SINGAPORE COMPUTER SOCIETY
INFOCOMM SURVEY 2011/2012

EXECUTIVE SUMMARY

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1. EXECUTIVE SUMMARY

This is the third Infocomm Technology Survey conducted by The Singapore Computer Society. The objective of this annual SCS ICT Survey is to understand the needs and issues of infocomm professionals in Singapore. The survey serves as a guide for SCS, relevant government agencies and organizations to shape ICT policies and strategies in Singapore.

This executive summary presents the key highlights of the SCS ICT Survey 2011. The following chapters will provide:
- The detailed discussion of the key findings of the survey and their implications;
- Survey methodology; and
- Detailed tabulated and graphed results that support the key findings and the implications arising from these findings.

1.1. Methodology

The sample of the SCS ICT survey comprises ICT professionals and ICT students. Data was collected via a web survey conducted between November 2011 and January 2012. The survey questions covered areas such as attraction, retention, detraction, meaning of ICT work, job satisfaction, turnover and turnaway. All survey questions were based on validated measures identified through a comprehensive review of the existing ICT literature.

We obtained 925 usable responses from ICT professionals and 1,354 usable responses from ICT students.

Profile of ICT Professional Respondents

The profile of ICT professional respondents is consistent with the Infocomm Development Authority's Annual Infocomm Manpower Survey, 2010. The responding ICT professionals are mostly males (76%; females 24%) and 40 years old and younger (61%).

In addition, the majority of responding ICT professionals have attained a bachelor's degree or higher (94%; diploma and below 6%). ICT professionals tend to be married (70%; singles 30%) and are Singapore Citizens (76%; PRs and non-citizens 24%). About a third (36%) of the ICT professionals surveyed report earning more than $100,000 per annum.

The ICT professionals work in multinational corporations (37%), Government & Statutory Boards (29%), start-ups/small-medium enterprises (15%), large local organizations (13%) and the remaining (6%) in non-profit and other types of organizations. The ICT professionals in this survey were sampled from in-house ICT job roles providing ICT services to other departments within their organizations (i.e. in the internal ICT department, 53%) and from external ICT job roles providing/selling/marketing ICT services to external organizations (i.e. ICT vendor services, 47%). ICT professionals in this survey held jobs in project management (27%), ICT management (including CIO, 17%), ICT service job roles (15%), software development (13%) and other ICT job roles (28%).

Profile of ICT Student Respondents

The ICT student respondents are 20 years old and younger (57%; 21 years or older 43%); male (66%; female 34%); pursuing an IT-related diploma or other non-degree certification (66%; bachelor's degree and higher 34%); and Singapore Citizens (85%; PR and non-citizens 15%).

1.2. Summary of Major Results

Attraction, Retention & Detraction
Both ICT professionals and students consistently ranked the following as the most important factors in attracting and keeping them in the ICT profession:
- o Salaries in the ICT profession compared to salaries in other occupations
- o Opportunities for career advancement
- o Need to do meaningful work
- o Fit with personality

Table 1 - Attraction, Retention & Detraction

Rank	ICT Professionals			ICT Students
	Top Reasons that Attract	Top Reasons that Retain	Top Reasons that Detract	Top Reasons that Attract
1	Salary compared to those in other occupations	Salary compared to those in other occupations	Need for a Balanced Lifestyle	Salary compared to those in other occupations
2	Opportunities for Career Advancement	Fit with Personality	Opportunities for Career Advancement	Fit with Personality
3	Fit with Personality	Opportunities for Career Advancement	Salary compared to those in other occupations	Opportunities for Career Advancement
4	Need to do Meaningful Work	Need to do Meaningful Work	Need to do Meaningful Work	Need for a Balanced Lifestyle
5	Demand for ICT Jobs	The opportunity to do broad / varied work	Demand for ICT Jobs	Need to do Meaningful Work

Meaningful ICT Work
- a. For both ICT professionals and students, meaningful ICT work is characterized primarily as:
  - o having many opportunities to learn and develop oneself;
  - o deriving a great sense of achievement from ICT work;
  - o working on things that they are passionate about.

Table 2 – Meaningful ICT Work

Rank	ICT Professionals		ICT Students
	Characteristics	Characteristics of Meaningful ICT Work that are Attained at Work	Characteristics
1	I have many opportunities to learn and develop myself.	I develop close relationships with the varied people I work with.	I have many opportunities to learn and develop myself.
2	I derive a great sense of achievement from my work.	I can leverage on my knowledge and skills.	I derive a great sense of achievement from my work.
3	I can create something of value through my work, which impacts my organization and its clients.	My work benefits my colleagues and users by making their work easier.	I can work with new / the latest technologies.
4	I can leverage on my knowledge and skills.	I can create something of value through my work, which impacts my organization and its clients.	I get to work on things I am passionate about.
5	I get to work on things I am passionate about.	I can exercise my own judgments and decisions on how I do my work.	My work is appreciated by others.

b. 78% of ICT professionals surveyed report that their ICT work is meaningful. ICT professionals describe that their ICT work offers:
    o   development of close relationships at work;
    o   ability to leverage their knowledge and skills;
    o   ability to undertake work that benefits and has value for others; and
    o   autonomy in what they do.

Satisfaction with ICT Career

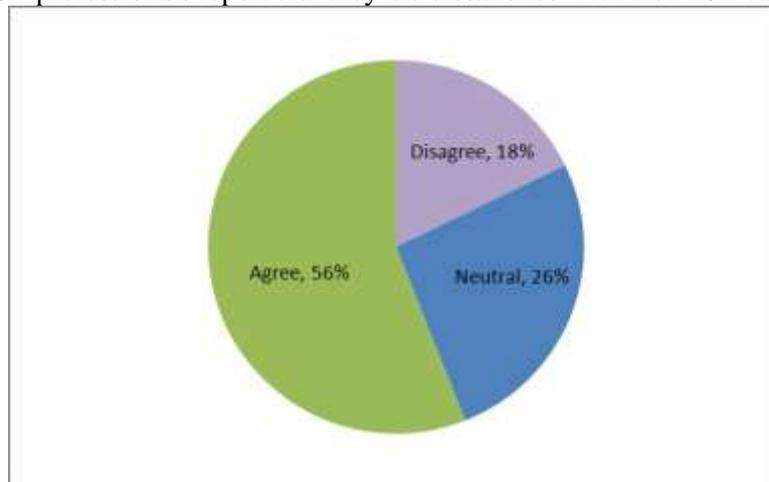a. 18% of ICT professionals report that they are dissatisfied with their ICT careers.

Figure 1 – Satisfaction with ICT Career

b. ICT professionals' career satisfaction differs across sectors/domains. More ICT professionals in the finance sector/domain (76%) report being satisfied with their ICT careers compared to ICT professionals in other sectors/domains. The public sector/domain report the lowest proportions of ICT professionals satisfied with their ICT careers.
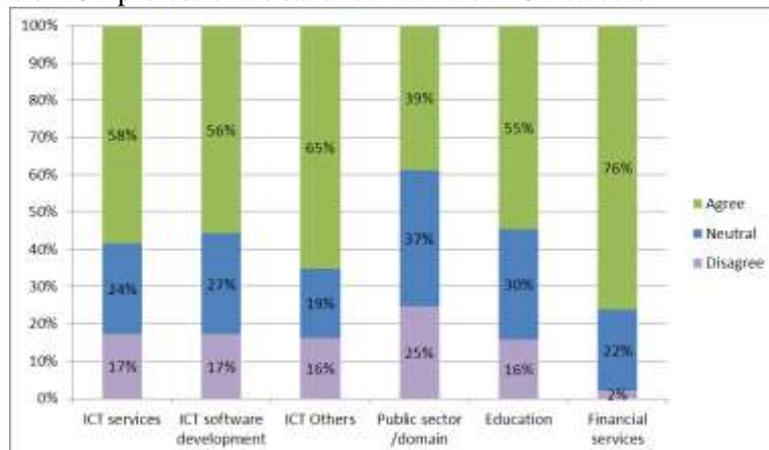
Figure 2 – Satisfaction with ICT Career by Sector/Domain

