

# Performance and Modelization of the Photovoltaic Pumping System

**Mohamed Elmamy Mohamed Mahmoud<sup>1-2-3\*</sup>, Abdellahi Ba<sup>2</sup>, Ismail Bidjel Ramdhane<sup>4</sup>, Yahya<sup>1</sup>, A.M., Ehssein<sup>2</sup>, C., Diene Ndiaye<sup>4</sup>, Mahmoud<sup>1</sup>, A.K. and Youm, I<sup>3</sup>.**

<sup>1</sup>Applied Research Laboratory for Renewable Energies (LRAER), UNA, Mauritania.

<sup>2</sup>Unité de Recherche en Electromécanique (UREM), ISET- Rosso, Mauritania.

<sup>3</sup>Laboratory of Semiconductor and Solar Energy, LASES, FST, UCAD, Dakar, Senegal.

<sup>4</sup>Laboratory of Electronic, Computing, Telecommunication and Renewable Energies (LEITER), UGB, Saint-Louis, Senegal

Corresponding Author E-mail: [ouldabelwehab@yahoo.fr](mailto:ouldabelwehab@yahoo.fr)

**Abstract:** The solar photovoltaic (PV) pumping system is an application widely used in the rural area to ensure the supply of water utilization for the populations and in isolated localities in Mauritania. This system is composed by three main parts; The PV Generator (PVG), impedance matching (DC/DC Power convert), and the hydraulic part (coupling of a motor and a centrifugal pump). In this article we study with simulation in Matlab/ Simulink environment the characteristics of a PV pumping system (submersible pump case); the three parts quoted for an overview of the performance of the system, taking into account the climatic parameters (solar irradiance, and ambient temperature), and the effect of the total manometric head (HMT) on the pumped flow rate. Two mathematical motor – pump models for PV application, were proposed in this article to contribute in the studies of PV pumping sizing. These models link directly the operating water current to the voltage and electrical power to the flow rate of the pump versus total head.

**Keywords:** PVG system, Power, Converter, motor-pump, flow, HMT.

## I. Introduction

Several research projects have been carried out on the renewable energy conversion systems and their applications which can be summarized in the following two points: The search for precise mathematical models that represent the real photovoltaic cell made it possible to retain the works of Biswas and Iqbal (2018) and Othmani *et al.*, (2017). The selected models were designed to reflect correctly the influence of different atmospheric conditions on solar cell

parameters. In this context, we must not forget to mention other works on optimization methods such as those of Hamidat and Benyoucef (2008), Yahyaoui *et al.*, (2015) and Dehini1 *et al.*, (2018). These methods are considered capable of determining the maximum power point of I (V) and P (V) characteristics of the photovoltaic cell. The search for the development of a determined mathematical models, which represent the optimization of the hydraulic part, made it possible to retain the work of Boutelhig and Bakelli (2012) and Bouden and Honsberg (2013). It is also possible to list other works, such as those of Mhamdi *et al.*, (2013), of Al-Badi *et al.*, (2018). These different researches have had the objective of proposing a use of photovoltaic pumping for any lighting condition and temperature.

## II. Description and modeling of the photovoltaic pumping system

### II. 1. System description

The system studied is shown in Figure 1, we have three parts that make up the PV pumping system; A PVG consisting of fort PV panels connected in series with a capacity of 190 Wp for each, The PV panel parameters are shown in table 1, a DC/DC power converter, and a permanent magnet DC motor coupled directly to a centrifugal pump, sensor less motor and a controller. The controller performances are shown in table 2. Mahmoud *et al.*, (2016).

**Table 1. Datasheet of the SOLTERRA-190 module**

Parameters	Value
Rated power	190 watt
Rated voltage	25,8V
Rated current	7,36A
Open circuit voltage	32,3V
Short circuit current	8,18A

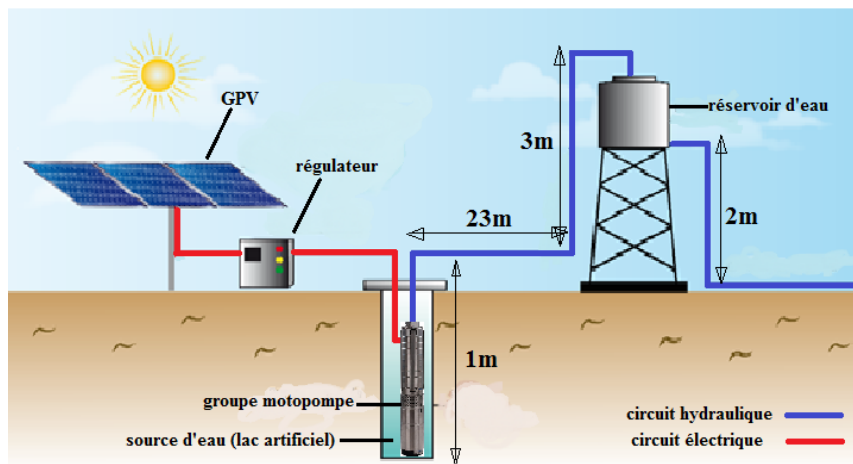
Photovoltaic module rated at  $1000\text{w/m}^2$  solar irradiation and  $25^\circ\text{C}$  cell temperature. The rated power of PV devices does not give an accurate indication of the outdoor performance, especially when the PV modules aren't a brand new one.

**Table 2. Controller performance**

Item # 1222	1222
Lift [m]	0-40m
Max. flow rate [ $\text{m}^3/\text{h}$ ]	7.5
Max. efficiency [%]	48
PVG nominal voltage DC	72- 96V

PVG open circuit voltage DC	200V
Solar generator [Wp]	350-1200
Max. motor current (A)	9.5
Pump type	Centrifugal
Motor power	1.7kw
Motor rate	900-3300

This study was performed at the Higher Institute Technological Education (ISET-Rosso) (16°30 North latitude, 15°48 West longitude at 8m altitude above the sea level).



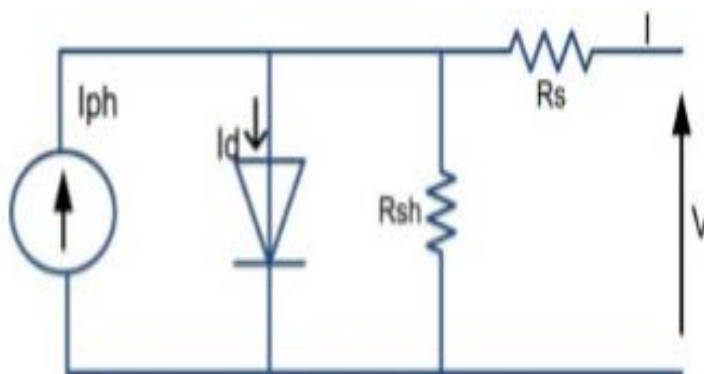
**Figure 1. The experimental setup**

## II. 2. PVG System modeling

A photovoltaic module is composed by photovoltaic cells, connected between them in series or/and in parallel, in the literature we can find two types of PV cell modeling; the model with a single diode or the other with two diodes, Mahmoud *et al.*, (2019), in our case, we use that with a single diode Figure 2.

This cell generates a current-voltage (I-V) characteristic that is strongly nonlinear, and that voltage-power (P-V). In order to detect this point, an attempt is made to trace these two characteristics using a variable resistive load or an electronic load Pelap *et al.*, (2016).

In this paper, we have chosen to work with the Luxor 190M model whose characteristic datasheet are presented in Table 1.



**Figure 2. Electrical model of the photovoltaic cell**

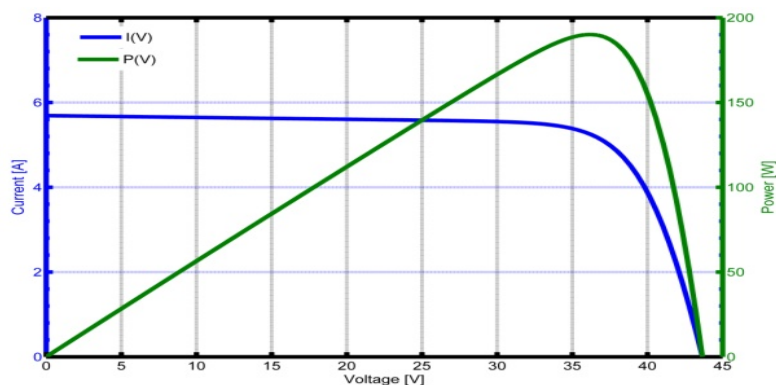
From this circuit, and applying Kirchhoff's law, we shall derive the following equations:

$$I = I_{ph} - I_s \left( \exp \left( \frac{V + R_s I}{V_t} \right) - 1 \right) - \left( \frac{V + R_s I}{R_{sh}} \right) \quad (1)$$

with:

$V_t$ : the thermal tension written as  $= (A * K * T) / q$ ,

$A$ : is the ideality factor of the diode, ( $K=1, 3805.10^{-38}$  J/K) is the Boltzmann constant,  $T$ : is the ambient temperature in  $^{\circ}\text{C}$ , ( $q=1, 02. 10^{-19}\text{C}$ ): is the electron charge,  $I_{ph}$ : is the photocurrent it is proportional to the solar irradiation flux,  $I_s$ : the diode saturation current,  $R_s$  and  $R_{sh}$ : are respectively the series and parallel resistance of the cell,  $V$  and  $I$ : are respectively the voltage and the current of the cell. Whereas the I-V curves represent the relation between the output current and voltage. The intersection of the curve with the y-axis gives the short circuit current and the intersection of the curve with the x-axis gives the open circuit voltage. Where the P-V curve colored green, the I-V curve colored blue. We plot the I-V and P-V characteristics of a module, shown in Figure 3.



**Figure 3. I-V Characteristic and P-V characteristic curve of a PVG**

### II. 3. Motor-pump modelization

There are several types of electrical motors that can be utilized to run the pump such as AC, DC, permanent magnet, brushed, brushless, synchronous and - asynchronous, variable reluctance, and many more.

The mathematical models of the inverter and the motor pump set are described in a great number of research papers. Thus, we can quote (Kou *et al.*, 1998; Pande *et al.*, 2003; Daud and Mahmoud, 2005; Hadj Arab *et al.*, 2006; Mezghani *et al.*, 2007).

These models describe the characteristics of each component of the pumping subsystem as the inverter, the motor or the pump. But these models do not give a direct relationship between the operating electrical powers of the pump.

In this paper, we use a mathematical model which directly links the output water flow rate  $Q$  versus the input operating electric power  $P$  and total head  $h$ .

This model is based on the analysis of the experimental results of one type pumping subsystems [Hmidat *et al.*, 2007; Hamidat and Benyoucef, 2008].

[Eckstein and Al-Ibrahim al] developed a detailed theoretical analysis to determine the characteristics of the motor and pump. The model is briefly summarized in the following. In their model, the performance of the pump can be predicted by using the affinity laws, which relates the pump speed ( $n$ ) to flow rate ( $Q$ ) head and power ( $P$ ) as:

$$Q = F(n) \qquad Q = Q_{ref} \left( \frac{n}{n_{ref}} \right) \qquad (2)$$

$$h = F(n^2) \qquad h = h_{ref} \left( \frac{n}{n_{ref}} \right)^2 \qquad (3)$$

$$P = F(n^3) \qquad P = P_{ref} \left( \frac{n}{n_{ref}} \right)^3 \qquad (4)$$

where  $Q_{ref}$ ,  $h_{ref}$  and  $P_{ref}$  are the corresponding values at a reference condition. These equations imply that for a given set of speed, flow rate and power, the corresponding values at a different speed can be determined for constant efficiency.

On the other hand, [Kou *et al.*, 1998] presented a model the first one relates the voltage ( $V$ ), current ( $I$ ) and head ( $H$ ) through the relation:

$$V(I, h) = a_0 + a_1 I + a_2 I^2 + a_3 h + a_4 h^2 \qquad (5)$$

The coefficients of the function ( $a_0, a_1, a_2, a_3$  and  $a_4$ ) are constants. Eq. (5) is used to determine the V-I characteristics of the PV pumping system. The I-V curve of the PV array at a certain weather condition and the V-I-H curve of the motor-pump are solved simultaneously. The second function relates the pump flow to current, and head can be expressed as:

$$Q(I, h) = b_0 + b_1 I + b_2 h \quad (6)$$

The coefficients of the function ( $b_0, b_1$  and  $b_2$ ) are constants. The coefficients of Eqs. (5 and 6) can be found from the data sheet provided by the manufacturer of the solar pump. So, Eq. (6) relates the pump flow rate to radiation level since the I-V curve of a PV array depends on the radiation level and temperature.

The operating point obtained from the PV model and Eq. (5) is substituted in Eq. (6) to find the pump flow rate of the PV pumping system at a certain head ( $h$ ).

With regard to the model (7) connecting the characteristic I-V of the pump with the pumping height and the (8) in form Q-V which develops characteristics to obtain the performance curves of the pump are proposed by the authors.

In the case of the current versus the voltage, we found that it is linear.

In the case of the flow, the experimental points present a certain curvature; therefore it seems more suitable to use second-degree equation.

For this reason, we suggested the following equation [Hadj Arab *et al.*, 2006]:

$$I(V) = aV + b \quad (7)$$

$$Q(V) = cV^2 + dV + e \quad (8)$$

with  $I$  and  $Q$  being positive. Where  $a, b, c, d$  and  $e$  are parameters easily obtained by means of an iterative Newton technique.

