

KNOWLEDGE SHARING – “ICT COMPETENCY SKILL” FOR INFORMATION SYSTEM DEVELOPMENT (ISD) PROJECT

CASE STUDY IN CICT, UTM
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1. RESEARCH OVERVIEW

- **Information and Communication Technology (ICT) Competency**

-Refers to the definition, management and planning, so it involves some major fraction of initiation, planning, control and completion of a project.

-ICT technology is very **important** especially in developing ICT systems that increasingly **very fast dynamic and complex**.

- It is a priority to the study of **ICT Competency Skill** that are based on the **flexibility human** resource development in order to meet the **sharing resources requirements**. (Loufrani-Fedida and Missonier , 2015)

- **Defines Competency**

"Measuring competence rather than intelligence". Competency is one of motivation, traits, skills, self-image or social roles or other intellectual entities that individual use (Wang, Li, & Chen, 2015) .

li. "competency means" capable of a work , potential features individual excellence and mediocre persons who distinguish, it can be motivation, character, self-image, attitudes or values, a field of knowledge, cognitive or behavioral skills - can be reliably measured or counted for the excellent performance of the individual and general features

- **THUS, THIS STUDY AIMS TO**

- i. Explore the literature on ICT Competency Skill criteria in Information System Development (ISD).
- li. Analyze the ICT technical criteria needed to construct competency framework for ISD.



2. PROBLEM BACKGROUND

01 The requirement of system development more complex – need the qualified project team member – competent skill

02 Problems factor contribute the failure of Project Delay , Run out of budget, Resources Issues, Individual

03 Previous study not cover in specifically detail competency skill in ISD

04 What is the Competency Skill issues – individual , customer, methodology of development or monitoring tools

05 What is the criteria competency skill need in the team member

3. PROBLEMS STATEMENT

The main research question is:

“What are the main appropriate Competency Skill of ICT in Information System Development team?”.

What are the ICT competency skills that CICT staffs who involve in Information System Development (ISD) should have?

How to construct an ICT competency framework for CICT Staff based on the current ISD organization structure?

How to evaluate that the proposed framework offers effective solutions to improve the competency level of CICT Staff?



What is ICT Competency Skill for ISD ?

4. OBJECTIVE OF THE STUDY

Main objective of this research:

Evaluate and comparing the best methodology in project management especially in term of staff competency that will affect the project delivery and successful especially in Information System Development

1. To identify the effective ICT competency skills for CICT Staff.

Through an exploratory from survey on ICT all the related topic in CICT staff competency in information system development will be reference for case study.

2. To recommend an ICT competency skill framework by analyzing previously framework

The research formulate what is the best option that suitable with current methodology or framework from the paper review and what type of the issues contribute the ICT competency almost fail completed the system development project on schedule.

3. To formulate a set of strategy to resolve staff competency and gap analysis for the best solutions to improve the ICT competency level for CICT Staff

Through a systematic literature review of previous studies ICT Competency in information system development project to monitoring adoption, technology adoption, and factors affecting the successful of project delivery on time and how they implement with minimum issues. This will help the top management of CICT to prepare the basic assessment for the best ICT competency skill team member for the application development team.