c. ICT professionals' career satisfaction differs across organization type. More ICT professionals in start-ups/small-medium enterprises (66%) and MNCs (62%) report being satisfied with their ICT careers compared to ICT professionals in large local organizations (47%).
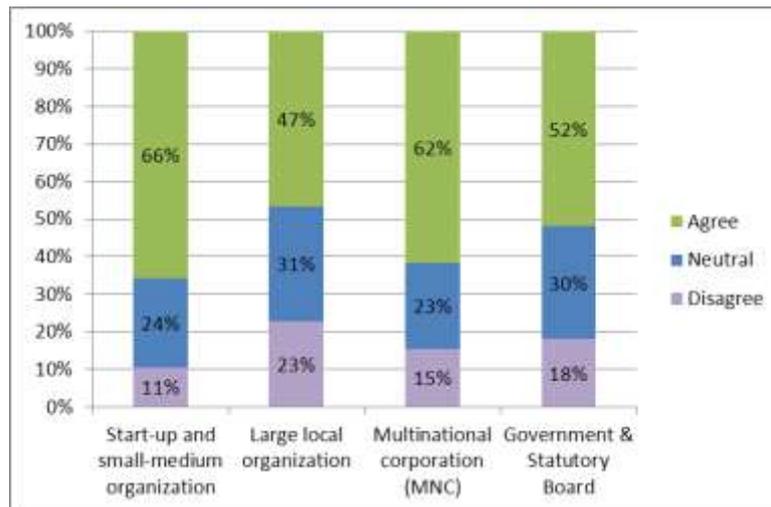
Figure 3 – Satisfaction with ICT Career by Organization Type

d. ICT professionals working in internal (i.e. providing ICT services to other departments within their organizations) versus external (i.e. providing/selling/marketing ICT services to external organizations) job roles do not differ much in terms of career satisfaction.
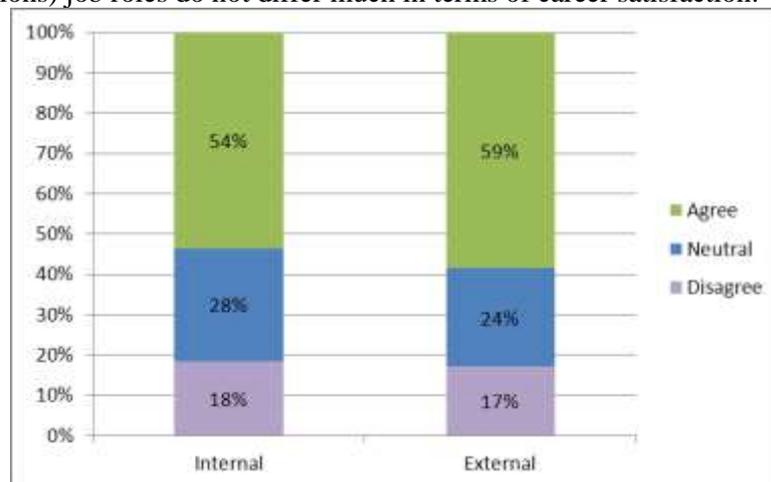

Figure 4 – Satisfaction with ICT Career by Provision of ICT Services

e. ICT professionals' career satisfaction generally increases with tenure in the ICT profession, with the exception of those with 4-7 years of ICT tenure (61%); the highest career satisfaction is report by ICT professionals with ICT tenure of 16 years and above (62%).
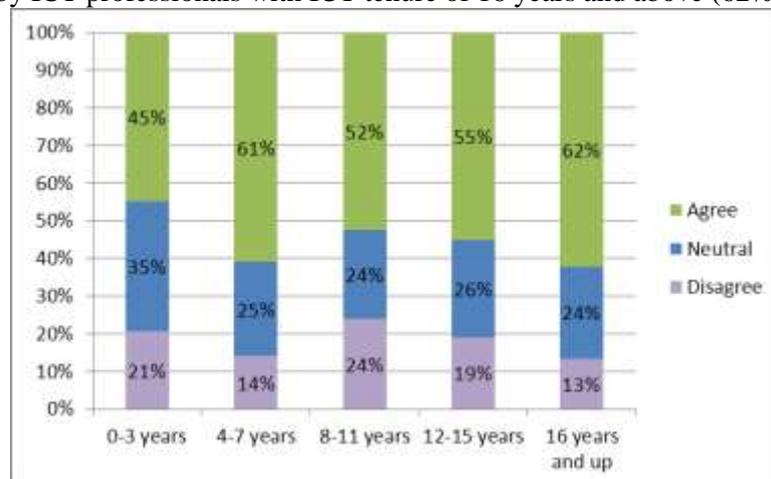

Figure 5 – Satisfaction with ICT Career by Tenure in the ICT Profession

Job Satisfaction

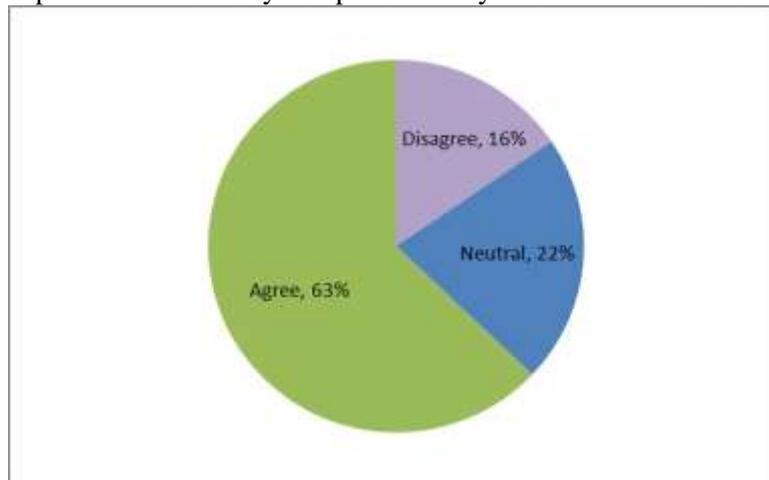a. 16% of ICT professionals surveyed report that they are dissatisfied with their job.

Figure 6 - Job Satisfaction

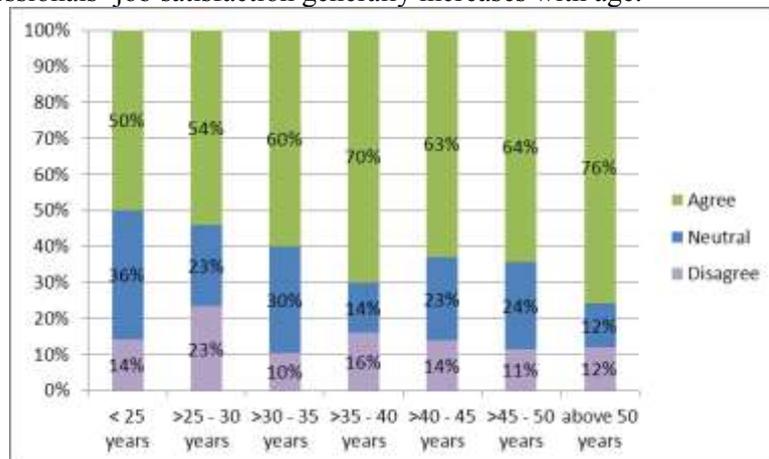b. ICT professionals' job satisfaction generally increases with age.

Figure 7 - Job Satisfaction by Age

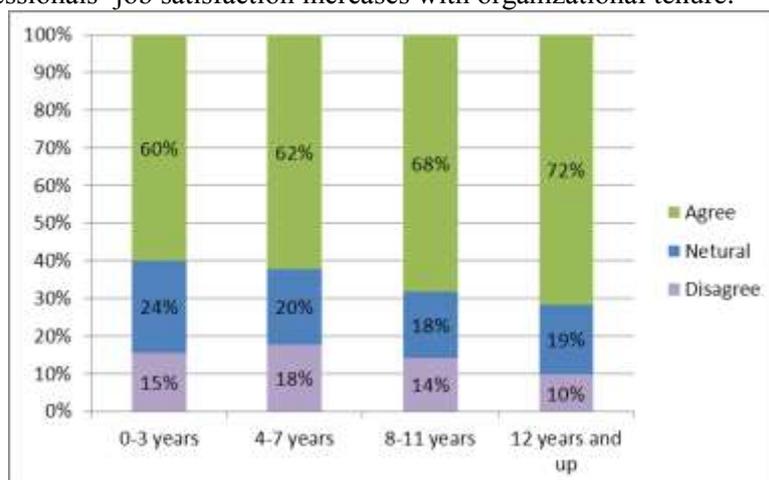c. ICT professionals' job satisfaction increases with organizational tenure.

