

INTER-SURFACE ORGANIZATIONAL PROBLEMS AND TECHNOLOGY MANAGEMENT

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ABSTRACT

This article is a multi-disciplinary study of Inter-Surface Organizational Problems of Technology Management from Philosophical Perspective. This article throws light upon major organizational and Human Resource related variables such as Job Security, Age, Management Goals Perception of workforce and Work attitude and analyses their relationship, role and influence upon Technology Management. In Telecom sector, inter surface problems are more vivid between New Generation Technologies (NGN) on the one hand and conventional Landline technologies such as C-DOT, OCB, EWSD and 5ESS on the other hand. Similarly, even in mobile technologies, the same problem is surfacing between the modern 5G ,4G Vs. 3G, 2.5G and others.

Thus, this article has got powerful theoretical foundations reinforced by advanced research, upon a sample of 726 (n=726) in HR domain (Doctoral work in Psychology), and upon a sample of 761 (n=761) in Marketing domain (Doctoral Work in Mktg. Mgmt) using highly standardized instruments with a scientific item validity index and Reliability Coefficients with more than 0.80 ($r_{th} = 0.80$) at less than 0.001 level, that is, measuring instruments are designed as per International Standards.

Keywords: Technology Management, Job Security, Work attitude, Management Goals, Item Validity Index and Reliability Coefficient.

INTRODUCTION:

Adoption of philosophical approach, as part and parcel of Philosophy of Technology s Management System will help modern organizations evolve themselves as true 'Learning Organizations' in general and High Technology Organizations in particular. It is not only an age-old but historically and scientifically evolved method. It reinforces all modern organizations at foundation level giving them an upper and cutting edge over all of their competitors. On the contrary, organizations which aim at adoption of Management programs more as an abstract, imaginary, theoretical and idealistic – unrealistic – activity devoid of concreteness from the given organizational condition with respect to the universal business environment are likely to wither away from business scenario in the days to come. In the modern era of 'Globalization and Electronic Revolution' almost all the leading organizations are adopting Defects Management System with modern Management Methods and Techniques which are by and large revolving around better and optimum utilization of Electronic and Information Technology for harnessing all other resources at the disposal of organizations, so as to transform organizations as 'Knowledge Organizations' by adopting better methods of organizational learning and practice/ application.

Inter-surface Problems – Unpredictable Future Management

To any organization, there are two kinds of problems – Predictable and Unpredictable problems. This will find its more reflections with respect to making predictions in Portfolio Management, Future Commodity Market, Funds flow and Cash flow Management systems. Modern software and Hardware technologies are changing with lightning speeds. Theory of the Negation of the Negation is finding its expression at a very higher plane in modern technologies, particularly in Software areas. For instance, in less than 10 years, BASIC has been negated by COBOL, the same was negated by PASCAL and FORTRAN. And those technologies were negated by C, C++, JAVA and so on so forth such as Cloud Computing, Artificial Intelligence, Robotics, etc.

Inter-surface Problems as impediments to Technology Management:

Inter-surface problems crop up into being due to lack of compatibility between advanced systems on the one hand and poor and less-developed systems on the other. In India, most of the organizational problems are cropping up due to lack of compatibility between highly advanced Technological systems such as Computer Systems, Telecom. Engineering Systems, Automated systems such as Robotics, AUTOCAD and AUTOCAM based design systems on the one hand and work force with poor technical skills, not-much positive disposition towards advanced technological systems on the other. Lack of compatibility between advanced Technological System with obsolete workforce and lack of congenial physical organizational environment will act as kind of obstructive forces towards the implementation modern technologies in general and 'High Technologies' such as new generation telecom. Technologies, such as 4G GSM, Wi-Fi, Wi-Max technologies, Cloud Computing, Neural Networks, Satellite Communication systems, computerized design technologies using artificial intelligence, machine learning and Robotics in particular.

This kind of contradiction between advanced technological systems and less developed and retrogressive workforce are finding its reflections through the following variables necessitating the constant monitoring of the functionality of those organizational variables.