The researchers, [Hadj Arab *et al.*, 2006] generalized the model for all heights by linking all the coefficients  $a, b, c, d$  and  $e$  to the pumping height  $h$  by the following second-degree equations:

$$a(h) = a_0 + a_1 h + a_2 h^2 + a_3 h^3 \quad (9)$$

$$b(h) = b_0 + b_1 h + b_2 h^2 + b_3 h^3 \quad (10)$$

$$c(h) = c_0 + c_1 h + c_2 h^2 + c_3 h^3 \quad (11)$$

$$d(h) = d_0 + d_1 h + d_2 h^2 + d_3 h^3 \quad (12)$$

Where the constant  $a_i, b_i, c_i$  and  $d_i$  are the secondary parameters and depend only on the pumping subsystem type. On the other hand, the model which gives  $P(Q)$

of the pump motor unit for different pumping heights has been developed by [Hadj Arab *et al.*, 2006].

This model directly links the useful electrical power  $P$  function of the water flow of the pump  $Q$  as follows:

$$P(Q, h) = a_{0j}(h)Q^3 + a_{1j}(h)Q^2 + a_{2j}(h)Q + a_{3j}(h) \quad (13)$$

The principal parameter  $a_{ij}(h)$  are constants depend of the pumping system.

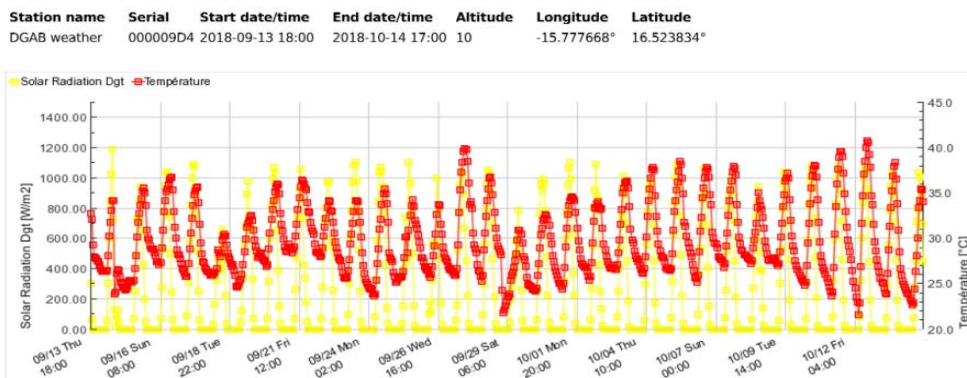
### III. Results and Discussions

The meteorological, electrical and hydraulic parameters were monitored hourly for four days. Table III shows the medium value of the parameters. Throughout these days the PV panel was mounted at a tilt angle of  $17^\circ$  for the two first days and  $7.5^\circ$  for the two last days and oriented to magnetic North.

**Table 3. Parameters of the four studied days**

Days number	01	02	03	04
Irradiation (kWh/m <sup>2</sup> /Day)	7.83	9.22	7.97	8.49
Temperature (°C)	29.52	33.03	40.22	29.06
Tilt angle (°)	17	17	7.5	7.5

The solar irradiation variations during the experimentation and the ambient temperature variations are depicted are illustrated in fig. 4. The solar irradiation variations were in the range between 700 and 1300 W/m<sup>2</sup>, with an average value of about 920 W/m<sup>2</sup>. The ambient temperature has influencing the radiation and convective heat loss from the top surface of the photovoltaic panel. During experimentation, the ambient temperature was varied between 23 °C to about 37 °C, with an average value of about 29.2 °C. Similar ambient temperature variations were observed.



**Figure 4. Variation of solar irradiation and ambient temperature**

The simulations are developed to obtain the models parameters applied to pump motor. It is necessary to physically separate the pump motor to develop in the rest of this work, simulations of current-voltage characteristics and the power-flow.

For each head, we obtained two measured curves: the I-V and the P-Q relationship of the motor pump. Figure 5 illustrates an example of the characteristics obtained for the pump centrifugal using the experimental measurement.

Which represent the dependence of the current versus the voltage for each head. From the result, we have tried to find simple mathematical expression, which allow us to adjust the experimental value. In the case of the current versus the voltage, we found that it is linear.

The P (Q) characteristics of the one tested subsystem are carried out and plotters for each total head. An example of the measurement values are shown in Figure 6. This represents the dependence of the electrical power, P versus the flow rate, Q the analysis a simple mathematical model (Hamidat, 1999).

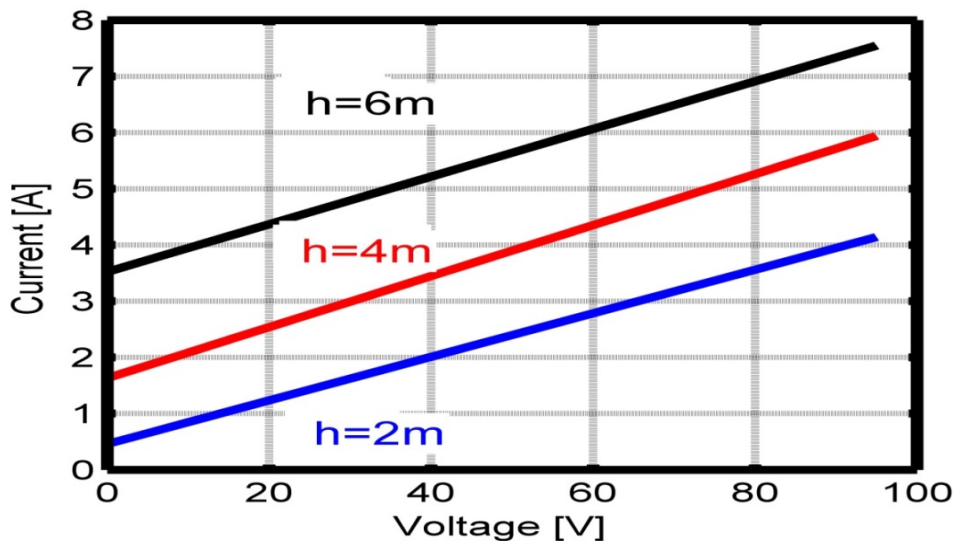
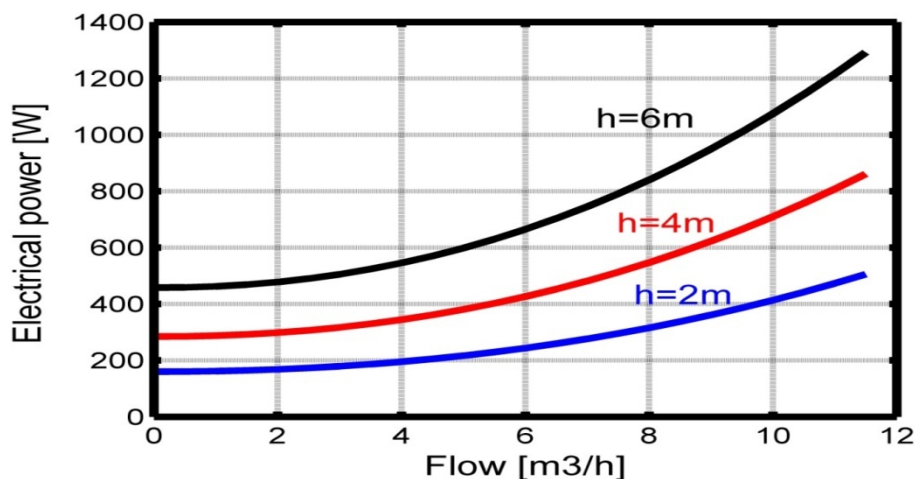


Figure 5. Characteristics current-voltage for pump for different heads





**Figure 6. Characteristics Electrical power-flow rate for pump for different heads**

#### IV. Conclusion

In this article, a PV water pumping system for the Mauritanian climate was designed. A case study for a small farm at the Higher Institute of Technology Institute (ISET-Rosso) was selected and discussed. This system is suitable for many rural areas as it is designed to operate free of charge and requires no maintenance. Modeling and validation of photovoltaic pumping subsystem models allowed us to simulate the performance of photovoltaic pumping systems on a site.

The analytical model allowed an excellent fit of the electrical characteristic curves of the current as a function of the voltage and the power as a function of the flow as a function of the solar radiation and the ambient temperature.

The development of the models with a pump motor allows us to obtain the operating point of the photovoltaic pumping system. The models are based on the experimental results of photovoltaic pumps, which have been completely characterized in the pumping test facility to obtain the parameter of the model. The models are designed for the centrifugal pump (Lorentz PS1200 c-sj8-5) with BLDC motor.

#### References

1. Al-Badi, A., Yousef, H., Al Mahmoudi, T., Al-Shammaki, M., Al-Abri, A. and Al-Hinai, A. 2018. Sizing and modelling of photovoltaic water pumping system. *International Journal of Sustainable Energy*, 37(5): 415-427.

2. Arab, A.H., Benghanem, M. and Chenlo, F. 2006. Motor-pump system modelization. *Renewable Energy*, 31(7): 905-913.
3. Biswas, S. and Iqbal, M.T. 2018. Dynamic Modelling of a Solar Water Pumping System with Energy Storage. *Journal of Solar Energy*, 2018: 1-12.
4. Boutelhig, A. and Bakelli, Y. 2012, December. Comparative study on Water Max A 64 DC pump performances based Photovoltaic Pumping System design to select the optimum heads in arid area. In *Microelectronics (ICM)*, 2012 24<sup>th</sup> International Conference on IEEE, 1-5 pp.
5. Bowden, S. and Honsberg C. 2013. PV CDRoom; Available from <http://pveducation.org/pvcdrom>, accessed on July 2013.
6. Daud, A.K. and Mahmoud, M.M. 2005. Solar powered induction motor-driven water pump operating on a desert well, simulation and field tests. *Renewable Energy*, 30(5): 701-714.
7. Hamidat, A. and Benyoucef, B. 2008. Mathematic models of photovoltaic motor-pump systems. *Renewable Energy*, 33(5): 933-942.
8. Kou, Q., Klein, S.A. and Beckman, W.A. 1998. A method for estimating the long-term performance of direct-coupled PV pumping systems. *Solar Energy*, 64(1-3): 33-40.
9. Mahmoud, M.E.M., Soukeyna, M., Yahfdhou, A., Mahmoud, A.K. and Youm, I. 2019. Sizing Method of a Storage System for Determining the Performance of a Photovoltaic Pumping System over the Sun. *Smart Grid and Renewable Energy*, 10: 17-28.
10. Mahmoud, M.E.M., Yahfdhou, A., Lemrabott, O.H., Ehssein, C., Kader, A. and Mahmoud, I.Y. 2016. Photovoltaic Pumping System for Application to Sites in Mauritania. *International Journal of Innovative Technology and Exploring Engineering*, 6(5): 12-20.
11. Mezghanni, D., Andoulsi, R., Mami, A. and Dauphin-Tanguy, G. 2007. Bond graph modelling of a photovoltaic system feeding an induction motor-pump. *Simulation Modelling Practice and Theory*, 15(10): 1224-1238.
12. Mhamdi, T., Hidouri, N. and Sbita, L. 2013. MPPT Control for photovoltaic pumping system based on perturb and observ algorithm. In *International*

---

Conference on Control, Engineering and-Information Technology.  
Proceedings Engineering and Technology, Volume 4, 117-121 pp.

13. Othmani, H., Chaouali, H., Mezghani, D. and Mami, A. 2015.Optimisation de la Technique de Perturbation et Observation par la logique floue. 3ème conférence Internationale des énergies renouvelables CIER, International Journal of Scientific Research and Engineering Technology (IJSET) 2015.
14. Pande, P.C., Singh, A.K., Ansari, S., Vyas, S.K. and Dave, B.K. 2003. Design development and testing of a solar PV pump based drip system for orchards. Journal of Renewable Energy, 28(3): 385–396.
15. Pelap, F.B., Dongo, P.D. and Kapim, A.D. 2016. Optimization of the characteristics of the PV cells using nonlinear electronic components. Sustainable Energy Technologies and Assessments, 16: 84-92.
16. Yahyaoui, I., Tina, G., Chaabene, M. and Tadeo, F. 2015. Design and evaluation of a renewable water pumping system. IFAC-PapersOnLine, 48(30): 462-467.

# **Extra-Pelvic Colo-Anal Pulls Through As an Alternative Techniques to Abdominoperineal in Low and Ultra Low Rectal Cancer in Hadhramout National Cancer Center**

**Salah Ahmed Binziad<sup>1</sup>, MD, Waleed K. Kaleem<sup>2</sup>, MD, Adnan A. Bakarman<sup>3</sup>, MD. and Saeed Ahmed Binbisher<sup>4</sup>, MD.**

<sup>1</sup> Assistants Professor of Surgical Oncology, Department of Surgery, College of Medicine, Hadhramout University, Mukalla, Hadhramout, Yemen. (HUCOM)

<sup>2</sup> Assistants Professor of Clinical Oncology, Department of Internal medicine, Faculty of Medicine, Hadhramout University, Mukalla, Hadhramout, Yemen.

<sup>3</sup> Assistants Professor of Hematological Oncology, Department of Internal Medicine, Faculty of Medicine, Hadhramout University, Mukalla, Hadhramout, Yemen.

<sup>4</sup> Professor of General Surgery, Department of Surgery, College of Medicine, Hadhramout University, Mukalla, Hadhramout, Yemen. (HUCOM)

Corresponding Author E-mail: binziadoncos@gmail.com

## **Abstract**

**Objective:** All patient with med, low and ultralow rectal tumors are wary from permanent colostomy after radical resection of distal rectal tumor, but the recognition of shorter safe distal resection margins, neoadjuvant chemoradiotherapy and the application of the technique of intersphincteric resection (ISR) have led to the prospect of restorative surgery for patients with distally situated tumor's.