Figure 8 - Job Satisfaction by Organizational Tenure

d. ICT professionals' job satisfaction differs across organization type. More ICT professionals in Government & Statutory Boards (67%) and start-ups/small-medium enterprises (67%) report being satisfied in their jobs compared to ICT professionals in large local organizations (58%).
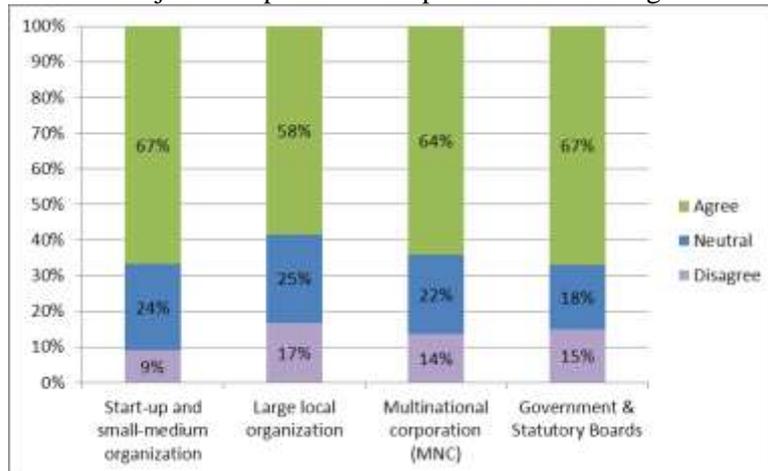

Figure 9 - Job Satisfaction by Organization Type

e. ICT professionals working in internal (i.e. providing ICT services to other departments within their organizations) versus external (i.e. providing/selling/marketing ICT services to external organizations) job roles do not differ much in terms of job satisfaction.
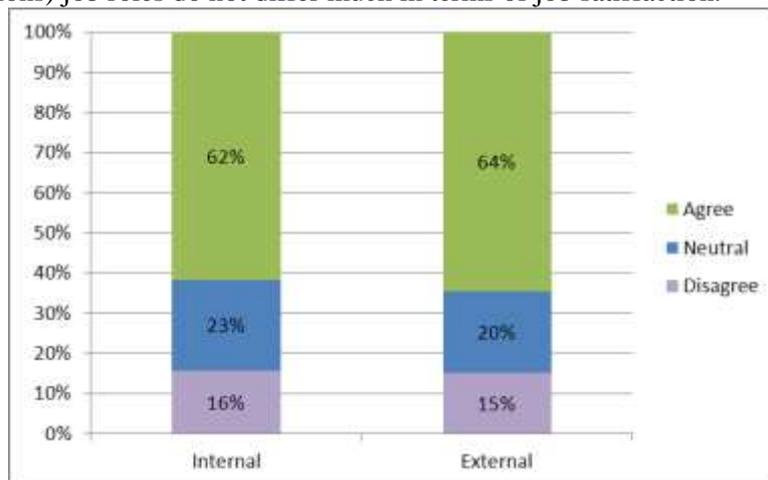

Figure 10 – Satisfaction with ICT Career by Provision of ICT Services

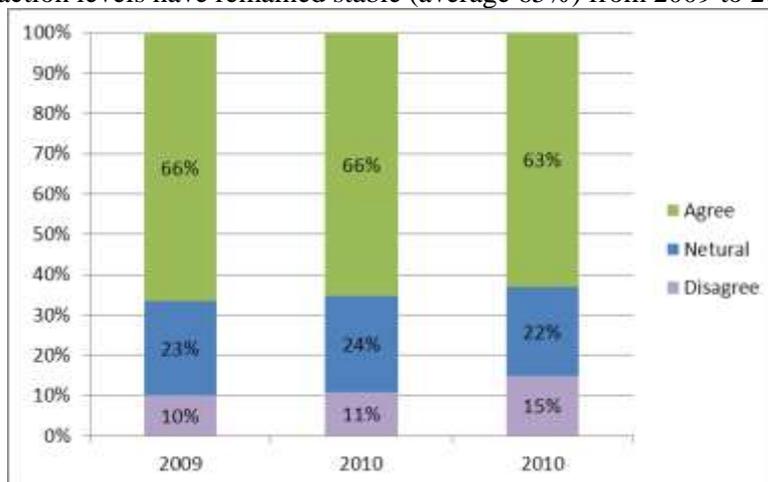f. Job satisfaction levels have remained stable (average 65%) from 2009 to 2011.

Figure 11 - Job Satisfaction (2009 – 2011)

Turnover and Turnaway

a. 32% of ICT professionals surveyed report intentions of leaving their current organization/employer.
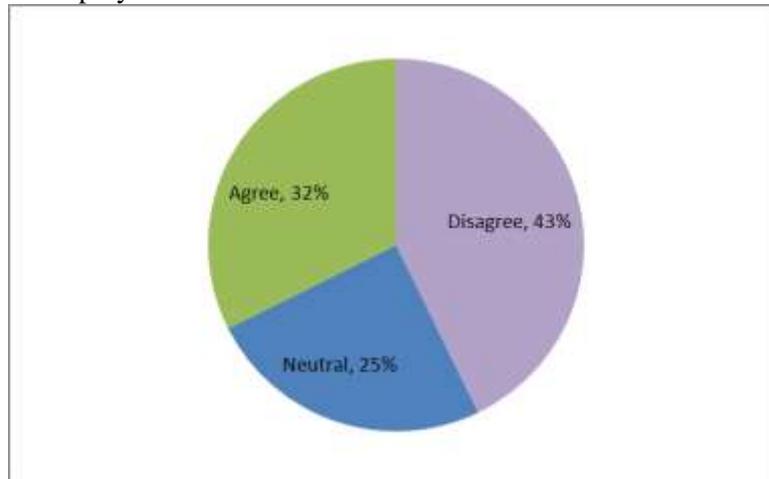

Figure 12 – Turnover Intention

b. ICT professionals with 4-7 years of organizational tenure are at higher risk of turnover (41%) compared to the other groups.
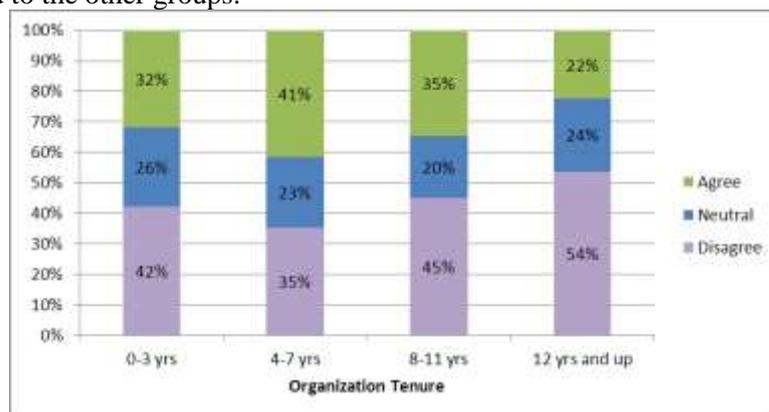

Figure 13 – Turnover Intention by Organizational Tenure

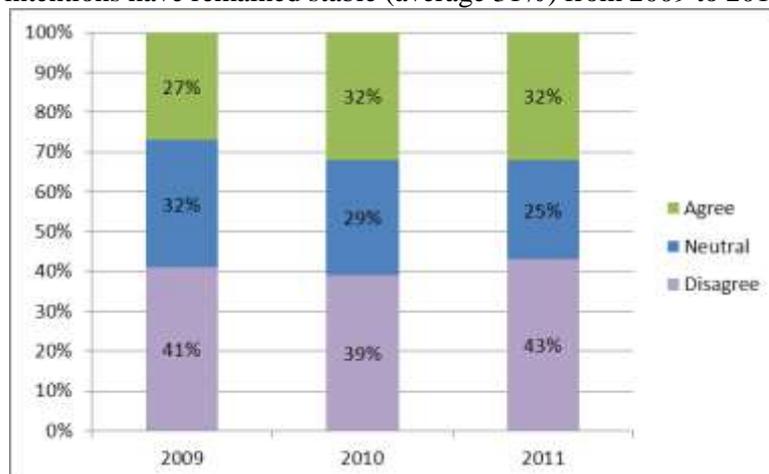c. Turnover intentions have remained stable (average 31%) from 2009 to 2011.