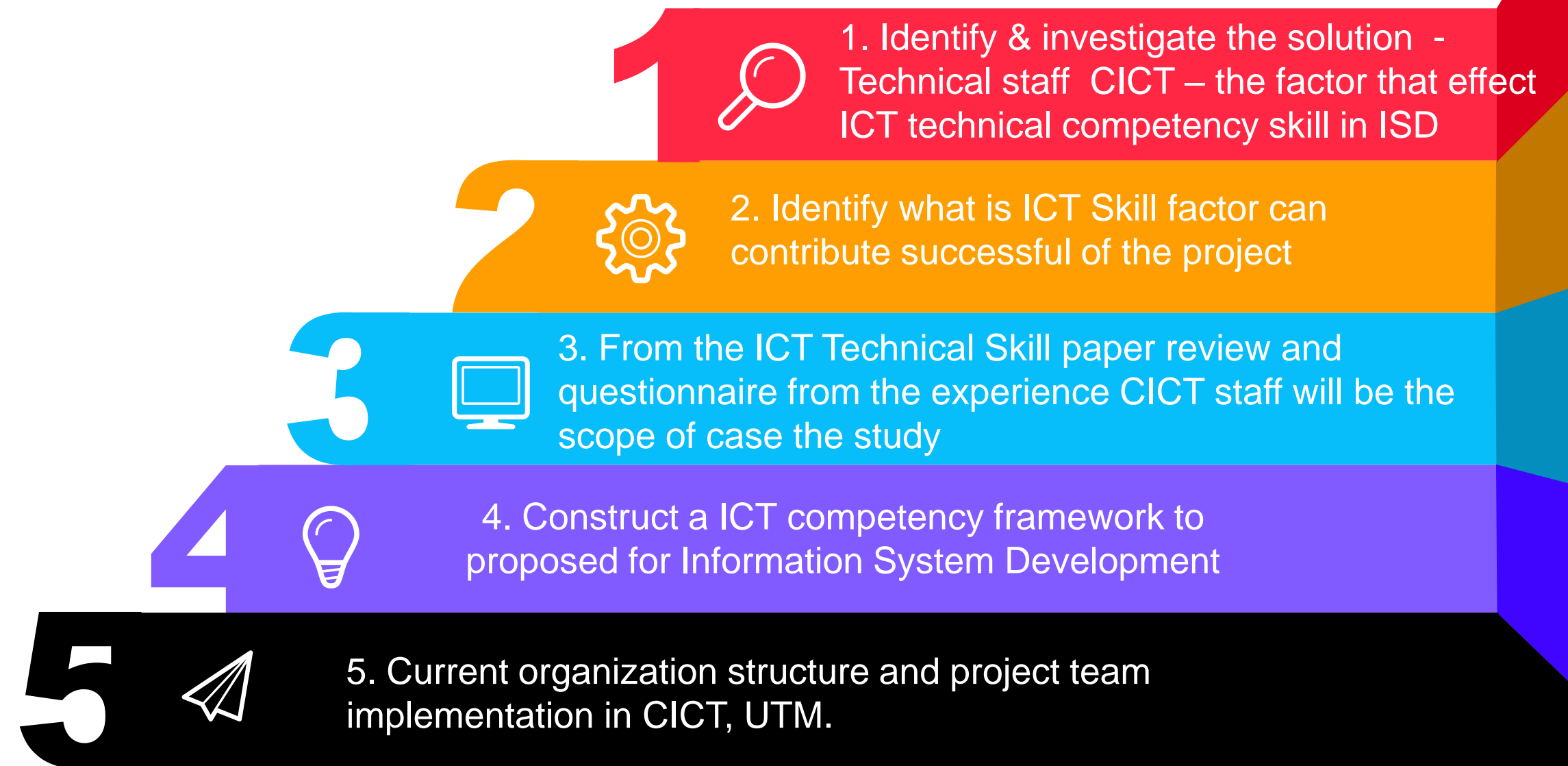


ICT
COMPETENCY
SKILL

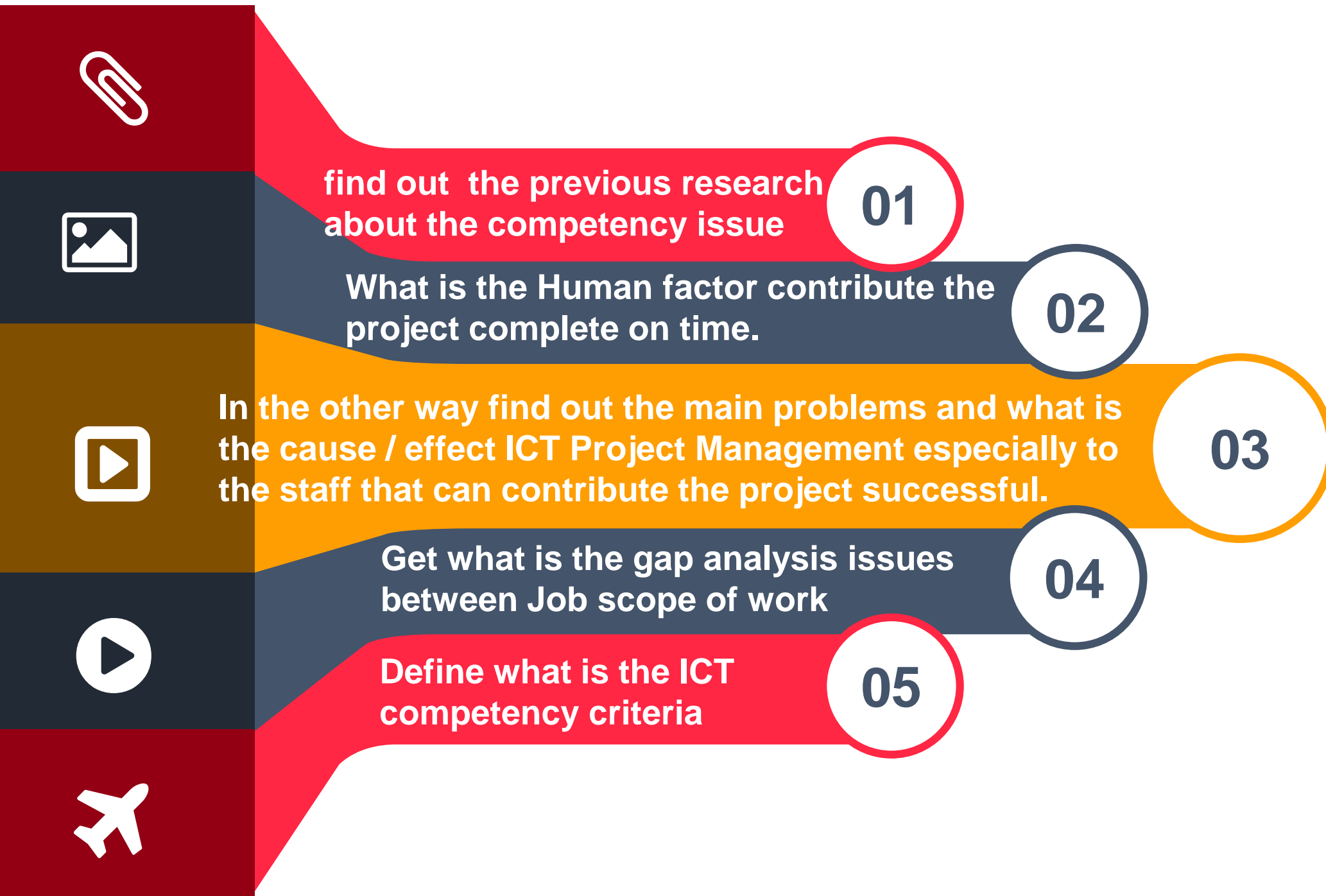
5. SCOPE OF THE STUDY

Importance of the Study

This study will help us more understanding on how to setup the new team member with various ICT competency skill background that can be blended into one big organization especially for the ICT System development base on specific competencies. However, in this study will focusing in ICT Technical Competency Skill that will help the CICT UTM define the right person with the good technical skill on the right position especially in ISD.

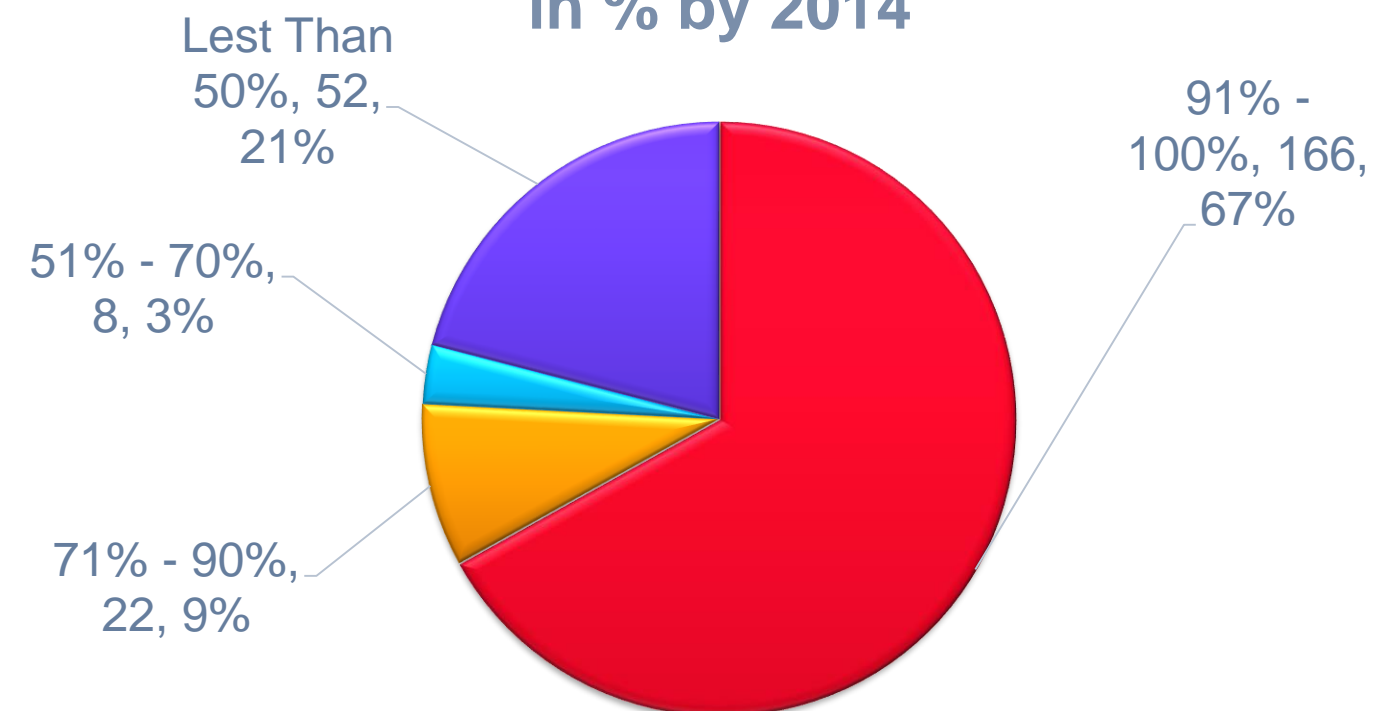


6. SIGNIFICANT OF THE STUDY



Status Project Progress in 2014		
No	Status Projek	Project
1	91% - 100%	134
2	71% - 90%	12
3	51% - 70%	5
4	Less than 50%	31
5	No Information	4
Total Project		186

Project Delivery Status Achievement in % by 2014



LITERATURE MAP

Topic Review

- To study the current issue in Information System Development (ISD)
- To study the highlighted literature finding paper

Current Methodology

- Define any ICT competency skill approach that can be adapt to CICT, UTM as one of government agency in Higher Education
- Define competency issues that contribute project delivery

Study Project ICT Competency

- To study the best practice and the approach, define what is ICT Competency Project.
- Define what is the cause of the problems to the staff that effect the competencies issues.