**Aim of study:** This prospective study was designed to evaluate the safety and efficacy of the coloanal pull through in adult with sphincter preservation or coloanal anastomosis as alternative methods for abdominoperineal procedure to avoid permanent colostomy and to improve post-operative quality of life.

**Method:** A prospective study of 45 patient of Hadhramout National Cancer Center at Iben Sena Central Hospital and Al-Burj Consultant Hospital in Mukalla, Yemen from 2011 to 2018 was performed to identify feasibility of coloanal pull through in adult patient(s) as an alternative method of coloanal anastomosis. This study was reporting outcomes following coloanal pull through for mid, low and very low rectal cancer. The outcomes of interest included short-term adverse

events, functional and sexual results, postoperative quality of life and oncologic outcomes.

**Results:** Forty five patients were included, Operative mortality following CAP (coloanal pull through) was none and anastomotic leak rate was also none. Total stump ischemia, anastomosis dehiscence in 3 patients, were managed by redo operation on the 5<sup>th</sup>, 7<sup>th</sup> and 10<sup>th</sup> day respectively. Partial stump ischemia and partial anastomotic dehiscence occurred in two patients on the 4<sup>th</sup> & 7<sup>th</sup> day, who were managed by conservative methods. Recto-vaginal fistula occurred in two patients, one was due to a stitch and the second was after posterior pelvic exenteration. Adhesive intestinal obstruction occurred in one patient 7 months later, who was managed by exploration and adhesolysis. Stenosis occurred in three patients, and they were managed by dilatation under anesthesia. Deep venous thrombosis (DVT) was observed in one patient and was treated medically. The pooled rate of local recurrence was 8.8% (4 patients, 1.3, 1.5, 1.9 and 2yrs respectively.) with an average 5-year survival of 85.6%. Functional outcomes and quality of life may be improved with time progress. The use of chemoradiotherapy can offer benefits in terms of oncologic result, but at the cost of worse functional outcomes.

**Conclusion:** Careful case selection and counseling are required if satisfactory results are to be achieved. Coloanal pull through as an alternative technique to CAA (coloanal anastomosis) in middle and low rectal cancer after TME (total mesorectal resection) seems to be a safe and efficient with sphincter-preserving that provides effective procedure with acceptable oncologic and functional results to treat patients with middle or low rectal cancer while avoiding a prophylactic, diverting stoma with satisfactory function, quality of life is excellent and dramatic decrease of the cost.

**Keywords:** Coloanal, abdominoperineal, ultra-low rectal cancer, intersphincteric resection.

**Abbreviations:** CAP; (Coloanal pull through), CAA; (Coloanal anastomosis), TME; (Total mesorectal excision), ISR (Inter sphincteric resection), APR; (The abdominoperineal resection) SP; (Sphincter preservation).

## Introduction

Annually, approximately 39,670 patients are diagnosed with rectal cancer in the United States [1]. Surgical resection is the cornerstone of curative treatment. Superficially invasive, small cancers may be effectively managed with limited surgical procedures, such as local excision. However, the majority of patients have more deeply invasive tumors that require more extensive surgery, such as low anterior or abdominoperineal resection. Others present with locally advanced tumors that are adherent or fixed to adjoining structures such as the sacrum, pelvic

sidewalls, prostate, or bladder. The surgical and oncologic management of these patients varies greatly depending upon stage and location within the rectum [2, 3].

Recently, surgical techniques for sparing rectal function after radical resection of lower rectal cancer have improved significantly by advanced technology including double stapling devices, anastomotic devices and improved surgical skills in the patients with rectal cancer. However, there are about 20%–30% patients with low rectal cancer who require permanent colostomy [1-5].

The abdominoperineal resection (APR), which is a widely accepted surgical procedure for patients with low rectal cancer, has provided an increased chance of sparing the residual rectum function and satisfying patients with a good quality of life after surgery. Sphincter preservation (SP) and the maintenance of fecal continence have long been of interest and concern to colorectal surgeons [4, 5, 6].

Total mesorectal excision (TME), described by Heald in 1982 [7], has been increasingly used by clinicians. This has increased the rate of SP for more patients with low-lying rectal cancer, even in those with very low-lying cancer [8]. TME is considered to be the primary procedure for doing a radical resection for middle and lower third rectal cancer [9, 10].

The concept of specimen orientated surgery has led to effective management of rectal cancers with low levels of local recurrence [11]. These developments have resulted in constant refinements of the concept of what represents a safe distal resection margin following the excision of rectal cancer [12]. Which some consider be as low as 1 cm in certain circumstances [13].

In tandem with this, the importance of quality of life outcomes for rectal cancer patients is increasingly recognized, with several studies suggesting that quality of life and sexual activity are impaired by the presence of a permanent colostomy following abdominoperineal excision (APER) [14]. Single stage transanal Soave pull-through procedure (TSPP) represents an improvement in the sense of minimal invasive surgery for Hirschsprung's disease (HD) [15]. It has been rapidly popularized in many centers since it was published by De la Torre-Mondragon in 1998 [16].

### **Patients and Methods**

A total of Forty-five patient (27 males and 18 females), their ages ranged from 22 to 65 years old with distal, low or ultra-low cancer rectum with proven tissue diagnosis of rectal cancer, who underwent an a rectal resection with total mesorectal excision with sphincter preservation and hand-sewn coloanal pull

through anastomosis, whom treated at Hadhramout National Cancer Center, Iben Sena Central Hospital and Alburj Consultant hospital in Mukalla, Hadhramout, Yemen, Surgical department between October 2011 and December 2018.

**Exclusion Criteria:** Stage T4 tumors, involvement Ano-rectal ring or levator ani muscle and incontinent patients.

Tumor assessment: by

- ✓ Digital rectal examination
- ✓ MSCT.
- ✓ Proctoscopy.

### **Operative Technique**

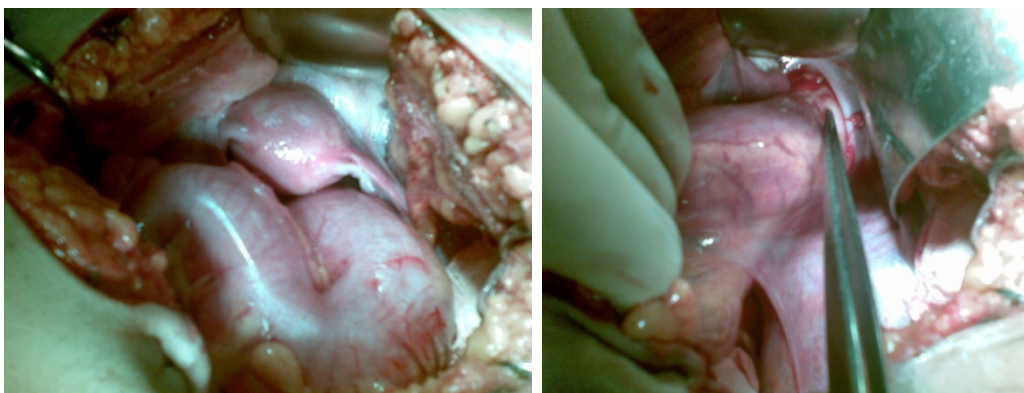
We performed conventional radical surgery of total anorectum and sigmoid resection with high resection of the inferior mesenteric artery, in which the artery is divided at its origin and the left colic artery before it gives the ascending and descending branches, preserving the arterial arcade to the distal colon. D2 lymph-node dissection, total mesorectal excision, and autonomic nerve preservation.

The perineal approach was taken with circumferential incision of the rectal mucosa just proximal to the dentate line then continue toward anal verge (mucosectomy). After specimen removal, the sigmoid colon was pulled down with colonic stump 5-7cm distal to anal ring, and a coloanal anastomosis was done. The anastomosis was performed by using manual hand-sewn suturing with 3-0 vicryl, 1-2 ampoule.

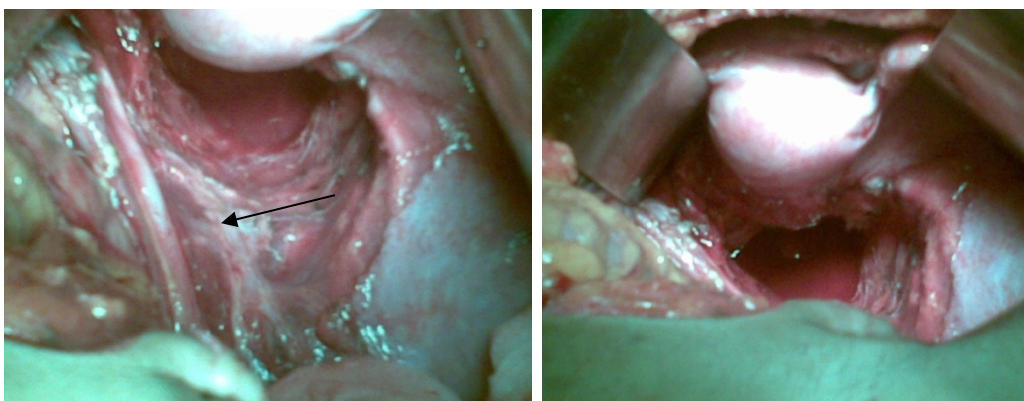
The sutures were placed between the colon and the anoderm, 6-8 stitches. The abdominal part of the procedure is completed by peritonization of the pelvic floor by suturing the lateral peritoneal reflections to the serosa of the dragged colon, Closure of the paracolic gutter.

Suction drain in the para-rectal space. Operative time ranged from 1.5 to 3 hrs, with declining curve with progressing of the learning curve. Hospital stay ranged from 5 to 10 days, except in complicated cases which have an average of 19 days.

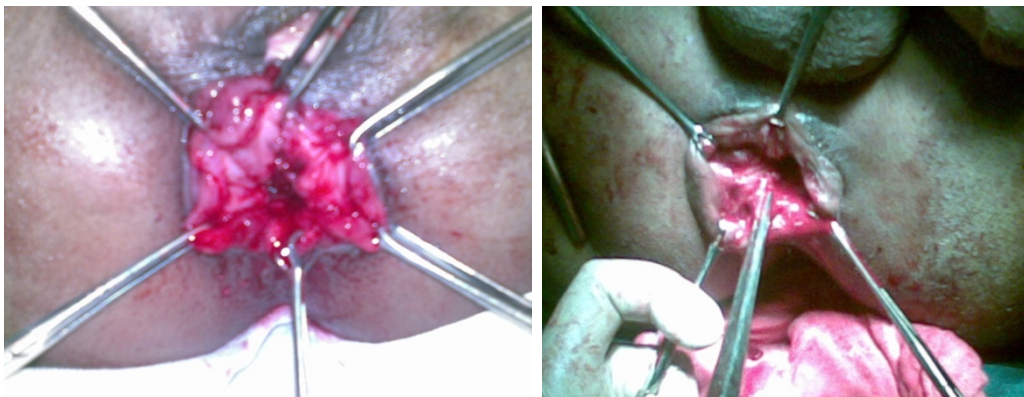
Care of the pulled stump is simple by keeping it wet and clean by saline wash and Vaseline gauze, Application of antiseptic cream twice daily. Stump trimming is performed after 2 weeks, (the patient is readmitted for one day).



**Figure 1. Mobilization of the rectum**



**Figure 2. Arrow sees preservation of splanchnic nerve and pelvis after resection**



**Figure 3. Mucosal resection of rectum below dentate line**





**Figure 4. Specimen after removal and stump colon**



**Figure 5. Stump of the colon throw anal ring**



**Figure 6. Stump trimming after 2 weeks suture line of coloanal anastomosis after trimming**

**Adjuvant Therapy**

If the depth of tumor invasion was T3 upon preoperative evaluation, we selectively treated the patients with pre-operative chemo-radiotherapy (CCRT). The CCRT was as follow: 5FU, 325 mg/m<sup>2</sup>, and leucovorin, 20 mg/m<sup>2</sup>, were given as intravenous infusions in 500 ml of saline over 6 hours on days 1-5 and 29-33.

The radiotherapy was delivered in the afternoon, after infusion of chemotherapeutic agents, with a total dose of 50.4 Gry in 28 fractions. A radical resection was performed after four weeks. In patients with histologically-proven lymph node (stage III) involvement, adjuvant chemotherapy with 5-fluorouracil and leucovorin was applied for duration of six months. No radiotherapy was done after surgery.

**Assessment of Efficacy and Complications**

The effect of the operation was evaluated with regard to anal incontinence, local recurrence, and disease-free survival (DFS). Anal incontinence was evaluated by using a questionnaire at six months after surgery. Incontinence was scored by using Kirwan's classification: 1, no incontinence; 2, incontinence of flatus and liquids; 3, occasional incontinence of solids; 4, frequent incontinence of solids; 5, incontinence requiring a colostomy.

We grouped Kirwan's grade 1 and grade 2 as tolerable, and others as intolerable. Urinary voiding difficulty was defined as chronic urinary retention with residual urine in spite of three days training, and in such cases, it was necessary to consult with the Urology Department. Sexual dysfunction in male under the age of 70 was evaluated with direct questions and answers six months postoperatively.

Follow-up examinations were performed with digital examinations and anoscopy every month for 12 months. Local recurrence was defined as recurrence around the anastomosis and the pelvic floor. Colonoscopy and Abdominopelvic CT were done three and six months after surgery, and then annually or more frequently in cases of abnormal symptoms or findings.