Inter-Surface Problems, the Root-Cause for Internal and External Contradictions

Any organization will have both internal and external contradictions with respect to Organizational Change Management. Internal Contradictions pertain to internal organizational work environment that is relations among colleagues, subordinates and superiors in general whereas the External contradictions pertain to the contradictions between workforces on the one hand and external customers on the other. One of the root causes for internal contradictions is improper perception of Management goals, Job Security, Automation and/or New Technology implementation. Often, internal contradictions play a vital role but in subtle form.

In Telecom sector, inter surface problems are more vivid between New Generation Technologies (NGN) on the one hand and conventional Landline technologies such as CDOT, OCB, EWSD and 5ESS on the other hand. Similarly, even in mobile technologies, the same problem is surfacing between the modern 5G, 4G Vs. 3G, 2.5G and others.

For instance, India has got the world-class automobile technology. Unfortunately, our Roads & Bridges technology is mostly moderate or obsolete, resulting in galloping rate of road accidents which are taking a number of human lives apart from causing colossal loss of property.

Mining Technology gave birth to blue collar worker with primitive behavior patterns. Service sector gave birth to white collar workers. Modern information technology produced Gold collar workers Stephen P. Robbins (1996). Each and every behavior patterns are coupled with corresponding levels of work attitude, organizational behavior and knowledge management practices. All these changes in the history of Science and Technology, vividly shows that even to implement advanced technology there shall be a suitable and corresponding level of behavioral patterns reinforced by Knowledge Management practices.

REVIEW OF LITERATURE

The four recognized major components of high-technology organizations are viz; Orgaware, Humanware, Technoware and Infoware (Sheriff and Ramanathan, 1985). There is a greater need for Research and Development as part and parcel of Defects Management System and for their sound application of Programs in the modern technology-based organizations.

In the changed production scenario, the very approach to managing the process of change in organizations is acquiring a new dimension. Management of change without resistance itself has become the major concern, for modern Organizational Development specialists. It is a system-wide application of behavioral science knowledge to the planned development and reinforcement of organizational strategies, structures and processes for improving an organization's effectiveness (Northcraft et al, 1990).

Management of change without resistance, even when it does not result in the replacement of existing man-power, is not an easy task as it sounds. Resistance can be overt, implicit, immediate, or deferred. It is easiest for management to deal with resistance when it is overt and immediate. For instance, a change is proposed and employees quickly respond by voicing complaints, engaging in a work slowdown, threatening to go on strike, or the like (Robbins, 1996).

Constant up gradation of knowledge and skills on the part of workers called for a change in the approach of Managers as team-leaders towards their workers. The leader of modern age will be a facilitator of change – a learner and a teacher, a coach and counselor, a role model, a diagnostician, a designer of new systems and organizational structures and a master of conversation (Bounds, 1996). Dawn of automated, digital technology is calling for a planned and scientific human resources strategy for the next millennium. In the coming age of the new technology worker, work cannot be organized if planning is divorced from doing.

The more planning a worker does and the more responsibilities he takes for what he does, the more productive he can be. A worker who does only as instructed can do only harm (Rath, 1998).

The role of the enterprise is to devote itself to the difficulties of economic creativity, of change and innovation, making all the decisions necessary to stimulate their occurrence. The particular characteristics of this creative activity are the vision of possible points of initiative and innovation, the influence needed to start it and the acceptance of adequate responsibilities, and the effort necessary to surmount the difficulties and the risk of change. This creative capacity is the foundation of the act of entrepreneurship without which it would fail (Pathak and Richards, 1996).

Modernization of production process means changing the existing mode of production process with a better and sophisticated one (Arnold and Robertson, 1991). Change in the nature of Technology is influencing not only the internal organizational sub-systems but the very nature of workers itself; their personality attributes such as work-attitude and job-satisfaction are finding their realization in a higher order (Arnold, et al, 1991).