Highlighted Success Story

- Highlight the success story and how they contribute the project planning and delivery.
- Define which the best solution for CICT, UTM for ICT ISD Competency skill that should have in the structure or team member.

7. LITERATURE REVIEW

(Soft Skill & Technical Skill)

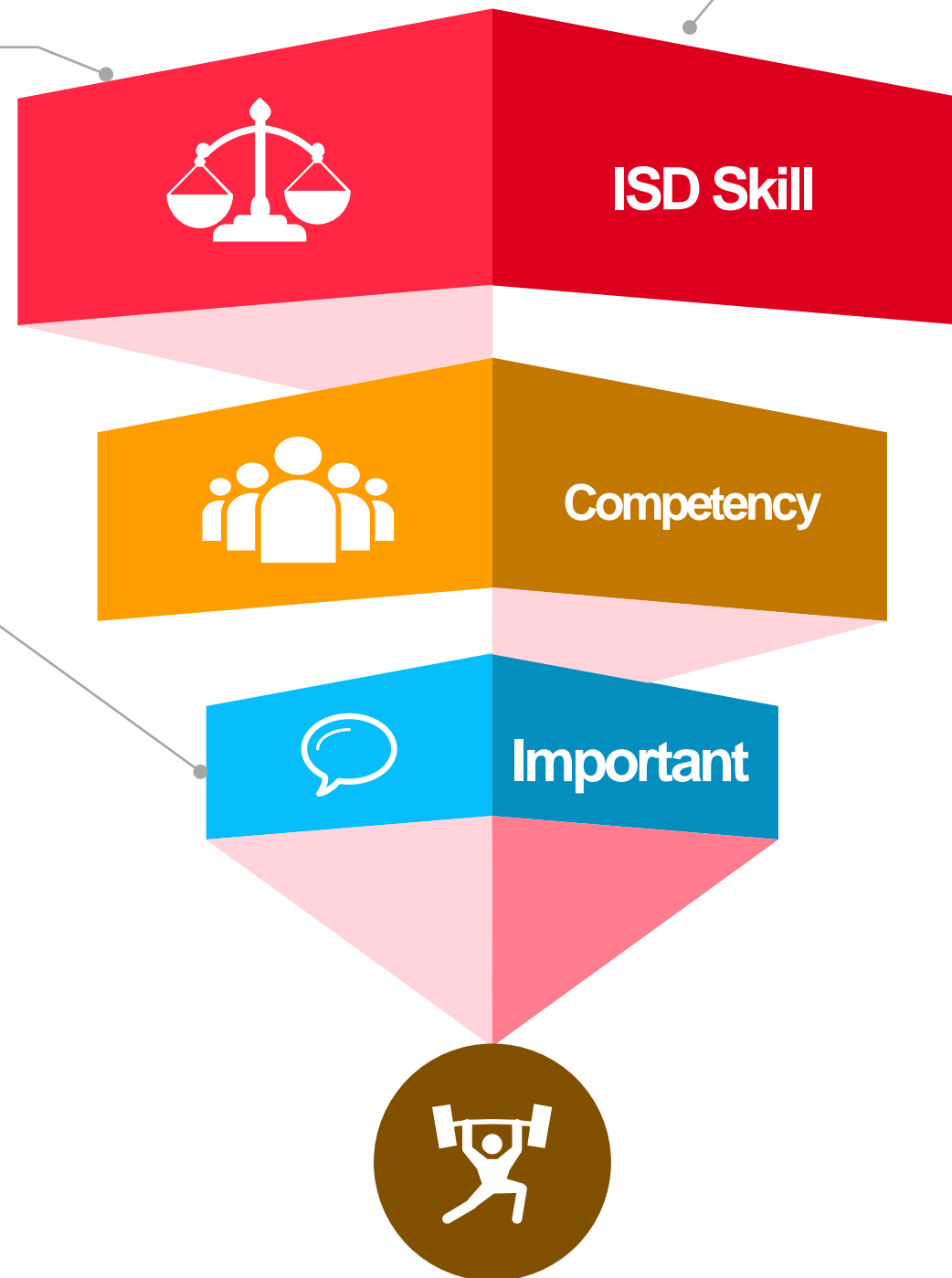
Staff Competency

We are placing great text in this text frames. Lorem ipsum will be replaced soon. The dummy sentences does not contain any meanings att all so are the other made up sentences.