**Statistics and Survival**

Statistical analyses were performed with chi-squared tests and Student's t-test, whenever appropriate, to compare the categorical variables between the groups.

The disease-free survival curves were calculated by using the Kaplan-Meier method. The difference between the in survivals curves was measured using log-rank tests. Statistical significance was defined as  $P < 0.05$ .

## Results

### Patient Demographics and Characteristics

Forty five patients were analyzed. The mean age was 43, Males were more than females, two patients were lost to follow-up after hospital discharge.

**Table 1. Illustrate total number of cases 45 (27 males and 18 females), age ranging from 22 to 65 years**

Sex		Age		
		<40	40-60	>60
Male	27	12	10	5
Female	18	13	4	1
<b>Total</b>	<b>45</b>	<b>25</b>	<b>14</b>	<b>6</b>

Operative procedures were rectal and sigmoid resection with Colo-anal pulls through and hand-sewn anastomosis in 45 patients. The mean of the distal resection margin from 1-4cm.

**Table 2. Illustrated macroscopic rectal tumor and Distance from anal average**

Gross pathology	Distance from anal verge			Total
	4-7 cm	8-10	>10 cm	
Annular mass	6	10	3	19
Ulcerating mass	10	5	0	15
Polyploid	4	7	0	11
<b>Total</b>	<b>20</b>	<b>22</b>	<b>3</b>	<b>45</b>

The thin body stature frequently made it easy to access to the pelvic floor for the sphincter-saving operation. Post-operative assessment of the specimens and lymph node status reveal the following:

**Table 3. Type of Histopathology tumor type and Grading**

Histopathology	Well diff.	Moderate diff.	Poor diff.	Total
Adenocarcinoma	17	14	0	31
Mucoid	9			9
Signet ring	2			2
Mucinous	3			3
<b>Total</b>	<b>45</b>			

**Table 4. Illustrate Lymph node metastases**

Site	L.N. Status	
	Negative	Positive
Pararectal	39	6
Iliac	14	31

**Functional Outcome and Fecal Incontinence after Surgery**

At 6 months after the surgery, the patients suffered intolerable anal incontinence (Kirwan's grade ( $>2$ ) 44.4 % (12/27) of the males had intolerable anal incontinence, which was significantly more than 16.6% (3/18) for females ( $P < 0.005$ ).

We aggressively followed up the cases of total intersphincteric resection (total ISR). Of nine cases, five cases gradually recovered continence six months after surgery and remaining 4 cases after 12 months.

**Follow-up and recurrence**

The median follow-up was 24.0 and 23.5 months. The local recurrence rate after operations was 8.8 % (4/45). The sites of local recurrence were the lateral pelvic wall (1), the line of anastomosis (3). During the intensive follow-up, we successfully performed completion abdominoperineal and pelvic colostomy in two cases.

**Figure 7. local recurrence**

In another two cases, we could not perform a secondary operation because there was a distant metastasis when we detected local recurrence.

**Figure 8. End result****Table 5. Postoperative Complications**

Type	No. and Details
Mortality	Non
Total stump ischemia/anastomosis dehiscence	3 patients, managed by redo on the 5 <sup>th</sup> , 7 <sup>th</sup> & 10 <sup>th</sup> day.
Partial stump ischemia/partial anastomosis dehiscence	2 patients on the 4 <sup>th</sup> & 7 <sup>th</sup> day, managed by conservation.
Recto-vaginal fistula	2 patients, one due to a stitch and the second after post. Pelvic exenteration.
Adhesive intestinal obstruction	1 pt. 7 months. After, managed by exploration and adhesolysis.
Stenosis	3 patients, managed by dilatation under anesthesia.
DVT	1 patient, medical treatment
Recurrence	4 patients, 1.3, 1.5, 1.9 & 2ys. Respectively.

## Discussion

Low rectal tumors are often treated with sphincter-preserving resection followed by coloanal anastomosis [17]. In the last few decades, the treatment of rectal cancer has changed dramatically. The value of sphincter-preserving surgery is the radical resection of the tumors of the distal rectum with preservation of the anal sphincter and genitor-urinary functions. A sphincter-preserving operation may be classified as a standard low anterior resection, low anterior resection with coloanal anastomosis, or low anterior resection with J-pouch colonic reservoir. A coloanal anastomosis is an extra pelvic anastomosis situated at the apex of the anal canal or lower in the anal canal at the dentate line [18].

Recognition of shorter, safe, distal resection margins and the application of coloanal pull through technique have led to the prospect of restorative surgery for patients with distally-situated cancer of the rectum, and coloanal pull through surgery has no limitations, in that the anastomosis could be done at the surgical ring of anal canal. In our study, the number of Colo-anal pulls through cases was larger for males than for females.

Schiessel reported that the rate of long-term continence function for solid, liquid stool, and flatus was 86.3% after the operation, but we observed that only 65% of the patients with an intersphincteric resection had tolerable continence for solid stool at 6 months after surgery. With the other reports from East Asian countries, 72% of the patients recovered tolerable continence at 6 months after surgery [19, 20]. The degree of anal incontinence after surgery is so complex that it is not easy to apply the index developed by several authors [21, 22]. The details of continence, such as a description of leakage to gas, mucus, or liquid stool, episodes of minor incontinence, use of medical agents to influence bowel activity, and pad, were included in a questionnaire to provide a better picture of how continence was influenced by sphincter resection [23].

Bong Hwa Lee *et al.*, followed-up with five patients who underwent a total resection of the internal sphincter, total ISR. Two of the five patients recovered continence, and could lead a normal life without a pad. Schiessel reported a 5.3% local recurrence in ISR patients. The pooled rate of local recurrence by collective review was 9.5% (range: 0-31%) [24]. Practice Parameters for the Management of Rectal Cancer' of the American Society of Colorectal Surgeons described the minimum acceptable length of the distal margin as 1 cm. Margins more than 1 cm should be obtained with larger tumors for cancers of the distal rectum (5 cm from the anal verge) [25].

The range of distal resection margin for locally-recurrent Less than 1 cm. We might speculate possible cause of local recurrence was not the narrow distal resection margin, but a circumferential extension of tumor cells. This may suggest that alternative routes or spread in very low cancers may lead to inadequate resection by TME resection alone. The tumor's spread along the musculature of the hind gut beyond the dentate line could possibly explain the occasional involvement of lymph nodes outside the conventional mesorectum [26]. The pathology of the resection margin in the cases of recurrence in the vaginal wall were shown to be free of tumors. We could not rule out contamination of the tumor cell during the resection because the patients did not have preoperative radiation therapy in two cases of recurrence. Another possible cause was a chance of skip metastasis to the vaginal wall.

---

**Conclusion**

Extra-pelvic Colo-anal pull through as an alternative technique to CAA in middle and low rectal cancer after TME seems to be a safe and efficient with sphincter-preserving that provides effective procedure to treat patients with low or ultra-low rectal cancer while avoiding a prophylactic, diverting stoma give satisfactory function and quality of life is excellent. Peritonization of the pelvic floor and Closure of the paracolic gutter lead to a dramatic decrease in the incidence of post-operative intestinal obstruction due to internal herniation or adhesions. an acceptable complication rate, in the long-term outcome, in terms of disease-free survival.

**References**

1. Jemal, A., Siegel, R., Xu, J. and Ward, E. 2010. Cancer statistics, 2010. CA: a cancer journal for clinicians, 60(5): 277-300.
2. Wood, W.C. and Willett, C.G. 1992. Update of the Massachusetts General Hospital experience of combined local excision and radiotherapy for rectal cancer. Surgical Oncology Clinics of North America, 1(1): 131-136.
3. Willett, C.G. 1998, January. Local excision followed by postoperative radiation therapy. Seminars in Radiation Oncology. 8(1): 24-29.
4. Gambacorta, M.A., Valentini, V., Coco, C., Manno, A., Doglietto, G.B., Ratto, C., ... and Mantini, G. 2007. Sphincter preservation in four consecutive phase II studies of preoperative chemoradiation: analysis of 247 T3 rectal cancer patients. Tumori Journal, 93(2): 160-169.
5. Guillem, J.G., Chessin, D.B., Shia, J., Suriawinata, A., Riedel, E., Moore, H.G., ... and Wong, W.D. 2007. A prospective pathologic analysis using whole-mount sections of rectal cancer following preoperative combined modality therapy: implications for sphincter preservation. Annals of Surgery, 245(1): 88-93.
6. Gu, J., Bo, X.F., Xiong, C.Y., Wu, A.W., Zhang, X.P., Li, M., ...and Wang, H.Y. 2006. Defining pelvic factors in sphincter-preservation of low rectal cancer with a three-dimensional digital model of pelvis. Diseases of the Colon and Rectum, 49(10): 1517-1526.
7. Heald, R.J., Husband, E.M. and Ryall, R.D.H. 1982. The mesorectum in rectal cancer surgery-the clue to pelvic recurrence?. British Journal of Surgery, 69(10): 613-616.

8. Grotowski, M. 2004. Rectal cancer-review of methods and treatment results. *Polski merkuriusz lekarski: organ Polskiego Towarzystwa Lekarskiego*, 16(93): 289-292.
9. Pinsk, I. and Phang, P.T. 2007. Total mesorectal excision and management of rectal cancer. *Expert Review of Anticancer Therapy*, 7(10): 1395-1403.
10. Tzardi, M. 2007. Role of total mesorectal excision and of circumferential resection margin in local recurrence and survival of patients with rectal carcinoma. *Digestive Diseases*, 25(1): 51-55.
11. Dai, Y., Jiang, J.B., Zhang, X.M., Ma, Z., Jin, Z.T. and Bi, D.S. 2006. Application of single stapler combined with prolapsing technique in anterior resection of ultra-low rectal cancer. *Zhonghua yi xue za zhi*, 86(12): 822-825.
12. Guerriero, O., Tufano, G., Pennetti, L., D'Amore, E., Sarnella, G. and Sodano, B. 2006. Sphincter-saving surgery in low rectal cancer. *Chirurgia Italiana*, 58(1): 83-92.
13. Wang, J.P. and Song, X.M. 2006. Extended resection for locally advanced colorectal cancer. *Chinese Medical Journal*, 119(20): 1675-1676.
14. Wu, X.J., Wang, J.P., Lei, W., He, X.S., Zou, Y.F., Lei, L., ... and Ping, L. 2008. Increased rate change over time of a sphincter-saving procedure for lower rectal cancer. *Chinese Medical Journal*, 121(7): 636-639.
15. Teeraratkul, S. 2003. Transanal one-stage endorectal pull-through for Hirschsprung's disease in infants and children. *Journal of Pediatric Surgery*, 38(2): 184-187.
16. De la Torre-Mondragon, L. and Ortega-Salgado, J.A. 1998. Transanal endorectal pull-through for Hirschsprung's disease. *Journal of Pediatric Surgery*, 33(8): 1283-1286.
17. Brown, S., Margolin, D. A., Altom, L. K., Green, H., Beck, D. E., Kann, B. R., ...and Vargas, H. D. 2018. Morbidity following coloanal anastomosis: a comparison of colonic J-pouch vs straight anastomosis. *Diseases of the Colon and Rectum*, 61(2): 156-161.



18. Modaber, A.M.A., Hammad, A. and Vusal Aliyev. 2018. Different Modalities of Sphincter Saving Procedures for Distal Rectal Cancer. *Interdisciplinary Journal of Gastroenterology, Hepatology and Endoscopy*, 2(1): 1-8.
19. Tzardi, M. 2007. Role of total mesorectal excision and of circumferential resection margin in local recurrence and survival of patients with rectal carcinoma. *Digestive Diseases*, 25(1): 51-55.
20. Hansen, O., Schwenk, W., Huckle, H.P. and Stock, W. 1996. Colorectal stapled anastomoses. *Diseases of the Colon and Rectum*, 39(1): 30-36.
21. Parks, A.G. and Percy, J.P. 1982. Resection and sutured colo-anal anastomosis for rectal carcinoma. *British Journal of Surgery*, 69(6): 301-304.
22. Lazorthes, F., Voigt, J.J., Roques, J., Chiotasso, P. and Chevreau, P. 1990. Distal intramural spread of carcinoma of the rectum correlated with lymph nodal involvement. *Surgery, Gynecology and Obstetrics*, 170(1): 45-48.
23. Kameda, K., Furusawa, M., Mori, M. and Sugimachi, K. 1990. Proposed distal margin for resection of rectal cancer. *Japanese journal of cancer research*, 81(1): 100-104.
24. Shirouzu, K., Isomoto, H. and Kakegawa, T. 1995. Distal spread of rectal cancer and optimal distal margin of resection for sphincter-preserving surgery. *Cancer*, 76(3): 388-392.
25. Karanija, N.D., Schache, D.J., North, W.R.S. and Heald, R.J. 1990. Close shave in anterior resection. *British Journal of Surgery*, 77: 510-512.
26. Guillem, J.G., Paty, P.B. and Cohen, A.M. 1997. Surgical treatment of colorectal cancer. *CA: a cancer journal for clinicians*, 47(2): 113-128.