Figure 14 – Turnover Intention (2009-2011)

d. ICT professionals who find their work meaningful also hold lower intentions to turnover. Of the ICT professionals who find work meaningful, about 3 in 10 (29%) intend to turnover. Comparatively, of the ICT professionals who do not find work meaningful, about 1 in 2 (55%) intend to turnover.
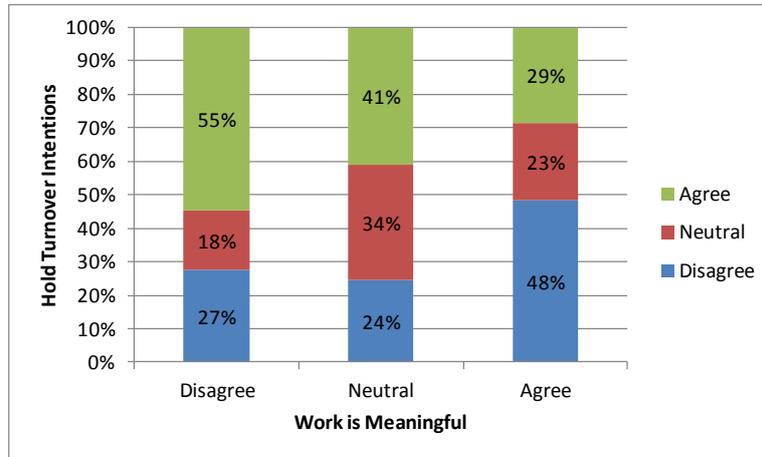

Figure 15 – Turnover Intention by Meaningful Work

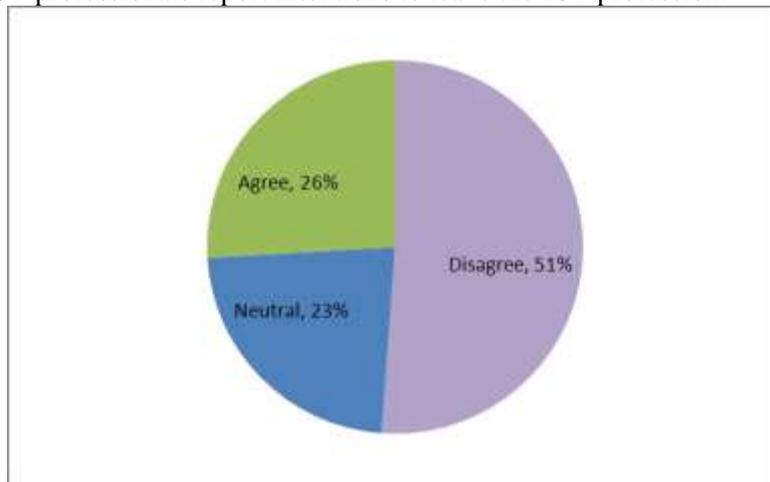e. 26% of ICT professionals report intentions to leave the ICT profession.

Figure 16 – Turnaway Intentions

f. ICT professionals with 12-15 years of experience are at higher risk of turnaway (31%) compared to the rest.
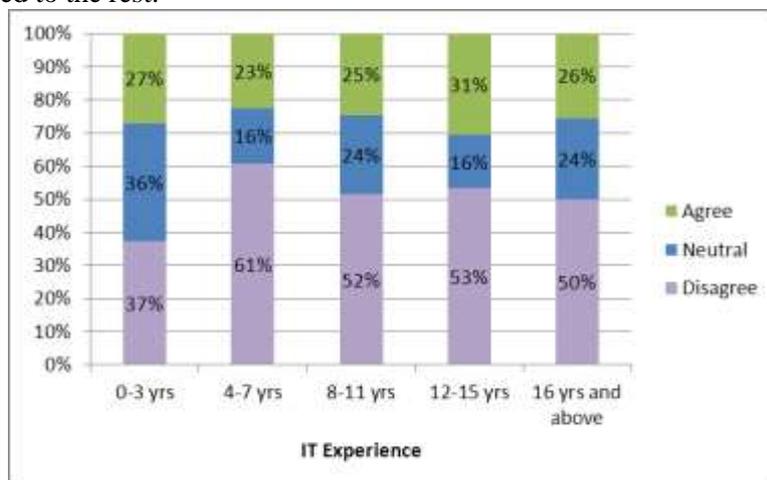

Figure 17 – Turnaway Intentions by ICT Experience

g. Turnaway intentions have remained stable (average 23%) from 2009 to 2011.
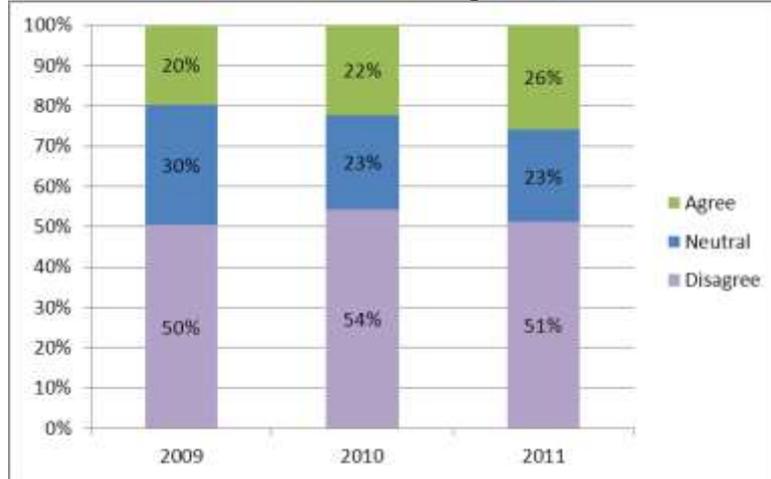

Figure 18 – Turnaway Intention (2009-2011)

h. ICT professionals who find work meaningful also hold lower intentions to turnaway from the ICT profession. Of the ICT professionals who find work meaningful, about 1 in 5 (21%) intend to turnaway. Comparatively, of the ICT professionals who do not find work meaningful, about 3 in 5 (58%) intend to turnaway.
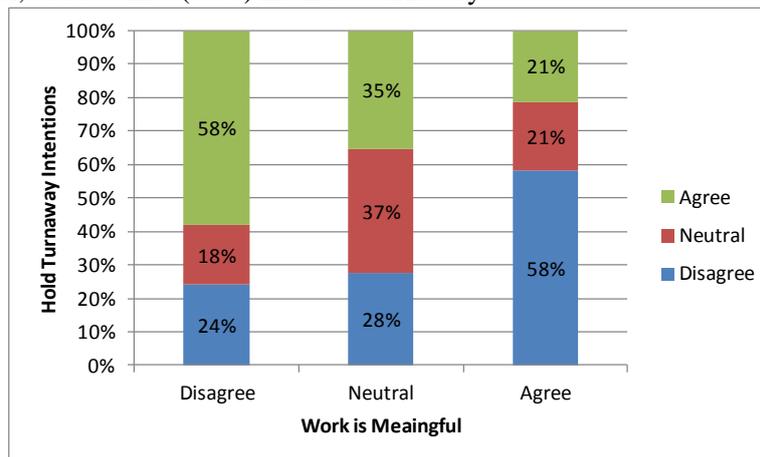

Figure 19 – Turnover Intention by Meaningful Work

Organizational and Professional Commitment
a. 55% of ICT professionals surveyed report that they remain committed to their organizations.
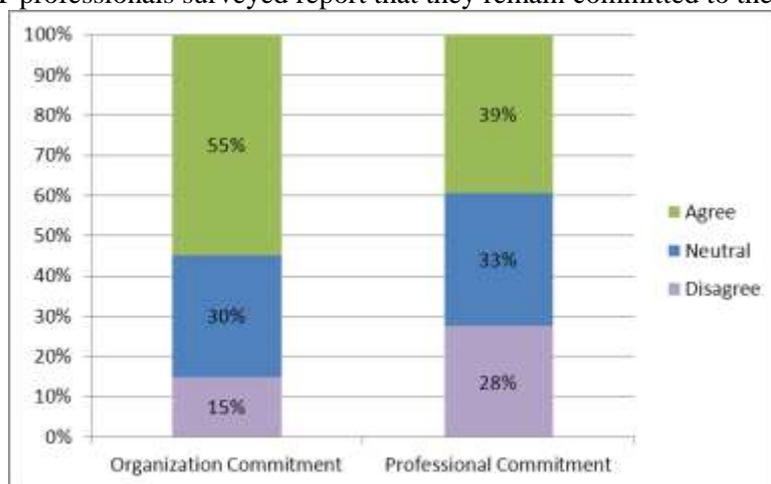b. 39% of ICT professionals surveyed report that they remain committed to the ICT profession.