The Importance of ICT Competency Skill

i. Chan and Chan (2004) have proposed two groups of measures of success: objective measures, such as time, cost, safety and environment. The second group contains subjective measures which consist of quality, functionality and the satisfaction of different project participants.

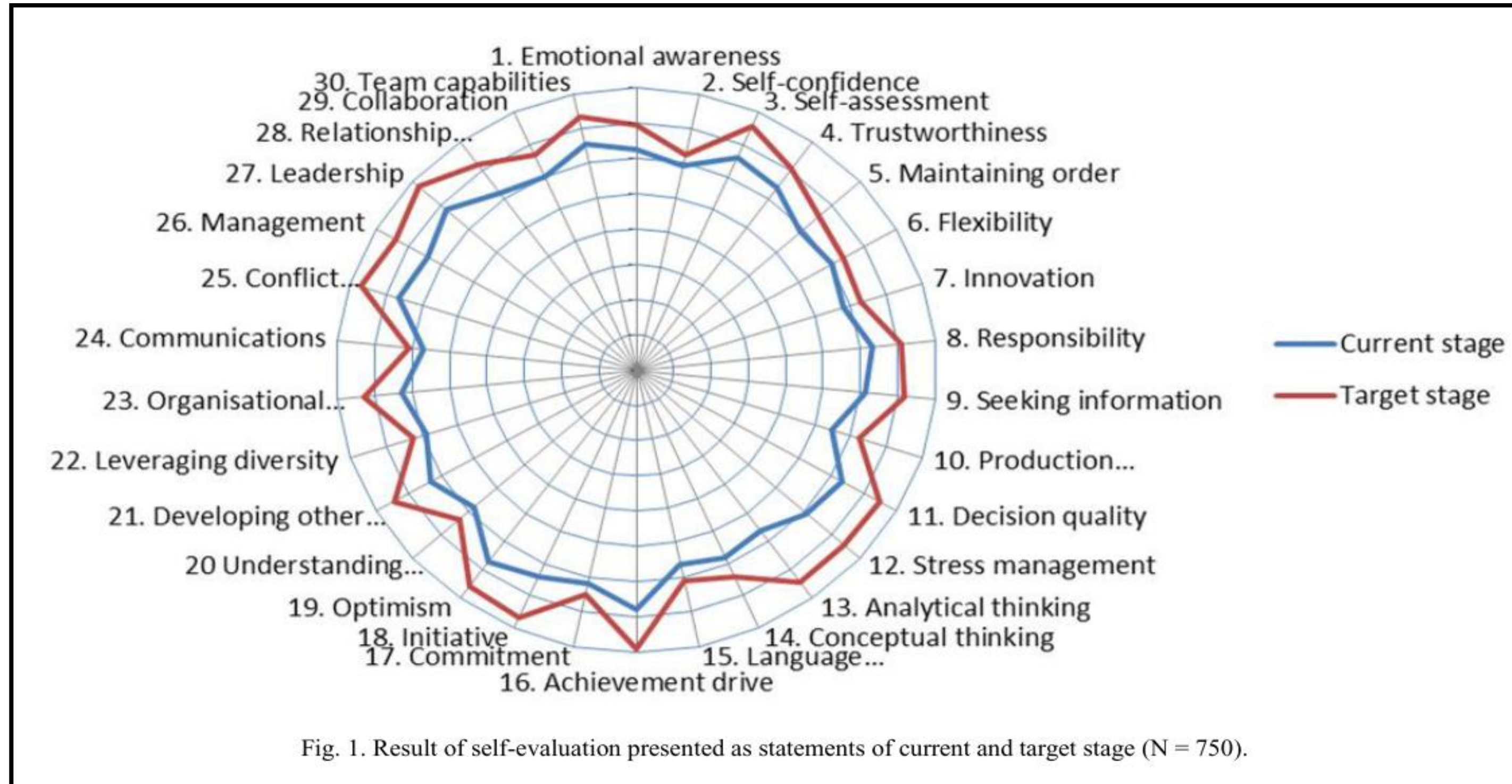
ii. Wang et al. (2015) mention that employer need to employ the software engineer that have enterprise standard competency.