# The Role of Patent System in Hi-Tech Entrepreneurship-An Empirical Study from Shanghai

Cheng Deli and \*Weijia Kong

Shanghai International College of Intellectual Property, Tongji University,  
Shanghai, China

Corresponding Author E-mail: marina\_kong@tongji.edu.cn

**Abstract:** “Mass entrepreneurship and innovation” is an effective way to stimulate social innovation potential and entrepreneurial vigor. The role of intellectual property in entrepreneurial activities has attracted much attention. The paper examines the complex relationship between entrepreneurial activities and the application and use of patent through questionnaire surveys and field interviews of nearly 200 technology startups in Shanghai. The survey found that patents have a weaker incentive for startups’ innovation, but they play an important role in helping companies to gain competitive advantages, by means of preventing technology from copying, obtaining government support, and improving corporate image etc. Startups are reluctant to apply for patents because of the insufficient legal protection and the fear of competitors’ follow-up R&D. The commercialization of the patent in entrepreneurship needs to be further strengthened besides the defensive purposes, and suggestions for improving the application of comprehensive patent strategies and raising the level of judicial protection are proposed.

**Keywords:** innovation and entrepreneurship, patent system, incentive, competitive advantage, policies, suggestions.

## 1. Introduction

Entrepreneurship contribute significantly to economic growth in the global economy (Audretsch *et al.*, 2006; Van Stel, 2018). Entrepreneurship, in nature, is a process of finding, evaluating and exploiting the opportunity to make the commodity or services (Shane and Venkataraman, 2000). They create new organizations, products, services, jobs, and chances for complementary economy (Verheul *et al.*, 2002). Intellectual property (IP) law is an important policy lever that affects not only the opportunities for engaging in entrepreneurship but also the success or failure of many entrepreneurial efforts (Sichelman and Graham, 2010). Intellectual property law, as the legal basis of knowledge and technology, has important functions of “innovative law” and “industry law” (Wu, 2016). Its

core research is innovation (Zhang, 2017). It not only becomes a competitive weapon for companies to protect innovation, gain benefits and leading position, but also an important part of corporate value (Granstrand, 1999), and gradually surpasses tangible assets to dominate the development of contemporary enterprises (Reitzig, 2007). Especially for high-tech startup companies, the disadvantages of tangible assets are difficult to change in the short term, but effective management and application of intellectual property rights can create new competitive advantages for enterprises and promote the rapid growth of enterprises (Hanni *et al.*, 2012; Marcus, 2013). Although a considerable body of previous work has explored the relationship between IP rights and innovation (Gallini and Scotchmer, 2002; Lee *et al.*, 2006; Jiang and Dan, 2014; Fang *et al.*, 2017), far less scholarship has focused on the more particular relationship between IP rights and entrepreneurship (Burstein, 2016).

At present, China is vigorously advocating innovation and entrepreneurship. From 2015 to 2017, the “Government Work Report” has elevated innovation and entrepreneurship (mass entrepreneurship and innovation) to the strategic height of the new engine of national economic development. Innovation and entrepreneurship have attracted unprecedented attention. From January 2015 to December 2017, as many as 45 policies related to innovation and entrepreneurship have been issued by the State Council of P.R.C. only, and hundreds of documents have been issued by various ministries and local governments.<sup>1</sup> The study of the interactive relationship between intellectual property rights and innovation and entrepreneurship has a strong practical significance for a correct understanding of the promotion role of intellectual property rights in entrepreneurship. However, the current theoretical researches, policy analysis or empirical researches have not yet clarified how a specific intellectual property (e.g., patent) affects the innovative development of startup companies (Graham, 2010).

This article will employ an empirical research to discuss the role of the patent system in entrepreneurship. The paper is organized as follows: The second part reviews the literature on the relationship between intellectual property and entrepreneurship. The third part explains the research methods and survey data collection. The fourth part analyzes the impact of patents on innovation activities. The fifth part analyzes the ways in which patents help companies gain competitive advantage, and summarizes the significance, enlightenment and further problems to be discussed in the last part.

---

<sup>1</sup>Source: China Government website, "Public entrepreneurship, and innovation" policy compilation analysis platform, search URL: <http://www.gov.cn/zhengce/zhuti/shuangchuang/>, Retrieved on February 1, 2017

## 2. Literature Review

Most existing studies of the relationship between intellectual property and entrepreneurship focus on the effects of various IP laws on entrepreneurial behavior (Autio and Acs, 2010; Kirzner, 2015; Liu, 2017). They focus, in other words, on how startups utilize and encounter the existing arrangement of IP laws. To be sure, this approach offers some valuable insights, but it does not provide a complete picture of the ways in which intellectual property and entrepreneurship interact because intellectual property is not just a legal or operational issue in entrepreneurship (Smith and Barclay, 1997), it is also a strategic issue in the entrepreneurial process (Gallié and Legros, 2012).

What is the role of patents in the development of startup companies? Jurists believe that patents can provide exclusive rights to technology to thus effectively protect technology; economists believe that granting inventions exclusive rights to remunerate their investment and prevent their R&D results from being copied without compensation (Polinsky and Shavell, 2007).

The most comprehensive empirical study of the relationship between intellectual property and entrepreneurship is the Berkeley patent survey (Graham *et al.*, 2009). The study examined 1,332 early-stage technology startups in the United States on a series of issues involving the relationship between intellectual property and entrepreneurship. Many meaningful discoveries have been made. For example, patents generally have weaker incentives for innovation activities; the motives of patent applications for startups vary greatly according to the nature of industry and technology; the main purpose of startups to obtain patents includes seeking commercial financing, to prevent copying, and to improve company reputation and so on.

Some scholars have emphasized that the relationship between patents and entrepreneurship is closely related to the entire ecological innovation environment and the background of the entrepreneurship (Burstein, 2016). It depends on the relative competitiveness of startups and existing companies, on the characteristics of technology that startups want to commercialize, and on the social, political and legal environment in which they are located (Nelson, 2014).

First, patent protection affects entrepreneurial activity. Liang Cui and Wang Zhixin (2017) believe that the strength of patent protection affects the activity of entrepreneurship and demonstrates the inverse U-shaped relationship of patent protection on the level of entrepreneurial activity. Startups are often affected by patent troll during the licensing and implementation of patents (Karakashian, 2015). Research has found that start-ups are more likely to pay a small sum to

settle their troubles rather than pay a lot of money to participate in litigation (Chien, 2013).

Second, startups applied for patents to obtain venture financing. An econometric study shows that there is a positive correlation between patents obtained by startups and the number of financings (Sichelman and Graham, 2010) because patents indicate the quality of the technology owned by the company, the superiority of the management team, and the strategic positioning of the company. These are important investment decision-making basis for investments of venture capital (Hsu and Ziedonis, 2013). Another explanation is that patents can help startups to operate freely, making their flexible business models more attractive to investors (Graham *et al.*, 2009). Third, the patent licensing system has promoted the development of startups. In addition to applying patents themselves, startups also obtain and use patents through a patent licensing system.

The survey data shows that the implementation of licensing in startups is increasingly becoming the main means of technology transfer (Feldman and Lemley, 2015). The “technology-for-market” theory emphasizes the importance of patents in expanding the exchange of technical information between partners (Arora *et al.*, 2001), and believes that small businesses are more likely to license their patents and import technologies into the downstream product markets of the industry chain, and thus patents strengthen technology licensing as a kind of particular business model (Arora and Merges, 2004).

The existing literature on patent activity and entrepreneurship described above produces two important conclusions. The first is that the relationship between the patent system and entrepreneurial activity is complex and multifaceted. Patents affect entrepreneurial activities in many aspects in different ways. The second is that the role of the patent system is highly dependent on the environment and the industry, company structure and technical characteristics. So, in the current stage of social development and the environment of incentive entrepreneurship policies in our country, how does the patent system affect or promote entrepreneurial activities? This article will illustrate it by empirical study of survey data of startups in Shanghai.

### **3. Research Methods and Data Collection**

#### **3.1 Research Methods and the selection of company, respondents, industrial sectors**

Based on the purpose of our research and related literature review, we have proposed a series of questions on the relationship between the patent system and entrepreneurship. For example, how does a patent play a role in a company's

innovation activities? What is the purpose of patent application of startup companies? What role does a patent play in startup financing? How do startups treat patent infringement? Given these issues are more general, we have designed a questionnaire that can provide more data. In order to better translate these issues into questionnaire surveys, we visited experts in the areas of intellectual property, innovation and entrepreneurship, technology transfer managers, managers of science and technology parks, and some active entrepreneurs. We examined the literatures of economics, law, management, and other social science and empirical literatures (Edwin, 1986; Thursby and Marie, 2002). With reference to the previous survey on intellectual property and innovation, some hypotheses have been formed. Through the above research and exchanges, we have a better understanding of the entrepreneurial environment in our country and have carried out a few rounds of amendments to the questionnaire.

With the help of the Shanghai Science and Technology Commission, 198 startup companies established in the past 10 years (from 2007) were selected. These startups are mainly scientific and technological small and medium-sized enterprises<sup>2</sup>. The respondents were mainly the CEO and senior technicians of the company. Because we mainly want to understand how patents affect the entrepreneurial process of entrepreneurs, we target the selected companies to some industries with high degree of concern.

Reference is also made to the "Guiding Catalogue of Key National Strategic Emerging Industries Products and Services"<sup>3</sup>, "Statistical Catalogue of National High-tech Industries"<sup>4</sup> and "National Catalogue of Patent-Intensive Industries"<sup>5</sup>. Based on the literature, previous survey data and understanding of entrepreneurial characteristics in interviews, we have overlooked some high-tech industries that are not suitable for entrepreneurship, such as the research of wind, electricity, and

---

<sup>2</sup> Technology-based SMEs refer to the companies that conduct S&T research and development activities, obtaining independent IP rights and converting them into high-tech products or services. The total number of employees shall not exceed 500, the annual sales income shall not exceed 200 million yuan, and the total assets shall not exceed 200 million yuan. Source: "Measures for the Evaluation of Science and Technology SMEs (Guokefazheng [2017] No.115)". Ministry of Science and Technology.

<sup>3</sup> National Development and Reform Commission. Guidance Catalog for Key Emerging Industries Key Products and Services 2016 Edition, National Development and Reform Commission Notice (2017[1]). Address: [http://www.ndrc.gov.cn/gzdt/201702/t20170204\\_837246.html](http://www.ndrc.gov.cn/gzdt/201702/t20170204_837246.html), retrieved May 5<sup>th</sup>, 2017

<sup>4</sup> National Bureau of Statistics. National Statistical Yearbook of High-tech Industry-2016, China Statistics Press, 2016.

<sup>5</sup> State Intellectual Property Office. Catalogue of Patent-Intensive Industries (2016) (Trial), official website of the State Intellectual Property Office: Address: [http://www.sipo.gov.cn/tjxx/yjcg\\_tjxx/1052503.htm](http://www.sipo.gov.cn/tjxx/yjcg_tjxx/1052503.htm), retrieved on May 2<sup>nd</sup>, 2017.

nuclear new energy industries and the high equipment manufacturing of satellites, ocean engineering, and aviation industries. In the end, we chose companies in the five major fields for investigation, namely biomedicine, information technology, smart manufacturing, environmental protection, and new materials (see Table 1).

**Table 1. Summary of Industry Distribution of Enterprises**

No.	Industry field	Company count	Proportion
1	biomedicine	54	27.2%
2	information tech	47	23.7%
3	Smart manufacturing	43	21.7%
4	Environment protection	33	16.7%
5	new materials	21	10.7%
	<b>Total</b>	<b>198</b>	<b>100%</b>

**Resource: Designed by author from the survey.**

### 3.2 Data collection

We distributed questionnaires to 450 SMEs and took back 251. After sorting and analyzing, 198 questionnaires were confirmed as valid questionnaires. Most of the establishment of the company was concentrated in 3-6 years. 40 companies have been set up for 1-3 years, 69 companies for 3-5 years, 56 companies for 5-8 years, and 33 companies for 8-10 years. Meantime, we interviewed CEO and senior managers of 30 small and medium-sized startups.

**Table 2. Patent data of Startups in the survey**

	all	1	2	3	4	5
Patents holding rate	60.4%	75%	57%	55%	62%	53%
Average	7.52	8.5	7.6	6.4	7.9	7.2
Application	3.6	5	4	3	4	2
Transfer	2.4	3	2	2	2	3
Self-transfer	2.8	3	3	2	4	2

**1= biomedicine; 2=information technology; 3=smart manufacturing; 4= new materials; 5= environmental protection.**

**Resource: Designed by author from the survey.**

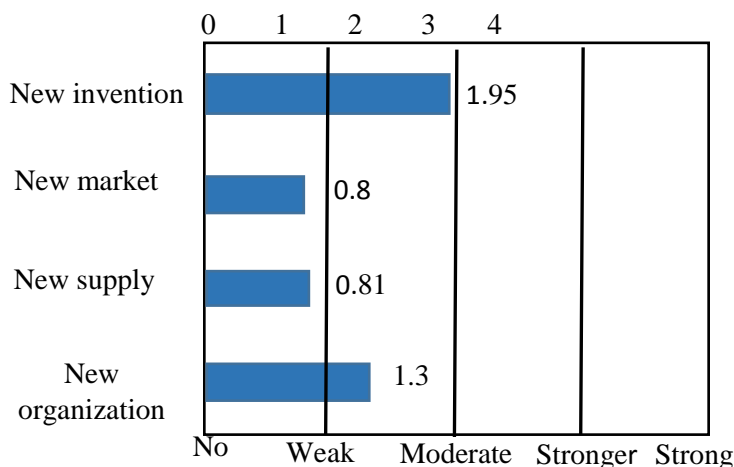
According to the survey questionnaire statistics, 119 startups have at least one patent, accounting for 60.4%; 79 startups have no patent at the moment, accounting for 39.6%. This patent holding rate of companies is much higher than other domestic surveys. It may have a lot to do with the type of the companies, most of which are technology-based companies. There are three main sources of patents for startup companies: company creators' transfer, others transfer or license, and applying themselves.