Figure 20 – Organizational and Professional Engagement

Engagement – Say, Strive and Stay
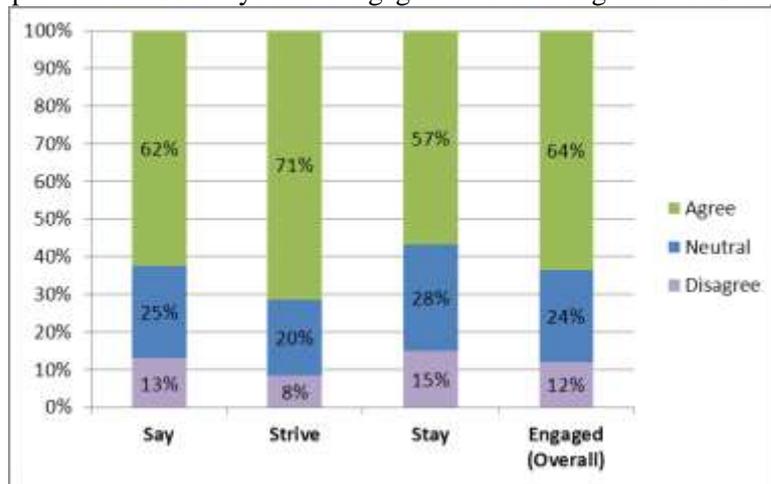   a. 64% of ICT professionals surveyed feel engaged with their organizations/employers.

Figure 21 – Engagement (Say, Strive, Stay)

   b. About 3 in 5 ICT professionals (Say: 62%) report that they speak positively about their organization to others.

   c. About 7 in 10 ICT professionals (Strive: 71%) report that they are willing to do the utmost for their organization.

   d. About 3 in 5 ICT professionals (Stay: 57%) report the desire to continue their employment relationship.

   e. Fewer ICT professionals below the age of 30 perceive that they engage with their organizations/employers, compared to older ICT professionals, especially those above the age of 50.
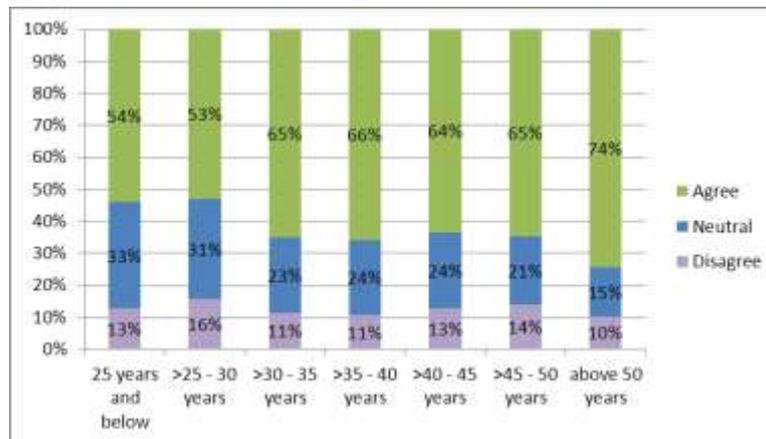

Figure 22 – Engagement (Say, Strive, Stay) by Age

   f. ICT professionals earning $50,000 or less, report lower levels of engagement compared to ICT professionals earning more than $50,000. ICT professionals earning $125,000 and more, report higher levels of engagement compared to ICT professionals earning less than $125,000.
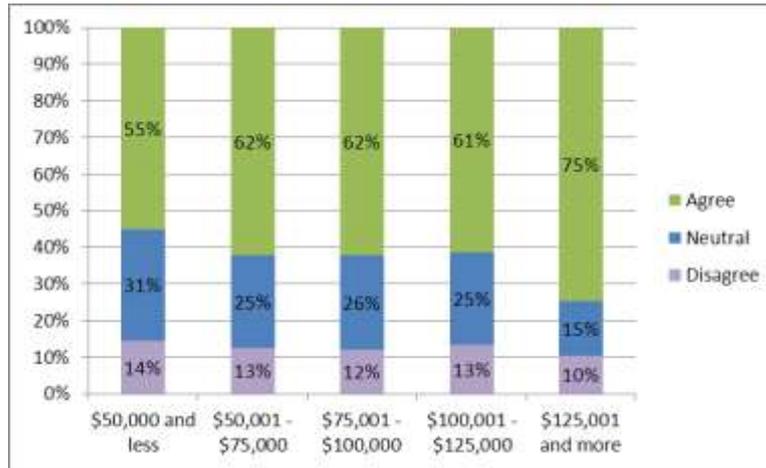
Figure 23 – Engagement (Say, Strive, Stay) by Annual Gross Salary

g. ICT professionals in start-ups/small-medium enterprises (70%) and multinational corporations (68%) report higher levels of engagement compared to ICT professionals other types of organizations.
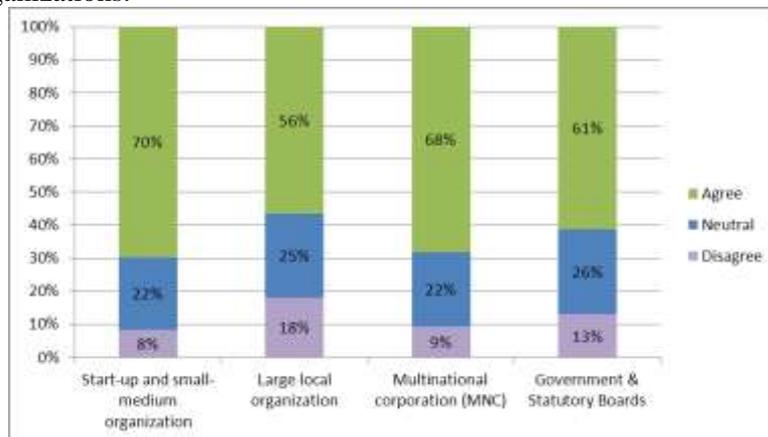
Figure 24 – Engagement (Say, Strive, Stay) by Organization Type

h. ICT professionals who are engaged with their organizations also hold lower turnover intentions. Of the ICT professionals are engaged with their organizations, about 1 in 5 (22%) intend to turnover. Comparatively, about 2 in 3 (64%) of the ICT professionals who are not engaged with their organizations intend to turnover.

Figure 25 – Engagement (Say, Strive, Stay) by Turnover Intentions

i. ICT professionals who are engaged are also hold lower turnaway intentions. Of the ICT professionals are engaged with their organizations, about 1 in 5 intend to turnaway from the ICT profe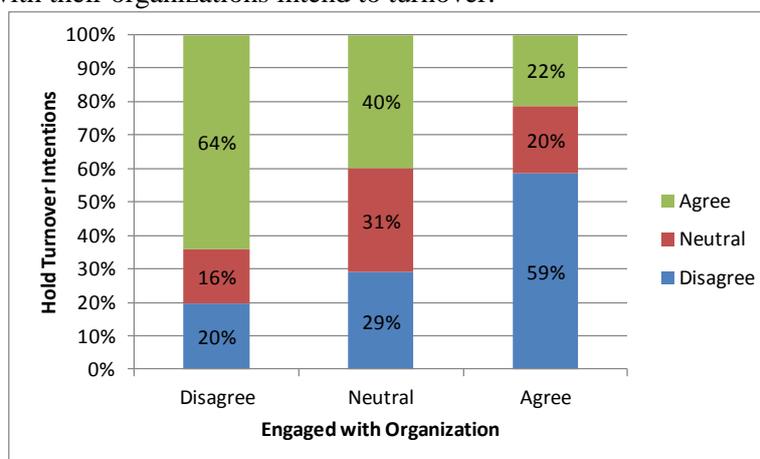ssion. Comparatively, about 1 in 2 ICT professionals who are not engaged with their employers intend to turnaway from IT.
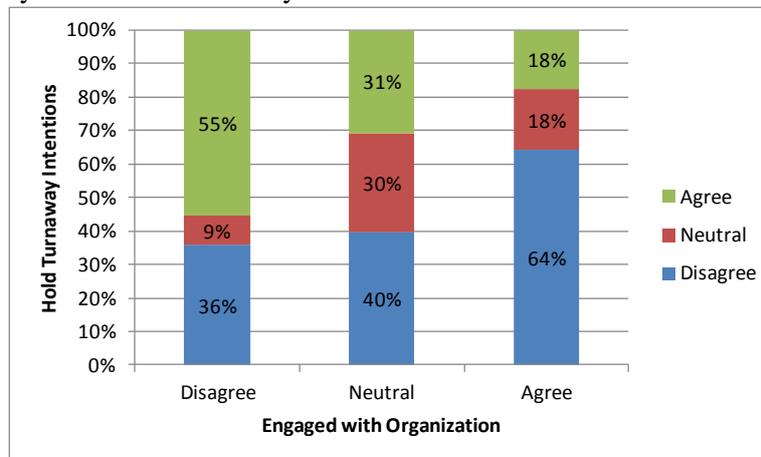
Figure 26 – Engagement (Say, Strive, Stay) by Turnaway Intentions

Prosocial Behaviors

a. Prosocial behavior[1] refers to ICT professionals' willingness to go beyond what is required explicitly by their job, and engage in discretionary voluntary actions that benefit others in their organization and the profession. Specifically, "voice" refers to ICT professionals' willingness to speak up to give constructive suggestions for change and innovation, while "helping" refers to ICT professionals' willingness to go beyond their explicit job requirements and help others with their work or work-related activities.

b. 65% of ICT professionals surveyed report having constructively expressed their opinions and suggestions in their organizations.

c. 74% of ICT professionals report helping others in their organizations.