With increasing mechanization, automation and development in technology, many organizations have emerged as complex organizations that produce a wide range of products. Even medium-sized organizations have expanded their business. Expansion has led to a growth in the number of employees, and layers of hierarchical levels, and complex organization structures involving advanced technologies such as Digital Communications Switching Technologies such as 5ESS, 3-G, 4-G and 5-G technologies, implementation of BIG DATA ANALYTICS, Artificial Intelligence, Cloud Computing, Neural Networks and Digital Control mechanisms and so on so forth. Digital Networking has facilitated the emergence of Automatic Teller Machines across the globe. Automatic Signal routing mechanisms, automatic fault localization techniques with automatic alarms and so on so forth are playing a vital role in the emergence of modern, complex organizational structures with advanced and highly talented workforce in all the modern organizations in general and vital organizations such as Space Technologies, Telecommunications Technologies, Navigational Electronics, Modern Networking based Banking and others. This kind of expansion has led to complex problems of coordination and integration of activities. Eventually, the need for continuous training is felt at all levels in such organizations from shop floor to top executives (Monappa, 2006)

Information Technology, while bringing changes in the production process in industrial sector is determining the direction of service sector development and thereby the entire social production process. It is activating modern man by tapping all of his innate abilities to come to their realization in production. Ramprasad, an expert in Information Technology and Optics noted that the task of development cannot be defined as a closely bound social project. It has necessarily to be a movement from below working with a self sustained motive force generated within the system through mass enlightenment and feedback thrust. The course of social events around us is determined by the degrees of freedom for action and advancement available to individuals and by the checks and controls, deliberate or implied. The totality of Social Intelligence in general and that of a worker in active production in particular is nothing but an integration of individual contributions over space and time (Ramprasad, 1988).

Concepts such as Self Confidence, Job satisfaction, work attitude and Organizational Perceptions such as Management Goals, Unions perception and Job Security were started studying by Management Theorists and Organizational Psychologists from humanistic, ethical standpoint. Thus, modern organizational psychology has become the humanistic psychology in essence. Mechanistic, Machine-centered approaches of the erstwhile industrial age started withering all over the world (Davis, 1995).

Further, emergence of advanced Engineering Psychology has helped Managers and Technologists in studying the most important human problems related to modern technology such as analysis of the tasks facing man in the Control Systems and distribution of functions between man and automatic devices, computers in particular, study of the joint activities of operators communication and informational interaction among workers, analysis of the psychological activity of operators study, of the factors influencing the efficiency, quality, precision, speed and reliability of the actions of operators, study of the reception by man and of man's sensor 'input', analysis of decision-making and the processing and, storage of information by man, the psychological mechanisms of the regulation of the activities of workers, elaboration of the methods of psycho-diagnosis, professional orientation and selection of operator-specialists, analysis and optimization of the processes of teaching and training of workers (Krylov and Shadrikov, 1988).

It is suggested that companies should consider establishing and integrating strategic technology management as a distinguishing managerial discipline amongst other organizational functions Sahlman, Kari, (2010). Academic research and consultancy in technology innovation management have potential to be a valuable external resource that can be used by organizations for the improvement of management methodologies and human resources training, Adalberto Mantovani, et al (2013). It is important to highlight basic aspects related to value creation and business model, strategy formation and execution, technology strategy, technology management, innovation management, and interface between technology and innovation strategy, Z. Mahmood, A. Amir, et al. (2013)

Another high-technology related but the product of Engineering Psychology which came into being during the modern 'Information Age' is Ergonomics. It plays a major role in studying modern worker's role in automated production activity, machine design and job design areas of research. Ergonomics as a group of sciences concerned with comprehensive study of man in production activity and with optimization of means and conditions of labor. Ergonomics also includes the applied sections of Engineering Psychology, Labour Physiology, Hygienics, Anthropology, scientific organization of labour, Technical Design, Cybernetics, the General Systems Theory, the Theory of Automatic Control, etc. The subject of Ergonomics involves the study and optimization of man-machine environment systems. The methodological foundation or Ergonomics involves a systems approach allowing to obtain a comprehensive idea on the process of labour and on ways for perfecting that process in order to enhance the efficiency and quality of work all round development of the individual, and satisfaction of the creative requirements of working people (Lomov et al, 1998). Even in Marketing, it is established by Vishnumurty N, (2013) that Customer Loyalty is a function of Employee Loyalty. The Cohen's Effect-Size Correlation for the total sample of 761 (n=761) stood at 0.658 at a probability level of 0.001 (Vishnumurty N, 2013).