From Table 2, 60.4% of the companies own patents. However, there is a slight difference between industries. The industry with the most possessions is the biopharmaceutical industry (75%), followed by the new materials industry (62%), and only 57% in the communication information field which was influenced by the software and Internet companies in which more than 85% of respondents report no patents, but the output of patents in the communications equipment field was extremely strong.

#### 4. The influence of patent on the company's innovation activities

##### 4.1 Patents have a weaker incentive on startups innovation

The general theory holds that patents have a great incentive for the company's innovation activities, which is also the theoretical basis for giving patent monopoly rights. In order to further verify the value of patents for innovation, we set several options in the questionnaire to ask respondents to rank the role of patents in corporate innovation activities in the order from weak to strong. They are: no incentive (0 point), weak incentive (1 points), moderate incentive (2 points), stronger incentive (3 points), very strong incentive (4 points); at the same time, we follow the innovation theories of Schumpeter<sup>6</sup> and divide innovation from "idea" to "invention" to "development" to "commercialization". They are: (1) inventing a new product, method and service, (2) developing a new market, (3) grazing or controlling a new source of supply of raw materials or semi-manufactures, (4) achieving any kind of industrial new organization.



**Figure 1. The role of patents in different stages of corporate innovation.**

**Source: This survey**

<sup>6</sup> Schumpeter, Joseph, and Ursula Backhaus. "The theory of economic development." Joseph Alois Schumpeter. Springer, Boston, MA, 2003. 61-116.



The results showed (Figure 1) that most of the respondents believed that patents have a weaker incentive in entrepreneurial activities. The best performance was that patents would be a more effective incentive in the process of creating new products and new methods, with the value of 1.95<sup>7</sup> between the "weak incentive" and the "moderate incentive".

In other areas, the incentive of patents is not satisfactory and basically remains at the level of "weak incentives". In particular, patents have the least incentive for "initial R&D" and "implementation of products", with a value of 0.8. The evaluation of the incentive of patents also varies according to the industries. In the fields of biomedicine, IT hardware, manufacturing, and new materials, the respondents believe that the incentives of patents are relatively large, and they basically maintain the "weak incentives" and "moderate incentives", with the value of 1.0-1.5. In the field of Internet and IT software, the incentive of patents is considered to be small and the value is maintained at 0.8-1.3.

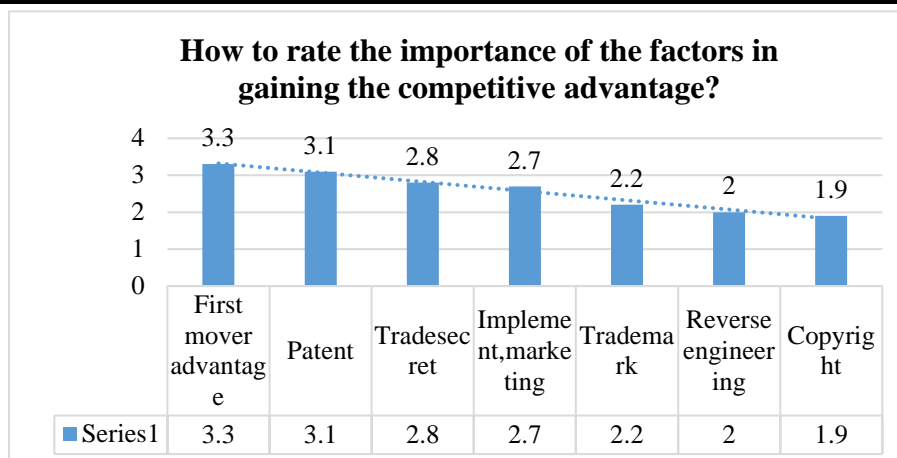
There is a certain gap between our findings and legal theory of "patent stimulating incentive innovation", and it is also quite different from many literatures about the role that patent plays in innovation (Chesbrough, 2003; Jiang and Dan, 2014). What kind of relationship does this have with our entire innovative eco-environment? Are intellectual property rights (patents) playing an innovative role just as some scholars have argued that only those countries with an initial level of development above average can benefit from it (Sweet *et al.*, 2015)? This is a question worthy of our further discussion. What's the role of patents in business startups then?

#### 4.2 Patent Enhancing Enterprise's Competitive Advantage

Existing research has proven that intellectual property plays a key role in the company's first-mover advantage (Teece, 1986). A social survey of managers of large U.S. companies also reflects that intellectual property is a key means for enterprises to gain competitive advantage (Cohen *et al.*, 2000). The results of this survey show that patents play an important role in the startup companies' gaining competitive advantage. In the questionnaire, we listed seven factors that enable companies to secure a competitive advantage: first-mover advantage, trade secrets, patents, copyrights, trademarks, reverse engineering, implementation and marketing capabilities. In the same way, we give five evaluation options of "not important" to "very important" for the respondents to choose (multiple choices), with 0 to 4 points respectively.

---

<sup>7</sup> 1.95 is the average value of the sum of all choices from "No incentive" (0 point) to "Strong incentive" (4 point).



0=not important; 1=slight important ; 2=important ; 3=more important ; 4=very important

**Figure 2. Factors in gaining competitive advantage**

**Source: The survey**

The results show (see Figure 2) that startups will use a variety of strategies to gain competitive advantage. The first-mover advantage was evaluated as the most important means to obtain a competitive advantage. The rating was between “more important” and “very important”, with an average score of 3.3 points. The next level is patents, trade secrets, implementation and marketing, and the degree of importance assessed is not much different. They are all between “important” and “more important”, with average scores of 3.1, 2.8 and 2.7 respectively. The remaining three items: copyright, trademark and reverse engineering were rated as “important” with an average score of 2.03. The methods used by startups to gain competitive advantage vary greatly according to industry. For example, software and internet companies basically use copyright as the most important means to gain competitive advantage, while companies in other fields report that patents can help early technology companies to obtain competitive advantage. However, what is the mechanism by which patents gain a competitive advantage? We will answer this question by exploring the motivation of the company to secure the patent.

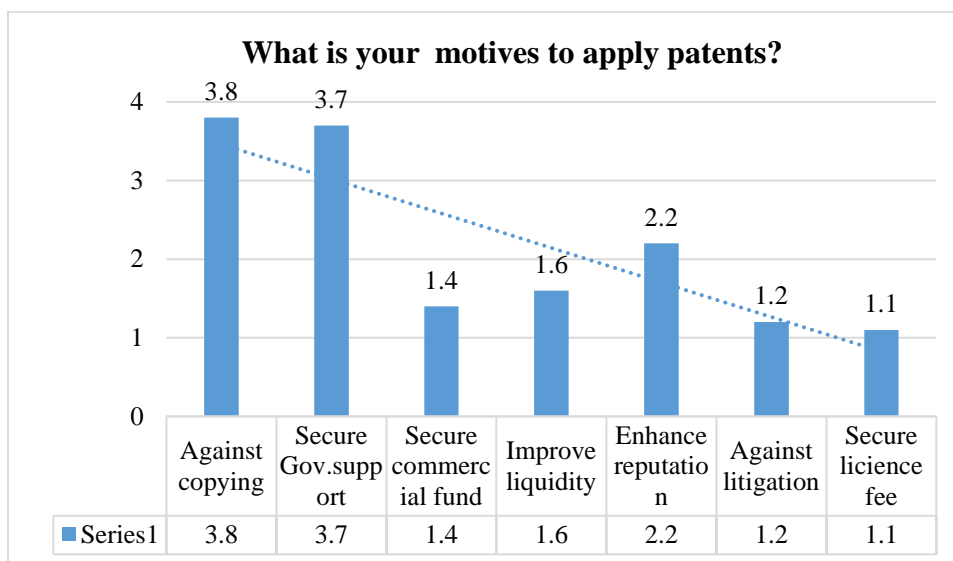
## **5. Startups’ motivation for holding patents**

### **5.1 The Investigation of startups’ Patent Motivation**

#### **5.1.1 “Preventing copying” and “acquiring government support” are the main motives to hold patents.**

To investigate how startups use patents to gain a competitive advantage, we investigated the motives of securing patents. Based on the literature reviews and

interview results, the questionnaire gave seven motives such as preventing technology from copying and obtaining commercial investment etc. From statistical analysis of the questionnaires (see Figure 3), most of the respondents took preventing from copying as the most important reason for holding patents, with an average score of 3.8. This means that almost all companies believe that “preventing from copying” are the main motive of them.



0=not important; 1=slight important ; 2=important ; 3=more important ; 4=very important

**Figure 3. Motives in securing patents**

**Source: The survey**

In our survey, “acquiring government support” is almost as important as preventing copying. There are obvious differences with past survey which reported the cost of application and implementation is the crucial factor<sup>8</sup>. Most of the interviewed companies ranked “acquiring government support” at an important position, with an average score of 3.7. In this regard, we conducted in-depth interviews and found that holding more patents can enable startups to receive the nominal and financial support from government. After China put forward the "Outline of the National Intellectual Property Development Strategy"<sup>9</sup> and the "National Innovation Driven Development Program"<sup>10</sup>, governments at all

<sup>8</sup> See note 23.

<sup>9</sup> The State Council. Notice of the State Council on Printing and Distributing the Outline of the National Intellectual Property Strategy (Guofa [2008] 18), [http://www.gov.cn/xinwen/2015-03/23/content\\_2837629.htm](http://www.gov.cn/xinwen/2015-03/23/content_2837629.htm), retrieved on March 3, 2017

<sup>10</sup> The 18th Congress of the Communist Party of China put forward “innovation-driven

levels have begun to set up a large number of funding for small and medium-sized science and technology enterprises to promote economic improvement and efficiency. According to incomplete statistics, the special funds or program that Shanghai's science and technology innovation enterprises can apply for reach more than 20 at the municipal level only<sup>⑩</sup>. Many district governments have carried out supporting work for these funds and program. These programs provide technology-based companies with funds ranging from hundreds of thousands to millions of RMB. Therefore, obtaining government support has become the reason for many startup companies to secure patents.

### 5.1.2 Financing and attracting investment considerations

The next group of important reasons for patenting include obtaining investment opportunities, promoting acquisition quality and opportunities, and improving company reputation and image. Respondents rated the improvement of the image of small companies very high with an average score of 3.2. When entrepreneurs and startup companies try to get business finance to support their growth, they may face great difficulties because of their small size, low assets and limited experience (Tyebjee and Bruno, 1984). This kind of uncertainty caused by limited information makes it difficult for potential investors to evaluate the quality of startups and their potential benefits. As a result, investors can only evaluate their value based on their existing tangible assets.

The questionnaire also investigated the importance of venture capital source. We have proposed six sources: family and friends, angel funds, venture capital, other company investments, investment banks, and commercial banks. The question is: When the startups negotiate with these sources of funding, how does the other party view the importance of the patent held by the startups? Only 8.8% of respondents in Shanghai believe that patents are important when obtaining financing while average of 47% of respondents in the United States believe that patents are important according to the Berkeley patent survey. Why is there such a big difference? Scholars believe that patents are a symbol of technical quality, and the expertise of patent offices has reduced the information asymmetry between investors and startups (Long, 2002). Further, patent office grants are certainly important. What's more important is that the company patenting activities can show that startup managers have the idea of systematicizing their knowledge, indicating that they have experience in the management of coded knowledge (Chien, 2008). Other explanation is that patents can provide businesses with the opportunity to operate freely and commercialize their specialty products (Gideon,

---

development strategy" in 2012

<sup>⑩</sup>Shanghai Municipal Government Special Fund Support Policy Summary Table,

<https://wenku.baidu.com/view/7818854a336c1eb91a375d76.html>, retrieved on June 6, 2017

2007). As for the situation in China, scholars believe that the low quality of Chinese patents is the main reason affecting their application (Zhu, 2013; Cheng, 2014) because there are many institutional factors and non-market factors that play an important role in the acquisition of patents (Hu *et al.*, 2017). Some empirical studies have concluded that China's patent promotion plan has increased patents by 160% (Li, 2012), Patent Subsidy Policy increases patents by 30% (Dang and Motohashi, 2015). The surge in patents has lowered the credibility of patents, which has reduced the value of patents in investment and financing.

### **5.1.3 Legal protection and licensing fees are considered**

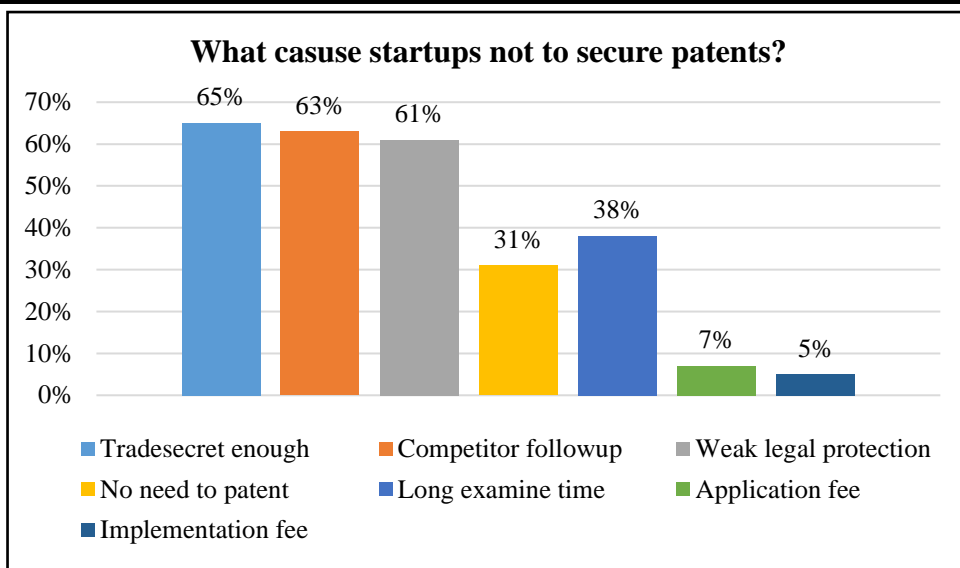
Another important reason for startups to file patents is the need of protection and profit strategies, namely consideration of infringement litigation and licensing fees. The interviewed companies rated the prevention of infringement litigation as “slight important”.

