www.jpb.com/creative/OrganisationalCreativity.Morris.pdf>> [Accessed 1 May 2010].
- Myers I.B., 1995. *Gifts Differing: Understanding Personality Type*. California: Davies-Black Publishing.
- Oravec, J.A., 2002. Constructive approaches to Internet recreation in the workplace. *Communications of the ACM*, 45(1), pp.60-63.
- Osborn, A. F., 1991. *Applied Imagination*. New York: Creative Education Foundation, Motorola University Press.
- Oswalt,B., Elliott-Howard, F. and Austin, S. F., 2003. *Cyberslacking – Legal And Ethical Issues Facing It Managers*. [online] International Association for Computer Information Systems. Available at:<[http://www.iacis.org/iis/2003\\_iis/PDFfiles/OswaltElliott-Howard.pdf](http://www.iacis.org/iis/2003_iis/PDFfiles/OswaltElliott-Howard.pdf)> [Accessed 23 December 2009].
- Robinson, A.G. and Stern, S., 1997. Corporate Creativity: It's Not What You Expect. *Innovative Leader*, 6(10), pp.17-25.
- Shoshani, Y. and Hazi, R. B., 2007. The Use of the Internet Environment for Enhancing Creativity. *Educational Media International*, 44(11), pp.17-32.
- SLICTA, 2007. *Rising Demand: The increasing demand for IT workers spells a challenging opportunity or the IT industry*. [online] Information and Communication Technology Agency. Available at:<[www.icta.lk/pdf/ICTWorkforcSurvey2007.pdf](http://www.icta.lk/pdf/ICTWorkforcSurvey2007.pdf)> [Accessed 10 May 2010].
- Stanton, J. M., 2002. Company profile of the frequent Internet user. *Communications of the ACM*, 45(1), pp.55–59.
- Stephens, K., 2004. *20 Ways to Encourage Children's Resourcefulness and Creativity*. [online] Exchange Press. Available at:<[http://www.childcareexchange.com/resources/view\\_article.php?article\\_id=5017500&keyword\\_id=119](http://www.childcareexchange.com/resources/view_article.php?article_id=5017500&keyword_id=119)> [Accessed 1 May 2010].
- Ugrina, J. C., Pearson, J. M. and Odom, M. D., 2007. Profiling Cyber-Slackers in the Workplace: Demographic, Cultural, and Workplace Factors. *Journal of Internet Commerce*, 6(3), pp.75-89.