ICT Staff Competency Skill in Information System Development

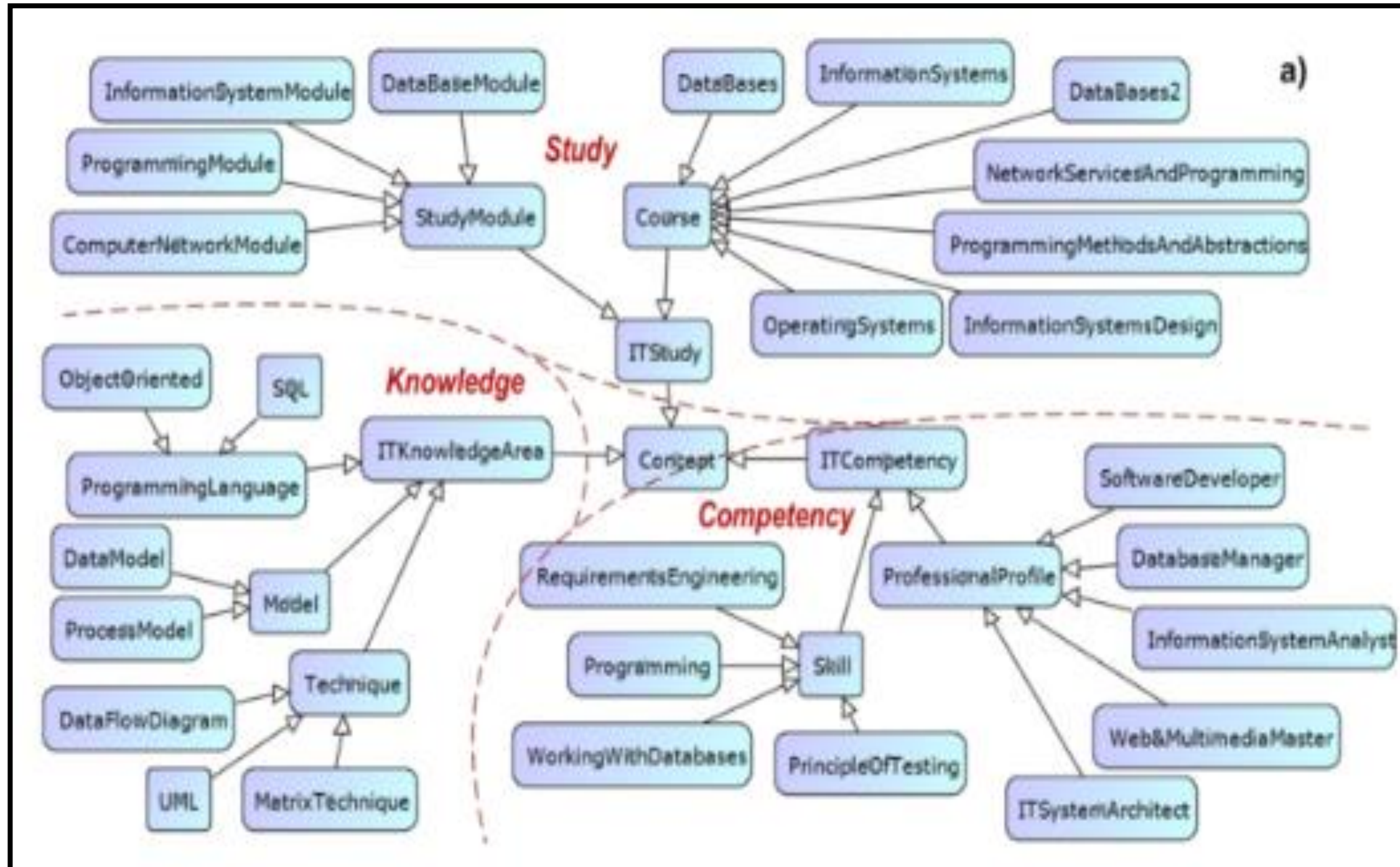
1. Wang et al. (2015) mention that employer need to employ the software engineer that have enterprise standard competency. From the research software engineer or software development engineers, they have to take risks, the ability to program strong, ambitious heavy, strong learning ability; although some developers are very clever.
2. Propose 2 Model (Iceberg & Onion Model) - Soft skill – communication skill, planning ability, the ability, the ability to solve problems independently, motivation, teamwork attitude, ability to learn . Technical Skill – develop specification, computer theory, algorithms logical thinking ability, business requirement and modelling.
3. (Liikamaa, 2015) mention that project leaders must have some of good criteria in the flexibility to respond in any uncertain or critical situations with minimum stress. 3 main criteria – *Competencies, Creative tension and Cycloid: Competency Self-Evaluation Application.*
4. Klarin and Celar (2015) define some of ontology lifecycle development based on the methodology and activities within the competencies question :- devide into 3 main criteria (Study, Knowledge & Competency).
5. Fernandez-Sanz (2010) mention that the analysis of non technical skills required for a variety of IT (Information Technology) positions and scope of working area.
6. Orsoni and Colaco (2013) mention in the paper review that competency framework for system development will have the behavioral competencies like Leadership, Team-working, Client focus and communication skill.