Judging from previous literature and investigation, we can infer that startup companies generally do not pay much attention on litigation. This is not similar to the fact that large companies have specialized legal affairs departments to formulate and handle infringement cases involving complaints. Practice has proved however that once the startup company rolls up infringement, it will have a serious obstacle to the development of the company because intellectual property cases, especially patent cases, generally take a long time and cost much.

In the end, almost all startup companies rated the importance of licensing income as lower than other factors. This result seems to conflict with the idea of “technology for market” (Arora and Ceccagnoli, 2006). This view holds that small businesses are more likely to license their patented technology and provide downstream companies with technical input. Indeed, the survey of European patent holders by Alfonso (2005) found smaller companies are more likely to license patents than larger companies. Our survey also found that the smallest part of the business community still views licensing revenue as an important incentive to secure patents. 20 out of 25 startups with annual revenues below 3 million yuan rated the licensing fees as “important” factors (accounting for 80%).

### **5.2 Reasons for not seeking a patent**

Although most of the respondents believe that patents are important, many other companies also opt against the patent system. Reasons include: Considering that technology can't be patented, the high cost of application and implementation, fear of reverse engineering, weakening patent protection, technology disclosure risks, and still other forms of protection. In the questionnaire we designed the question: What cause startups not to obtain a patent (multiple choice)?

**Figure 4. Response to reasons of not patenting****Source: This survey**

Our investigation found that “the protection of trade secrets is sufficient”, “fear of competitors’ follow-up” and “inadequate legal protection” are the main reasons why startups don’t file patents, reaching 65%, 63% and 61% of the respondents respectively (see figure 4). The intrinsic factors of these three options are linked to each other. The inadequate legal protection leads to copying and then enable the startups turn to trade secret. Therefore, the underlying cause is the problem of inadequate legal protection. Although the protection of intellectual property rights has been increasingly strengthened, there are many problems in the enforcement of intellectual property rights.

The main problems lie in the low cost of infringement, the high cost of rights protection (Kong, 2015); the difficulty in obtaining evidence for litigation, and the low amount of compensation (Zhan and Zhang, 2015). These factors have caused some startup companies to have no time and energy to deal with intellectual property litigation. Therefore, a better way is to choose the protection of trade secrets. Meantime, 38% of respondents believe that the long examine time of patent reviewing is one of the reasons for their opting against patenting. Another 31% believe that it is not necessary for them to protect their technology. Almost all respondents believe that the cost of patent application and implementation is not the most important reason for them to opt against patents.

About 7% and 5% of respondents respectively think that the cost is the most important reason for their reluctance to secure patents. While the cost of

application and implementation in developed countries without exception is the main reason why startups do not secure patents because the patent application and maintenance fee are very expensive, for example, obtaining patents only costs US\$ 10,000 to 30,000 in the United States (Lemley, 2000). In China, almost all application fees and maintenance costs for the first three years are funded by governments<sup>⑫</sup>. Therefore, the application and maintenance costs of patents in China are not the main issue.

## **6. The role of patent system in startups and its enlightenment**

In the questionnaire survey, we also designed a question on the role of the patent system in entrepreneurship. We asked respondents to answer a general subjective question. We asked "How about the role played by patent system for the development of your company?" We gave five options: very good, good, not good not bad, slight bad, bad. The results show that, most of the startup companies (61% of the respondents) believe that the patent system has a "not good not bad" effect on the development of their company. There are some slight differences between industries. For example, 31% of respondents in the bio-industry think that patents play a "good" or "very good" role in their development, but most (63%) responds to their development is "not good not bad". In the field of software and internet, 55% of the respondents answered that they are still "not good not bad", but 20% of the respondents think that the patent system does not work well for them. This survey also gives us some enlightenment:

### **6.1 Patents can help startups gain competitive advantage, but the incentives for innovation activities have not yet been exerted**

The survey shows that the interviewed companies believe that patents play an important role in gaining competitive advantage for the company. Of the many elements, the importance of patent is rated second only to the first-mover advantage. At the same time, however, the respondents believe that patents provide a weaker incentive for the company's innovation activities. As mentioned in the previous literature, the theory of "patent enhancing innovation" is demonstrated and approved by many experts. Why did patents not play the role of incentive to innovation in entrepreneurial activities of China?

In fact, technological innovation activities are a complete chain (Schumpeter, 1991). This "innovation chain" specifically includes: scientific and technological achievements, incubators, public R&D platforms, venture capital, industrial

---

<sup>⑫</sup>Patent Subsidy Policy begins from Shanghai in 1999 and nearly all provinces adopt the policies until 2003. The government bear the cost of application fee and maintenance fee for first years according to the policies.

chains formed around innovation, property rights transactions, market agencies, and legal services, logistics platform, etc. However, scientific and technological achievements such as patents are only one of several aspects of innovation. The innovation effect also depends on the improvement and mature of other factors. At the same time, it is also related to the quality of patents. When a large number of low-quality patents flood the market, not only does it reduce incentives for innovation, it may also hinder the pace of innovation<sup>⑬</sup>. The government should further improve the innovation ecology, such as comprehensive consideration in innovation power, innovation risk, innovation ability, and innovation financing etc.

### **6.2 Strengthen IP commercial operation strategy**

Patents are mainly regarded as a defensive tool in current Chinese startups. There are still great deficiencies in the active use of patent strategies for commercial planning and operations. Respondents almost unanimously view preventing competitors from copying and obtaining government support as the main reason for securing a patent. Stronger market elements such as obtaining commercial investment, increasing the quality of mergers and acquisitions, obtaining licensing fees, and improving the company's image are ranked in secondary positions, showing that entrepreneurs have not yet to strengthen their awareness of the commercial strategy of patent. Take the key venture capital for example, only 8.8% of funding sources believe that patents are important in investment decision and pledge financing while nearly half (47%) of venture capital sources believe that patents are important in their investment decisions in U.S.. Therefore, the patent management department should supervise the relationship between patent quality and quantity, enhance the credibility of patents in the technical field, and advocate the commercialization of patents. The government should also guide startups to conduct commercial operations when providing subsidy funding. It needs to provide education and training for startups, and strengthen the implementation of corporate intellectual property rights management and application strategies.

### **6.3 Shorten patent examination time and strengthen judicial enforcement**

The fact that startups do not secure patents for their use and protection is also due to factors such as long time of patent examination and weak legal enforcement. At

---

<sup>⑬</sup>On August 12<sup>th</sup> 2012, the European Union Chamber of Commerce in China issued a research report named Dan Prud'homme: "Lost in innovation: How China's Patent Policies and Practices Hindered the Steps of Innovation" and suggested that the increase in the number of Chinese patents that are too fast may hinder innovation. Address: <http://www.europeanchamber.com.cn/en/publications-archive?q=Position+paper>, retrieved on December 1, 2016.



present, the average period of China's invention patent examination cycle is 22 months, while Japan's total examination cycle averages 14.6 months, and the U.S. is 16.2 months<sup>14</sup>. Therefore, it is possible to shorten the patent examination cycle and further perfect the temporary protection before grant. At the same time, as previously analyzed, China's legal enforcement for intellectual property rights need to be improved, gradually changing the phenomenon of high costs of protection, difficulty in obtaining evidence of infringement, and lengthy court hearings which may prevent startups from seeking patent protection. The management departments of intellectual property rights and the judiciary should pay attention to these problems and employ the combination measures of administrative enforcement and judicial protection of intellectual property rights to change this phenomenon.

### Conclusions and Problems

Through investigation and research, we tried to reveal the delicate relationship between China's patent system and technological entrepreneurship. Our specific findings can't fully answer these questions. Technology startup companies tend to file and hold more patents, but they think that patents are less incentive for major innovation activities. We have then studied the reason why startups secure patents since the patent system does not have a strong incentive for innovation and found that patents are used to gain competitive advantage from other perspective such as obtaining government support, enhancing the company reputation and improving the merger and acquisition etc.

There are still significant deficiencies in the commercialization of active patent strategy. The main reason why startups do not file patents is the inadequate legal protection and long examination time. The insufficiency of this survey mainly lies in the limited data. For surveys and researches, the more data you get, the more objective the result is. Although the industries and regions we select are representative of entrepreneurship, the data is slightly thin. Another point is that the findings of the survey are based on the subjective evaluation of respondents. This has a lot to do with the personal values, concepts, and experiences of respondents. Further research can be conducted on the role of the patent system in stimulating innovation, using statistical analysis of data more scientifically.

### Acknowledgements

This article is supported by Grant Project of the National Social Science Foundation of P.R.C.: Research on the Strategic Path of the Power-nation based

---

<sup>14</sup>U.S. Patent Office (USPTO). 2016 World's Top 5 IP Offices, 2017. Sourced from the website of the State Intellectual Property Office: <http://www.sipo.gov.cn/docs/2018-02/20180201144736790625.pdf>, retrieved on November 3, 2017

on intellectual property-intensive industries, No.: 17ZDA140. We are grateful to the respondents, the technology transfer offices and their staff on the help given in the survey. The comments from Glockner Jochen, Xuhua Chang, Jieren Hu and Jie Hua are highly appreciated, from which we have profited much.

## References

1. Alfonso Gambardella *et al.*, 2015. The Value of European Patents: Evidence from a Survey of European Inventors, 2005, 41, available at <http://www.alfonsogambardella.it/PATVALFinalReport.pdf>.
2. Arora, A. and Ceccagnoli, M. 2006. Patent protection, complementary assets, and firms' incentives for technology licensing. *Management Science*, 52(2): 293-308.
3. Arora, A. and Merges, R.P. 2004. Specialized supply firms, property rights and firm boundaries. *Industrial and Corporate Change*, 13(3): 451-475.
4. Arora, A., Fosfuri, A. and Gambardella, A. 2001. Markets for technology and their implications for corporate strategy. *Industrial and Corporate Change*, 10(2): 419-451.
5. Audretsch, David B., Max C. Keilbach, Erik E. 2006. *Lehmann. Entrepreneurship and economic growth*. Oxford University Press.
6. Autio, E. and Acs, Z. 2010. Intellectual property protection and the formation of entrepreneurial growth aspirations. *Strategic Entrepreneurship Journal*, 4(3): 234-251.
7. Branstetter, L.G., Fisman, R. and Foley, C.F. 2006. Do stronger intellectual property rights increase international technology transfer? Empirical evidence from US firm-level panel data. *The Quarterly Journal of Economics*, 121(1): 321-349.
8. Burstein, M.J. 2016. The Entrepreneurial Commons: Reframing the Relationship Between Intellectual Property and Entrepreneurship. *Utah Law Review*, 2016(4): 611-630.
9. Candelin-Palmqvist, H., Sandberg, B. and Mylly, U.M. 2012. Intellectual property rights in innovation management research: a review. *Technovation*, 32(9-10): 502-512.

10. Cheng Deli. 2014. Research on the Operation Mechanism of Patent Technology in Colleges and Universities. *Intellectual Property*, 2014(7): 74-77 (程德理. 高等学校专利技术运营机制研究. *知识产权*, 2014(7): 74-77).
11. Chesbrough, H. 2003. The logic of open innovation: managing intellectual property. *California management review*, 45(3): 33-58.
12. Chien C. 2013. Startups and patent trolls. *Stanford Technology Law Review*, 2013, 17: 461.
13. Chien, C.V. 2008. Of trolls, Davids, Goliaths, and kings: Narratives and evidence in the litigation of high-tech patents. *NCL Review*, 87: 1571.
14. Cohen, W.M., Nelson, R.R. and Walsh, J.P. 2000. Protecting their intellectual assets: Appropriability conditions and why US manufacturing firms patent (or not) (No. w7552). National Bureau of Economic Research.
15. Dang, J. and Motohashi, K. 2015. Patent statistics: A good indicator for innovation in China? Patent subsidy program impacts on patent quality. *China Economic Review*, 35: 137-155.
16. Fang, L.H., Lerner, J. and Wu, C. 2017. Intellectual property rights protection, ownership, and innovation: Evidence from China. *The Review of Financial Studies*, 30(7): 2446-2477.
17. Feldman, R. and Lemley, M.A. 2015. Do patent licensing demands mean innovation. *Iowa Law Review*, 101: 137.
18. Galli  , E.P. and Legros, D. 2012. French firms' strategies for protecting their intellectual property. *Research Policy*, 41(4): 780-794.
19. Gallini, N. and Scotchmer, S. 2002. Intellectual property: when is it the best incentive system?. *Innovation Policy and the Economy*, 2: 51-77.
20. Graham, S.J.H., Merges, R.P., Samuelson, P. and Sichelman, T. 2009. High technology entrepreneurs and the patent system: Results of the 2008 Berkeley patent survey. *Berkeley Technology Law Journal*, 24(4): 1255-1327.
21. Granstrand, O. 1999. *The Economics and Management of Intellectual Property*. Books, Edward Elgar Publishing, number 1651, February.