Figure 27 – Prosocial Behaviors in Organization

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[1] Penner, Louis A., John F. Dovidio, Jane A. Piliavin, and David A. Schroeder. (2005). Prosocial Behavior: Multilevel Perspectives. Annual Review of Psychology (56) pp. 365-392.

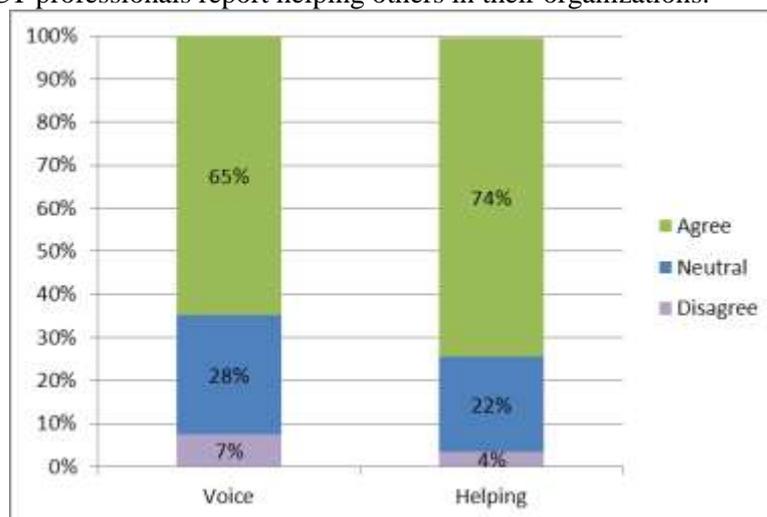d. ICT professionals who find work meaningful also report prosocial behaviours. Of the ICT professionals find work meaningful, 3 in 5 (63%) report prosocial behaviours. Comparatively, of the ICT professionals who do not find work meaningful, about 2 in 5 (16%) report prosocial behaviours.
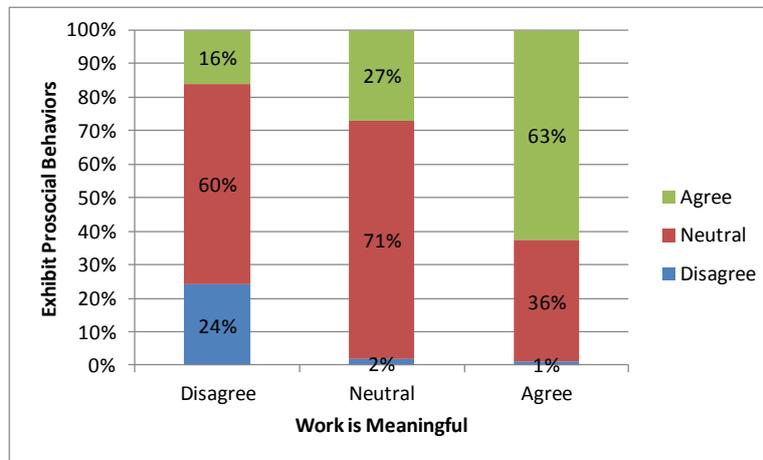
Figure 28 – ICT Professionals' Prosocial Behaviours by Meaningful Work

e. ICT professionals who are engaged with their organizations are also more likely to exhibit prosocial behaviours. Of the ICT professionals are engaged with their organizations, 4 in 5 (81%) report prosocial behaviours. Comparatively, of the ICT professionals who are not engaged with their organizations, about 1 in 5 (23%) report prosocial behaviours.
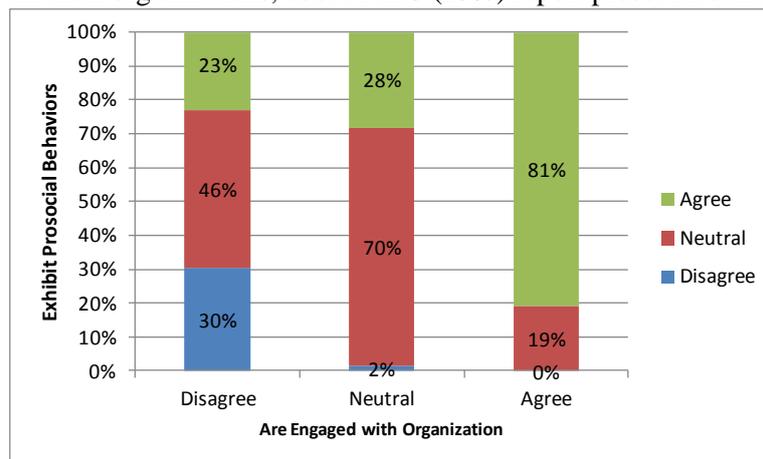
Figure 29 – ICT Professionals' Prosocial Behaviours by Engagement Level

f. 53% of ICT professionals report having constructively expressed their opinions and suggestions concerning the ICT profession. Less than 1 in 2 ICT students (46%) report having constructively expressed their opinions and suggestions concerning the ICT profession.

g. 40% of ICT professionals report helping others in the ICT community. About 1 in 3 ICT students (32%) report helping others in the ICT community.
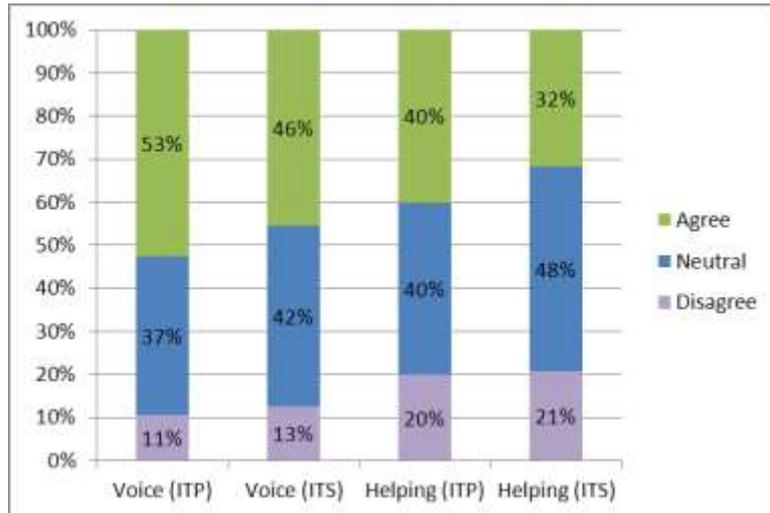
Figure 30 – Prosocial Behaviors of ICT Professionals and Students in the ICT Community

h. ICT professionals who are prosocial with respect to the ICT community also hold lower turnaway intentions from the ICT profession. Of the prosocial ICT professionals, about 1 in 5 (23%) intend to turnaway. Comparatively, of the ICT professionals who are less prosocial, about 1 in 3 (35%) intend to turnaway.
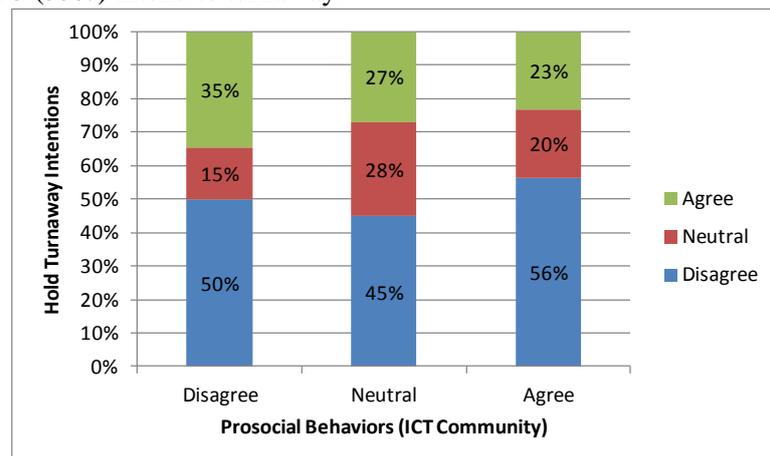
Figure 31 – Turnaway Intentions of IT Professionals by Prosocial Behaviors in the ICT Community