Spider Web Result Competency Assessment Evaluation By Liikamaa (2015)



Spider Web Result Competency Assessment Evaluation

By Klarin and Celar (2015)



	Study			Knowledge					Competency						
	StudyModule	DataBaseModule	ProgrammingModule	Course	ProgrammingLanguage	ObjectOriented	SQL	Model	Technique	UML	ProfessionalProfile		SoftwareDeveloper	Skill	Programming
CQ ₁₁	X			X											Study
CQ ₁₂	X			X											
CQ ₁₃	X			X											
CQ ₂₁					X			X	X						Knowledge
CQ ₂₂					X	X	X								
CQ ₂₃		X	X		X			X	X						
CQ ₄₂			X		X			X	X		X				Competency
CQ ₃₁											X	X			
CQ ₃₂											X				
CQ ₃₃												X	X		
CQ ₃₄						X			X		X	X	X		
CQ ₄₁					X			X	X		X	X	X		

The need of IT Professional in Different Industry by Fernandez-Sanz (2010)

Sector	% offers	Position	% offers
Computing services	51.4%	Programmer	12.7%
IT providers	5.1%	An/Programmer	7.6%
Tech. /Electronics/Aerospace	4.8%	Consultant	4.5%
Telco	4.6%	Project leader	4.4%
Consultancy	4.4%	Analyst	4.3%
Industry	3.7%	System technician	2.7%
Finance	2.8%	Systems admin.	2.5%
Building/civil eng.	2.3%	Others	61.3%
Government	2.2%	Areas	
Services	2.0%	Software dev.	42.6%
Health	1.7%	Systems	14.0%
Retail/distribution	1.1%	Consultancy	13.7%
Transport./logistics	1.0%	Management	9.1%
Others	12.7%	Others	20.6%

Item	Frequency
Teamwork	9,99%
Customer-orientation	7,32%
Proactivity	6,33%
Communication skills	6,10%
Results-oriented	4,58%
Creativity	3,74%
Autonomy/independence	3,43%
Capacity of analysis	3,36%
Management of teams	3,28%
Capacity og management	3,20%
Management of HR	2,75%
Leadership	2,29%
Selfconfidence	2,29%
Sales ability	2,06%

SFIA Common Competencies by Orsoni and Colaco (2013)

SFIA Common Competencies

	<i>SFIAPlus Common Competencies</i>
1	Analytical thinking
2	Information Acquisition
3	Goal Orientation
4	Customer Focus
5	Written Expression
6	Communicating Effectively by Word of Mouth
7	Initiative
8	Teamwork
9	Attention to Detail
10	Planning and Organization

Common Competencies Specific Roles

<i>SFIAPlus Competencies</i>	<i>Specific Roles</i>
Flexibility	Developer, Tester
Leadership	Senior Developer, Senior Tester
Creativity	Senior Developer, Developer
Conceptual Thinking	Senior Developer
Follow-up & Monitoring	Senior Tester

9. INITIAL FINDING

1

ICT STAFF SKILLS COMPETENCY AREAS –
PROJECT MANAGER

2

ICT STAFF SKILLS COMPETENCY AREAS –
SYSTEM ANALYST

3

ICT STAFF SKILLS COMPETENCY AREAS –
PROGRAMMER

4

ICT STAFF SKILLS COMPETENCY AREAS –
DATABASE DESIGNER

5

ICT STAFF SKILLS COMPETENCY AREAS –
TESTER

SUMMARY DISCUSSION

No.	Job Scope	Klarin and Celar (2015)	Fong et al. (2014)	Wang et al. (2015)	Liikama a (2015)	Misic and Graf (2004)	Fernandez-Sanz (2010)	Alias et al. (2012)	Elizabeth K. Hawthorne (2014)	Salleh et al. (2013)	Nahod and Radujković (2013)	Lazzarini Lemos et al. (2017)	Carvalho, Sousa, and Sa (2010)	Orsoni and Colaco (2013)
1.	Project Manager (PM)	✓	✓	✓	✓		✓	✓			✓		✓	
2.	System Analyst (SA)			✓		✓	✓		✓				✓	
3.	Developer (Programmer)	✓		✓			✓		✓	✓				✓
4.	Database Designer (DBA)								✓				✓	
5.	Tester											✓		✓

DEFINATION SKOP OF WORK

No.	Job Scope	Defination (OD)
1.	Project Manager (PM)	project manager role is to manage a project and achieve its objectives and the same time responsibilities as functional managers; they plan, schedule, motivate and control – by Alias et al. (2012)
2.	System Analyst (SA)	System Analyst defines the activities and skill in the system development that are used to modify an existing system, or to develop a new system – by Misic and Graf (2004)
3.	Developer (Programmer)	Ability and skills to use programming tools are considered as important and equivalent to skills in syntax and logic - Salleh et al. (2013)
4.	Database Designer (DBA)	Responsible for organization's databases strategy Including design and implementation if necessary - Carvalho, Sousa, and Sa (2010)
5.	Tester	Testing with the purpose of checking if the change that is made influenced all the functionalities of the software. It is carried out by a tester by means of passing Test Cases. Testing of separate entity of programming code as to verify its compliance with real behavior of the program compared to the expected one - Lazzarini Lemos et al. (2017)