RESEARCH PROBLEM

“INTER-SURFACE ORGANIZATIONAL PROBLEMS AND PHILOSOPHY OF TECHNOLOGY MANAGEMENT”

Objective of the Study:

Study of Inter-surface Organizational Problems in Service Sector Organizations and their mutual influence and determination of other factors which come under Management Goals, Unions Perception and Demographic Variables.

HYPOTHESES

- 1). Organizational variables, Management variables and Demographic variables have got considerable inter-relationships in influencing and determining their values, role and future of organizations in general and service sector organizations in particular.
- 2). Study of organizational, management, demographic and marketing variables shall not be considered as holistic, abstract and water-tight compartments.
- 3). Study of organizational, management, demographic and marketing variables as water-tight compartments will lead to abstract, incoherent and inter-surface problems among organizational sub-systems.
- 4). Scientific solution to Inter-surface problems lies in undertaking a comprehensive, correlated, concrete and dialectical understanding of the issues and organizations under investigation.
- 5). Organizations are dynamic and the external environment is also dynamic, as such, variables and issues shall be studied in constantly changing time-space organizational and business environments respectively.

Sample:

The Sample comprises of non-executive, non-managerial personnel, that is, the line level operative personnel, administrative personnel and supervisors working in computer environment belonging to Telecommunications, Banks and Insurance Service sector organizations. Total size of the sample is 726 (n=726) spreading across three service sector organizations. All are collected from Hyderabad and Secunderabad urban population as computer-oriented automation process is taking place on large-scale in Urban limits. The selection of sample from the various categories was guided by two principles viz. Incidental selection and random selection. The principle of incidental selection operated when the responders were available individually. An unbiased random procedure was adopted when they were in small groups without allowing the likes and dislikes of investigator. Since the investigator was not involved intimately in interpersonal interactions with the respondents, the scope for bias was minimal.

Description of Tools:

Total number of tools in the present study is eight. While three tools are already established tools, five are newly developed by the investigators.

- A. Tools already established
 1. Self- Concept
 2. Self-Confidence
 3. Job-satisfaction
- B. Tools newly developed by the investigators
 1. Automation – Dependent Variable
 2. Work Attitude
 3. Management Goals
 4. Union Perception
 5. Job Security

Development of New Instrument:

New instruments were developed after conducting a pilot study in consultation and under the guidance of professional experts for Item Analysis, establishment of Item Validity and Reliability of the instruments developed. In validating the tests, the first step adopted in the procedure is the administer the preliminary forms to seven judges with a request for evaluating the items with respect to

- a) Relevance to the variable
- b) Clarity
- c) Language
- d) Avoiding Redundancy
- e) Range – Coverage of the full spectrum of the variable

All the individual items in each sub-questionnaire have got the considerable discriminating power. Item analysis was done for each and every question by studying the response pattern for each individual question and the frequencies spread both below the Median and above Median scores of every responder.

S.No.	Name of the Test	Reliability Coefficient (r _{tt})	Significance level
1	Automation	0.89	0.001
2	Work Attitude	0.85	0.001
3	Job Security	0.81	0.001
4	Management Goals	0.88	0.001
5	Unions Perception	0.87	0.001

Collection and Analysis of Data:

Data was collected from workers working in three service sectors: Telecom; Insurance and Banking. The study was confined to urban areas and therefore all the responders are chosen from offices situated within the twin cities of Hyderabad and Secunderabad. Data was collected from responders on individual basis with a request to give their responses without consulting others.

ANALYSIS OF DATA:

Role of Organizational and Management Factors in Automation Process has been studied scientifically. Job Satisfaction and Customer satisfaction shall be monitored by using scientifically designed instruments with proper Item Validity Index and Reliability Coefficients.

When a study is being conducted in Telecom; Insurance and Banking sectors, it is established that perception of management goals by workforce has got a positive correlation of 0.37 (r = 0.37) to Automation process at a significance level of less than 0.001 (n=726). (Vishnumurty Narra, 2007).

Similarly, Job Security has got a significant, positive correlation to Automation process in modern sectors such as Telecom; Insurance and Banking sectors (n=726). It is found to be as r=0.41 at a significance, less than 0.001 level (Vishnumurty Narra, 2013).