i. More ICT students in postgraduate (61%) and in undergraduate (59%) programme report having constructively expressed their opinions and suggestions concerning the ICT profession compared to the proportion of ICT in diploma and other programmes (47%).
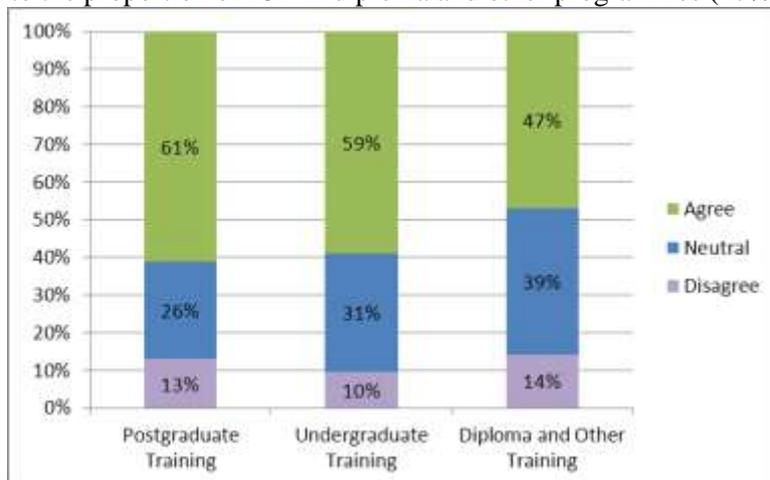
Figure 32 – ICT Students' Prosocial Voice in the ICT Community By Education Level

The ICT Profession as a Calling and ICT Identity

a. 48% of ICT professionals surveyed perceive working in the ICT profession as their calling in life. About 40% of ICT students perceive working in the ICT profession as their calling in life.
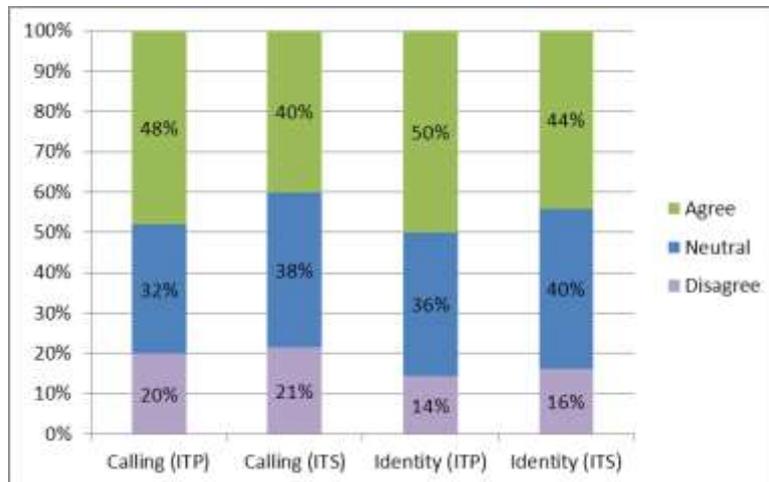
Figure 33 – Calling and Identity of ICT Professionals and Students

b. 50% of ICT professionals and 44% of ICT students identify with the ICT profession.

c. More ICT students in postgraduate and undergraduate programmes report ICT as their calling in life (Postgraduate: 63%; Undergraduate: 48%) and identify themselves with the ICT profession (Postgraduate: 54%; Undergraduate: 53%) compared to ICT students in diploma or other educational programmes (Calling: 34%; Identity: 39%).
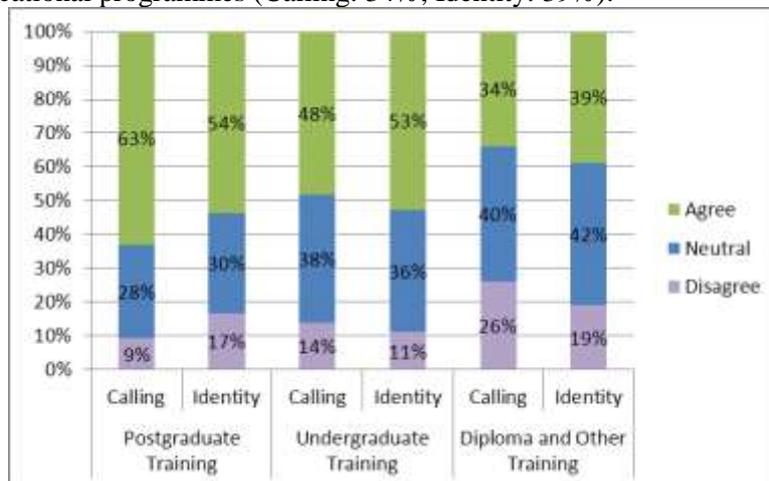
Figure 34 – Calling and Identity of ICT Students by Education Level

Competency Requirements in the ICT Profession

a. ICT professionals report that the skills most needed in their current job are intrapersonal (27%), technical (26%) and interpersonal (24%) skills.

b. The skills most needed for progression to the next level are interpersonal (40%) and business (26%) skills.

Figure 35 – Skills Required

Training Satisfaction

a. 13% of ICT students surveyed report dissatisfaction with their ICT training at their institutes of higher learning.

Figure 36 – Training Satisfaction

b. More undergraduates in ICT programmes report satisfaction with their ICT training compared to ICT students in diploma or other programmes.

Figure 37 – Training Satisfaction By Education Level

Job Preferences
a. Both ICT professionals and students prefer to be employed by multinational corporations.