1. ICT STAFF SKILLS COMPETENCY AREAS – PROJECT MANAGER

A. Project Manager (PM)				
No.	Category	Competency Skill	Skill Desc	Suggested by
1	Soft Skills	Analitical Thinking	Able to think deeply	[1], [2], [3]
2		Communication	refer to the ability to collect and analyze information, problem-solve, and make decisions	[1], [3]
3		Creativity	Creative thinking means thinking about new things or thinking in new ways	[1], [6], [8]
4		Critical Thinking	Critical thinking involves the evaluation of sources such as data, facts, observable phenomenon, and research findings.	[3]
5		Leadership	the action of leading a group of people or an organization	[3], [6], [8]
6		Teamwork	means that people will try to cooperate, using their individual skills and providing constructive feedback, despite any personal conflict between individuals	[5], [8]
7		Take Risks	to proceed in an action without regard to the possibility of danger involved in it - especially in the project base	[14]
8	Technical Skills	Strong in Programming	Able to code , syntax and logic	[7]
9		Project Management Skill	application of knowledge, skills, tools and techniques to project activities to meet project requirements	[1] , [4]

2. ICT STAFF SKILLS COMPETENCY AREAS – SYSTEM ANALYST

B. System Analyst (SA)				
No.	Category	Competency Skill	Skill Desc	Suggested by
1	Soft Skills	Teamwork	People will try to cooperate, using their individual skills and providing constructive feedback, despite any personal conflict between individuals	[5], [8]
2		Leadership	The action of leading a group of people or an organization	[8]
3		Creativity	Creative thinking means thinking about new things or thinking in new ways	[8]
4		Analytical Thinking	Examine things in critically idea to divide any issues into another picture or view	[10]
5		Communication	Ability to write and speak clearly, to summarize and document information in a manner that other people can understand.	[8] , [10]
6	Technical Skills	Technical Writing	Able to code	[10]
7		Business requirement and modelling	the process of capturing, assessing and justifying stakeholders' wants and needs.	[5] , [10]
8		Technical - Skill	Employ system development techniques such as functional decomposition, data flow diagramming, process specifications, object-oriented analysis, data modeling, computer programming, hardware and software knowledge, and other recognized tools designed to aid in system development.	[10]
9		Data Analytics to support decision making	Discuss on how data analytics can used to support decision making base on scenario.	[11]

3. ICT STAFF SKILLS COMPETENCY AREAS – PROGRAMMER

C. Developer (Programmer)

No.	Category	Competency Skill	Skill Desc	Suggested by
1	Soft Skills	Take Risks		[5]
2		Creativity	Creative thinking means thinking about new things or thinking in new ways	[8] , [12]
3		Ambitious Heavy		[5]
4		Strong Learning Ability		[5]
5		Teamwork		[8] , [5]
6		Flexibility		[12]
7	Technical Skills	Strong in Programming	Able to code , syntax and logic	[5] , [7] , [13]
8		algorithms logical thinking ability		[5]
9		Develop specification	Comprehensive description of objectives for a development project	[5]
10		Bbehavior to research		[6]
11		techniques of defensive programming and secure coding	Lists strategies for creating secure code.	[11]
12		Secure Software Development Lifecycle	Illustrates some, but not all the phases of the Secure Development Lifecycle accurately.	[11]
13		Debugging a programming or a scripting language to solve a problem.	Summarizes a solution to the problem, but fails to implement a working solution in a programming or scripting language.	[11], [13]
14		Discuss software development methodologies.	Describes basic software development methodology terms.	[11]
15		Conceptual Thinking		[12]
16		Testing		[13]

4. ICT STAFF SKILLS COMPETENCY AREAS – DATABASE DESIGNER

No.	Category	Competency Skill	Skill Desc	Suggested by
1	Technical Skills	Data analytics	Identifies some applications of data analytics.	[11]
2		database design based on an identified scenario.	Discusses a database design which reflects the business requirements for an identified scenario.	[11]
3		Produce simple database queries.	roduces a query which partially answers a question.	[11]
4		dealing with very large data sets, both structured and unstructured.	Recognizes some of the issues relevant to dealing with very large data sets.	[11]
5		Data Analytics to support decision making for a given scenario.	Discusses how data analytics could be used to support decision making for a given scenario.	[11]

5. ICT STAFF SKILLS COMPETENCY AREAS – TESTER

E. Tester				
No.	Category	Competency Skill	Skill Desc	Suggested by
1	Soft Skills	Leadership		[12]
2	Technical Skills	Strong in Programming	Able to code , syntax and logic	[9]
3		Follow-up & Monitoring		[12]

REFERENCES:-

No. Reference	Reference Name
[1]	Doyle (2017)
[2]	Alias et al. (2012)
[3]	Fong et al. (2014)
[4]	Nahod and Radujković (2013)
[5]	Wang et al. (2015)
[6]	Liikamaa (2015)
[7]	Klarin and Celar (2015)
[8]	Fernandez-Sanz (2010)
[9]	Lazzarini Lemos et al. (2017)
[10]	Misic and Graf (2004)
[11]	Elizabeth K. Hawthorne (2014)
[12]	Orsoni and Colaco (2013)
[13]	Salleh et al. (2013)

TECHNICAL COMPETENCY SKILL FOR ISD FRAMEWORK