Work Attitude has got a significant, positive correlation to Automation process in the leading service sectors, Telecom, Insurance and Banking (n=726). It is found to be as r=0.43 at a significance level, less than 0.001 level (Vishnumurty Narra, 2007).

It is also established that Age has got a negative correlation to Automation Process in the service sector organizations such as Telecom, Insurance and Banking sectors (n=726). It is found to be as r=0.14 at a significance level less than 0.001. (Vishnumurty Narra, 2007).

STATISTICAL ANALYSIS OF CROSS-CORRELATIONS

When a research study has been undertaken by the present investigator in the leading sectors such as Telecommunications, Insurance and Banking sectors, a very close inter-relationship between organizational variables on the one hand and management variables on the other was found. Following are some of the valid scientific observations found in all those three major service sector organizations which include both private and public sector organizations. For instance, Management goals perception by the workforce found to be a valid, significant and positive inter-correlation to the workforce attitude towards MNCs, Job satisfaction, Self Confidence, Self Concept and above all their attitude towards implementation of Automation processes in general and implementation of New Generation Technologies in particular. All those correlations were significant at less than 0.001 levels (n=726).

Also, very positive, significant and definite cross-correlations were found to have between Work attitudes on the one hand and Job satisfaction, Self confidence, Job security and Self Concept. This is true in all the three major service sector organizations, such as Telecommunications, Insurance and Banking sectors. All those cross correlations were significant at less than 0.001 levels (n=726).

Similarly, when Multiple Regression Analysis was conducted upon workforce working in Telecommunications, Insurance and Banking sectors upon a good sample of 726 (n=726) in one of the major cities in India, such as Hyderabad, it is observed by the investigator that organizational variables such as Work Attitude, Job security, Management Goals perception by Workforce, Workers age and another important psychological variable such as Self Concept emerged as major contributing factors towards determining the value of Coefficient of Determination (R^2). Their t-values in Multiple Regression Analysis were also found to be considerably valid and significant.

MULTIPLE REGRESSION ON AUTOMATION (n=726)

R² 0.368
F: 24.27

R² Adj: 0.352
ROOT MSE: 11.69

Prob: 0.0000010 AIC:4.94
Intercept 'a': 44.47

S.No.	Variable	Beta Wt.	R.Square	Reg.Coefficient	Std.error	t-value	t-prob
1.	Sex	0.01	0.0005	0.37	0.84	0.438	0.67
2.	Age	0.09	0.016	0.18	0.07	2.503	0.013
3.	Edn-gen	0.03	0.0033	0.403	0.488	0.826	0.409
4.	Tech.Qlfns	0.015	0.0025	0.2026	0.5029	0.403	0.687
5.	Dptl.Trg	0.109	0.0009	0.956	0.3021	3.166	0.002
6.	Comp.Edn	0.09	0.0172	1.139	0.464	2.452	0.014
7.	Income monthly	0.026	0.001	0.0001	0.0002	0.709	0.479
8.	Union participation	0.009	0.0005	0.27891	0.9463	0.295	0.768
9.	Hobbies	0.027	0.0012	0.3192	0.3652	0.874	0.382
10	Mgmt.goals	0.173	0.065	0.421	0.0929	4.058	0.000
11	Union Perception	0.063	0.002	0.216	0.107	2.008	0.045
12	Job security	0.230	0.09	0.611	0.097	60243	0.000
13	Work Attitude	0.289	0.121	0.832	0.101	8.22	0.000
14	Attitude > (MNC+MRTP)	0.003	0.0002	0.030	0.248	0.121	0.904
15	Job satisfaction	0.056	0.017	0.084	0.055	1.514	0.130
16	Self Confidce	0.020	0.0049	0.0168	0.039	0.433	0.665
17	Self Concept	0.087	0.025	0.06639	0.036	1.842	0.066
	Total		0.368				

FACTOR ANALYSIS (VARIMAX ROTATION) and the Association between variables found to have five major innate factors that are operating beneath their apparently, external influence. Communalities as the sum of squares for all the five innate factors were found to be above >=50% with respect to the organizational variables such as **Work Attitude, Job security, Job satisfaction, Self Confidence, Self concept** on the one hand and Management related variables such as Management goals perception, Unions Participation in Management, Attitude towards MNCs+ (Monopolistic and restrictive trade practices) MRTP, Union Perception on the other. Not only that, even the apparently not much significant variables such as Educational Qualifications (general), Technical qualifications were also exhibited considerable influence in determining the combined effect of innate factors in the form of Commonalities.