Table 3 - Job Preferences by Organization Type

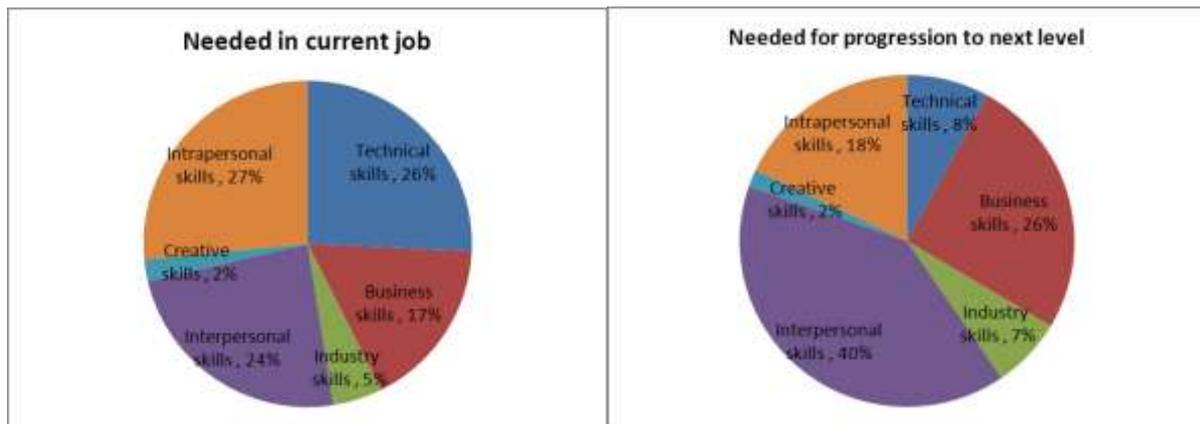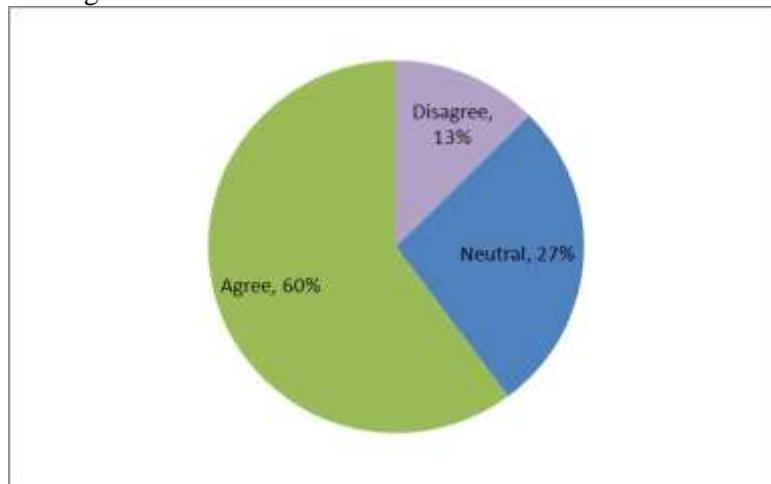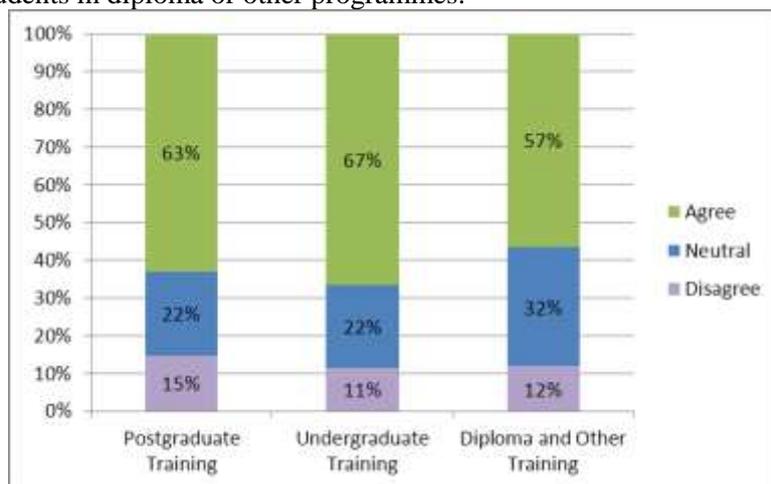| Rank	ICT Professionals Current Employment	ICT Professionals Preferred Employment	ICT Students Preferred Employment
1	Multinational Corporations (37%)	Multinational Corporations (56%)	Multinational Corporations (38%)
2	Government & Statutory Boards (29%)	Government & Statutory Boards (19%)	Start-ups/Small-Medium Enterprises (29%)
3	Start-ups/Small-Medium Enterprises (15%)	Start-ups/Small-Medium Enterprises (13%)	Government & Statutory Boards (17%)
4	Large Local Organizations (13%)	Large Local Organizations (6%)	Large Local Organizations (11%)
5	Non-Profit & Others (6%)	Non-Profit & Others (6%)	Non-Profit & Others (5%)

b. Working in the Financial sector/domain is no longer the top preference of ICT professionals and ICT students. The sector/domain most preferred by ICT professionals is ICT services. ICT students prefer working in ICT software development.

Table 4 - Job Preferences by Sector/Domain

Rank	ICT Professionals Current Job	ICT Professionals Preferred Jobs	ICT Students Preferred Jobs
1	ICT Services (27%)	ICT Services (20%)	ICT Software Development (17%)
2	ICT Software Development (15%)	Financial (14%)	Financial (14%)
3	Public Sector/Domain (12%)	ICT Software Development (12%)	ICT Others (e.g. R&D, IDM) (12%)
4	Education (11%)	ICT Others (e.g. R&D, IDM) (10%)	Education (10%)
5	Financial (6%)	Education (9%)	ICT Services (9%)

1.3. Major Implications Arising from the Findings

The findings from this study have several implications for ICT professionals and ICT students. We focus on the main implications for attracting and retaining ICT professionals, meaningful ICT work, and employee engagement and prosocial behaviors.

Attraction and Retention

As with findings from previous SCS Infocomm Technology Surveys, the pattern of results suggests that salary, career advancement, and fit with personality are important conditions in attracting and retaining ICT professionals in the profession and organization. This result implies that ICT managers, HR professionals and ICT workforce agencies:
-   should monitor salary levels vis-à-vis other professions as ICT professionals may easily and readily leave, given their portable skills. As salaries and career advancement appear to be hygiene factors, developing and maintaining transparent benchmarks for salary and promotions may be one mechanism by which to attract and retain ICT professionals. are important;
-   could consider individuals' fit with personality in the job placement process. The ICT profession offers a variety of job roles that fit various personality types.

Work-life balance remains an issue to contend with. ICT professionals report that it is the key issue that would push them out of the ICT profession. This finding suggests a need for human resource practices, e.g. flexi-time and telecommuting, to support and encourage a balanced work-life environment.

Career counselors and ICT educators should be aware that ICT students report needing a balanced lifestyle, in addition to salary and career advancement, as an attractor to pursue ICT as a career. As such, career guidance may be necessary to tamper students' expectations of work-life balance in the ICT profession. It is recommended that ICT students consider enriching career decision-making, e.g. through realistic job previews and internships, to obtain accurate information about work in the ICT profession.

Although ICT professionals are generally satisfied with their jobs, ICT professionals in ICT services job roles report the lowest levels of job satisfaction. Prior research, including those using past SCS survey data, show that job satisfaction levels are the strongest indicators of withdrawal from organization (turnover) and ICT profession (turnaway).

Large local organizations are at higher risk of losing their ICT talent compared to start-ups/small-medium enterprises, Government & Statutory Boards and multinational corporations. This higher risk of turnover and turnaway has been consistent with findings from the previous two surveys conducted by the Society. The higher risk of withdrawal for this group is related to lower levels of career satisfaction; lower levels of job satisfaction and lower levels of engagement. Given the national drive to grow local companies into global companies, the results reported in this study may suggest limits in organizations' ability to attract and retain talent.

Older ICT professionals are more satisfied, are more engaged in their organizations and are at lower risk of turning over and away; a finding that supports the reemployment of older workers.

The proportions of ICT professionals intending to turnover and turnaway hover at about 1 in 3 and 1 in 4 ICT professionals respectively. While we acknowledge that these are not actual turnover and turnaway rates, there is a need for ICT workforce planners to estimate actual attrition rates at the organization and profession levels. There is also a need to estimate acceptable attrition rates at the organization and profession levels to cater for the renewal of competencies in the local ICT.

Meaning of ICT Work

This SCS survey, to the best of our knowledge, is the first (locally and globally) to describe meaningful ICT work and to determine whether ICT work is meaningful to incumbents. The primary characteristics of meaningful ICT work, for both ICT professionals and ICT students, involve a theme of self-development, personal gain and developing social relationships. That ICT professionals describe meaning of work in terms of developing social relationships debunks the stereotype of ICT professionals as lacking or possessing lower levels of soft skills.

It appears that ICT work offers tangible, valuable outcomes for ICT professionals. Almost all ICT professionals surveyed report that their ICT work is personally meaningful. ICT professionals who find meaningfulwork are less likely to turnover and turnaway; and are more like to be prosocial by engaging their organizations and the ICT community towards excellence. The implication of these findings for ICT professional associations, workforce agencies and educational is clear – ICT work is meaningful to incumbents and leads to positive outcomes.

Employee Engagement and Prosocial Behaviors

This study finds that ICT professionals are engaged with their organization/employers. The findings of this survey indicate that older ICT professionals are more likely to provide constructive criticisms towards organizational improvements; go beyond their scope of work; and are more likely to stay with

their employers. In particular, this study finds that older employees are more engaged with their organizations compared to younger employees. As such, organizations and workforce agencies should engage older workers for their feedback and recommendations towards improving work.

Engagement appears to encourage prosocial behaviours. Employees who are engaged with their organizations are more likely to volunteer to go beyond responsibilities to help others. For example, in a recent project by the Infocomm Development Authority (the Silver Infocomm Day), fourteen SCS members signed on within the first two weeks to educate senior citizens on the latest in IT. Such rates of volunteerism in the IT profession are encouraging. Such employees are less likely to quit the organization and the ICT profession. The implications of this these findings suggest that organizations and professional associations develop structures to foster engagement with their constituents.

Yet, there is a significant proportion of students who rate themselves as "neutral" (41.9%) when it comes to voicing out for the ICT profession. Such students may feel a lack of connection towards the profession as a whole. One approach to motivate these neutral students to voice their opinions might be to provide mentoring. This survey finds that ICT professionals are willing and do help others in the organization and profession. Such ICT professionals could mentor and socialize new entrants into the organization and profession. Institutes of higher learning can play a role in providing administrative support for such mentoring activities.