S.No.	Variable	Commonalities of 5 innate factors
1.	Educational qualifications	0.46
2.	Technical Qualifications	0.77
3.	Departmental Training	0.63
4.	Computer Education	0.78
5.	Union Participation	0.55
6.	Automation	0.56
7.	Management Goals	0.68
8.	Union Perception by workforce	0.52
9.	Job Security	0.63
10.	Work Attitude	0.55
11.	Attitude towards MNCs & MRTP	0.67
12.	Job Satisfaction	0.53
13.	Self Confidence	0.78
14.	Self Concept	0.78

ASSOCIATION BETWEEN VARIABLES

s.no.	Variable	Vect-1	Vect 2	Vect 3	Vect 4	Vect 5	Vect 6
<u>1</u>	<u>Edn-gen</u>	0.27	0.28	0.02	0.51	0.18	0.38
<u>2</u>	<u>Tech.Qlfn</u>	0.22	0.78	0.25	0.11	0.14	0.05
<u>3</u>	<u>Dept.Trng</u>	0.27	0.09	0.07	0.70	0.21	0.24
<u>4</u>	<u>Comp.Edn</u>	0.25	0.78	0.25	0.05	0.19	0.05
<u>5</u>	<u>Union participation</u>	0.04	0.07	0.13	0.52	0.50	0.35
<u>6.</u>	<u>Automation</u>	0.66	0.13	0.07	0.27	0.17	0.25
<u>7.</u>	<u>Mgmt. goals</u>	0.57	0.15	0.56	0.13	0.03	0.01
<u>8.</u>	<u>Union Perception</u>	0.28	0.16	0.23	0.40	0.44	0.25
<u>9.</u>	<u>Job Security</u>	0.63	0.09	0.46	0.01	0.08	0.01
<u>10.</u>	<u>Work Attitude</u>	0.62	0.22	0.26	0.10	0.17	0.29
<u>11.</u>	<u>Atitude to MNCs& MRTPs</u>	0.10	0.04	0.40	0.33	0.61	0.43
<u>12.</u>	<u>Job satisfaction</u>	0.65	0.19	0.23	0.04	0.10	0.07
<u>13.</u>	<u>Self Confidence</u>	0.61	0.31	0.51	0.12	0.14.	0.24
<u>14.</u>	<u>Self Concept</u>	0.67	0.27	0.48	0.04	0.12	0.24

3-D Principal Component Analysis: All those above results observed through Correlation Analysis, Factor Analysis, Multiple Regression Analysis were also put to screening in 3-D Principal Component Analysis. There also, it is found that, several apparently independent organizational and management policy related variables are closely associated with one another, each one influencing and determining the values of other organizational and management related variables. At times, the organizational variables are influencing and determining the values of Management variables and vice versa. Many at times, the apparently not much significant Demographic variables such as Age, Sex, Monthly Income, Service and others were also determining and influencing the workforce attitude towards implementation several programs such as implementation of New Generation Technologies (NGN switches in Digital Switching) and Digital Automation processes in general.

Conclusions and Recommendations

1. Lack of Coherence among organizational and management perceptions by the workforce will play a vital role in Technology Management.
2. There shall be a proper and scientific coherence among all sub-systems.
3. Constant monitoring of Inter-surface problems by Expert Management System.
4. Internal and External Contradictions shall be brought down to the bare minimum.
5. Proper and Scientific future predictions shall be made by the Top Management leaving no room for short-sightedness.
6. Job Satisfaction and Customer satisfaction shall be monitored by using scientifically designed instruments with proper Item Validity Index and Reliability Coefficients.
7. Internal and External Contradictions shall be resolved by developing a higher order management system without much inter-surface problems among organizational sub-systems.
8. A true participation of Workforce on the one hand and Customers/Clients on the other shall be there while initiating modern Technology Management process methods and techniques.
9. Even in Marketing, it is established by the present investigator that Customer Loyalty is a function of Employee Loyalty.

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