22. Holgersson, M. 2013. Patent management in entrepreneurial SMEs: a literature review and an empirical study of innovation appropriation, patent propensity, and motives. *R&D Management*, 43(1): 21-36.
23. Hsu, D.H. and Ziedonis, R.H. 2013. Resources as dual sources of advantage: Implications for valuing entrepreneurial-firm patents. *Strategic Management Journal*, 34(7): 761-781.
24. Hu, A.G., Zhang, P. and Zhao, L. 2017. China as number one? Evidence from China's most recent patenting surge. *Journal of Development Economics*, 124: 107-119.
25. Jiang Nan, Dan Xiaoguang and Qi su. 2014. Study on the Contribution of Intellectual Property-intensive Industries to China's Economy. *Science Research*, 32(8): 1157-1165 (姜南, 单晓光, 漆苏. 知识产权密集型产业对中国经济的贡献研究. *科学学研究*, 32(8): 1157-1165).
26. Jiang Yuhong and DanXiaoguang. 2007. The Influence of Intellectual Property System on Urban Competitiveness-Based on the Mechanism Analysis of Innovation Incentive. *Intellectual property*, 2007(3): 26-30 (蒋玉宏, 单晓光. "知识产权制度对城市竞争力的影响——基于创新激励的机理分析." *知识产权*, 2007(3): 26-30).
27. Karakashian, S. 2015. A software patent war: The effects of patent trolls on startup companies, innovation, and entrepreneurship. *Hastings Bus. LJ*, 11: 119.
28. Kirzner, I.M. 2015. *Competition and entrepreneurship*. University of Chicago press.
29. Kong Xiangjun. 2015. Discussion on Several Issues Concerning the Current Judicial Protection of Intellectual Property in China. *Intellectual Property*, 2015 (1): 3-15 (孔祥俊. 当前我国知识产权司法保护几个问题的探讨——关于知识产权司法政策及其走向的再思考[J]. *知识产权*, 2015 (1): 3-15).
30. Lemley, M.A. 2000. Rational ignorance at the patent office. *Northwestern University Law Review*, 95: 1495.
31. Li, X. 2012. Behind the recent surge of Chinese patenting: An institutional view. *Research Policy*, 41(1): 236-249.

- 
32. Liang Cui and Wang Zhixin. 2017. Research on the Intellectual Property Protection Policy of Mass Innovation. *Management Science Research*, 35(6):16-19 (梁翠, 王智新. 促进大众创业万众创新的知识产权保护政策研究[J].*科学管理研究*, 35(6):16-19).
  33. Liu Lei. 2017. Intellectual Property International Registration Helps Innovation and Entrepreneurship Development. *China National Power*, 2017(5):22-24 (刘蕾. 知识产权国际注册助力创新创业发展[J].*中国国情国力*, 2017(5):22-24).
  34. Long, C. 2002. Patent signals. *The University of Chicago Law Review*, 625-679.
  35. Mansfield, E. 1986. Patents and innovation: an empirical study. *Management Science*, 32(2): 173-181.
  36. Nelson, A.J. 2014. From the ivory tower to the startup garage: Organizational context and commercialization processes. *Research Policy*, 43(7): 1144-1156.
  37. Parchomovsky, Gideon. 1999. Publish or perish. *Michigan Law Review*, 98(4): 926-952.
  38. Polinsky, A. Mitchell and Steven Shavell. 2007. (Eds.), *Handbook of law and economics*. Elsevier.
  39. Reitzig, M. 2007. How executives can enhance IP strategy and performance. *MIT Sloan Management Review*, 49(1): 37.
  40. Schumpeter, Joseph Alois. 1991. *The economics and sociology of capitalism*. Princeton University Press.
  41. Shane, S. and Venkataraman, S. 2000. The promise of entrepreneurship as a field of research. *Academy of management review*, 25(1): 217-226.
  42. Sichelman, T. and Graham, S.J. 2010. Patenting by entrepreneurs: an empirical study. *Michigan Telecommunications and Technology Law Review*, 17: 111.
  43. Smith, J.B. and Barclay, D.W. 1997. The effects of organizational differences and trust on the effectiveness of selling partner relationships. *Journal of marketing*, 61(1): 3-21.
-

44. Sweet, C.M. and Maggio, D.S.E. 2015. Do stronger intellectual property rights increase innovation?. *World Development*, 66: 665-677.
45. Teece, D.J. 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy*, 15(6): 285-305.
46. Thursby, J.G. and Thursby, M.C. 2002. Who is selling the ivory tower? Sources of growth in university licensing. *Management science*, 48(1): 90-104.
47. Tyebjee, T.T. and Bruno, A.V. 1984. A model of venture capitalist investment activity. *Management science*, 30(9): 1051-1066.
48. van Stel, A., Millán, A., Millán, J.M. and Román, C. 2018. The relationship between start-up motive and earnings over the course of the entrepreneur's business tenure. *Journal of Evolutionary Economics*, 28(1): 101-123.
49. Verheul, I., Wennekers, S., Audretsch, D. and Thurik, R. 2002. An eclectic theory of entrepreneurship: policies, institutions and culture. In *Entrepreneurship: Determinants and policy in a European-US comparison*, Springer, Boston, MA, 11-81 pp.
50. Wu Handong. 2016. The Innovation, Drive and Development of Intellectual Property under the New Normal of Economy. *Law Science*, 7: 004 (吴汉东. 经济新常态下知识产权的创新、驱动与发展. *法学*, 2016, 7: 004).
51. Zhan Ying and Zhang Hog. 2015. An Empirical Study on Judicial Precedents of China's Intellectual Property Rights Infringement: Centered on the Costs of Rights Protection and Infringement. *Science Management*, 36(7): 145-153 (詹映, 张弘. 我国知识产权侵权司法判例实证研究——以维权成本和侵权代价为中心[J]. *科研管理*, 2015, 36(7): 145-153)
52. Zhang Ping. 2017. Discussion on Basic Theory of Intellectual Property System. *Science and Technology Science-Technology and Law*, 3(4): 27-30 (张平. 知识产权制度基本理论之讨论[J]. *科技与法律*, 3(4): 27-30).
53. Zhu Xuezhong. 2013. Dialectically Treating the Quantity and Quality of Chinese Patents. *Chinese Academy of Sciences*, 28(4): 435-441 (朱雪忠. 辩证看待中国专利的数量与质量[J]. *中国科学院院刊*, 28(4): 435-441).

# Exploration of the Great Achievements in the 40<sup>th</sup> Anniversary of China's Reform and Opening Up: The Deepening of the Philosophical Theoretical System

Jianqing Chen

Law School, Fuzhou University, Fuzhou, China

E-mail: aaronpower@foxmail.com

**Abstract:** China's reform and opening up has been going on for 40 years. In the course of reform and opening up over the past 40 years, China has not only undergone earth-shaking changes in the economic field but also made remarkable progress and improvement in science and education, sports, health, democracy, and so on. The international community has been exploring the root causes of China's great achievements in reform and opening up in recent decades. Behind all these great achievements lies in the fact that the Communist Party of China has led the people of all ethnic groups throughout the country to creatively develop Marxist philosophy, so that Marxist philosophy does not just stay on its original basis. Instead, it combines the basic principles of Marxist philosophy with the unique national conditions of China. And according to the different stages of development, a series of innovative philosophical theories are put forward creatively, which provides a continuous supply of philosophical nourishment for China's reform and opening up at different stages. The Communist Party of China has also led and united with other parties of China to contribute to China's reform and development in all aspects of the country. The whole country is united and there is only one voice in the country, making concerted efforts to carry out construction and single-mindedly striving for development, and advancing in an orderly manner in accordance with the set goals.

**Keywords:** Reform and Opening Up, Sinicization of Marxism, Socialism with Chinese Characteristics, Economic Achievements.

## Introduction

On December 18, 1978, the Third Plenary Session of the 11<sup>th</sup> CPC Central Committee was held, at which the Communist Party of China (i.e., CPC) resolutely made the historic decision to transfer the central part of the work of the party and the country to economic construction and to carry out reform and opening up.

On December 18, 2018, the conference to celebrate the 40<sup>th</sup> anniversary of reform and opening up was held in Beijing. Through the 40 years' reform and opening up, today, China has realized a great leap forward from getting up to becoming rich and then becoming stronger, which is a great miracle in the history of human development. China's great achievements in its reform and opening up have attracted worldwide attention.

In the past 40 years of reform and opening up, the CPC has continuously realized the sinicization of Marxism in the practice of promoting modernization, and has formed a series of theoretical innovations of the party. Sinicization of Marxism, in general, refers to the process of forming and creating sinicized Marxism and guiding Chinese social practice [1]. In this process, the Chinese Communist Party's understanding and attitude towards the traditional culture of its country was firstly critical inheritance, carrying forward innovation and then developing it into creative transformation and innovative development. The excellent Chinese traditional culture has been applied and embodied in the reform and development practice of contemporary China. The theoretical innovation achievements of the CPC, such as the theory system of socialism with Chinese characteristics, contain rich traditional culture. The Confucian doctrine of golden mean also advocates to maintain a flexible attitude when dealing with people, and to maintain the diversity of methods under the firmness of principles [2].

The position of Chinese traditional culture in contemporary China's economic and social development is from emphasizing instrumental rationality to realizing the organic unity of instrumental rationality and value rationality. At the same time, when the CPC grasps the essence and connotation of traditional culture, it changes from paying attention to its epochal character to realizing the unity of its epoch and nationality. At present, the CPC continues to promote the party's theoretical innovation, earnestly promote the deep integration of Marxism and the excellent elements of Chinese traditional culture from various aspects of content and form, earnestly carry out the project of inheriting and developing Chinese excellent traditional culture, and vigorously promote the creative transformation and innovative development of Chinese traditional culture [3].

## **1. The Reasons and Background of China's Reform and Opening Up**

### **1.1 The Reasons of China's Reform and Opening Up**

Culture forms the basis, and is a raw material for philosophical reflection [4]. The ten-year "Cultural Revolution" constrained the development of productive forces. China had every reason to reform and open up in order to liberate the productive forces to the greatest extent. There were mainly four main reasons for China's reform and opening up.



Firstly, the situation of the country needed to be changed. The "Cultural Revolution" left a serious situation for the country: the slow development of productive forces, the problem of inadequate food and clothing of the people, the backward education of science and technology and so on. This situation must be changed.

Secondly, China needed a second revolution. After the founding of the People's Republic of China, the imitation of the highly centralized planned economic system established by the Soviet Union had seriously hindered the development of China's productive forces. China needed a second revolution and the liberation of the productive forces. This situation must be changed.

Thirdly, the socialist system needed a self-improvement and development. In every historical stage of a socialist society, according to the requirements of economic development, it was necessary to constantly promote the self-improvement and development of socialist system in time, so as to make the socialist system full of vitality.

Fourthly and lastly, new ideas must be available in the realization of socialist modernization. The new way of thinking was to establish and continuously perfect the socialist market economic system, actively and steadily promote the reform of the political system, develop socialist democracy, build socialist political civilization, and promote the reform of the cultural system.

## **1.2 The Background of China's Reform and Opening Up**

The reform and opening up is a new chapter in contemporary Chinese history. After the "Gang of Four" (the Gang of Four refers to the gang formed during the Cultural Revolution by Wang Hongwen, Zhang Chunqiao, Jiang Qing and Jiang Qing) was arrested in 1976, the broad masses of the people urgently demanded an end to the "Cultural Revolution," urgently demanded to criticize the crimes of the "Gang of four", to bring order out of chaos, to correct unjust and wrong cases, and to unite and focus on economic construction. However, in February 1977, the "Two Whatevers" (it literally means "all decisions made by Chairman Mao are firmly upheld by us, and we always abide by Chairman Mao's instructions.") were put forward as the guiding principles, which not only made the exposing and criticizing of the evils of the "Gang of Four" encounter many obstacles but also made it difficult for the party and the country to carry out the work, especially economic construction. We urgently need to bring about a revolution in humanity's institutions of learning, so that humanity may be able to begin to learn how to make social progress towards a better, wiser world [5].

Deng Xiaoping, who had not resumed his work at that time, clearly pointed out in May of that year that the "Two Whatevers" were not in line with Marxism and that "we must guide our whole party from generation to generation with accurate and complete Mao Zedong Thought."

After Deng Xiaoping resumed his work in July 1977, he put forward that the essence of Mao Zedong Thought is seeking truth from facts, and from then on people began the discussion that practice is the sole criterion for testing truth. After almost a year of discussion, by the end of 1978 the CPC had convened the third Plenary Session of the Eleventh Central Committee, criticizing the "Two Whatevers", putting forward the slogan of "emancipating our minds and using our heads", advocating that theory should be linked with practice and that all things should be based on reality, affirming that practice is the sole criterion for testing truth and reestablishing the ideological line of seeking truth from facts. It was explicitly required to stop using the erroneous formulation of "taking class struggle as the guiding principle", and the CPC decided to shift the focus of the whole party's work to the socialist modernization drive, and make a major decision on the implementation of reform and opening up. Therefore, it realized its historic change from "taking class struggle as the guiding principle" to economic construction as the central task, from being rigid and semi-rigid to a comprehensive reform, from being closed and semi-closed to the opening to the outside world [6].

The philosophical theory of the criterion of truth solved the problem of ideological line and put forward new correct policies. Discussing and criticizing the wrong policy of "Two Whatevers" had greatly promoted the cadres and the masses to get rid of the cult of personality, emancipate their minds, speed up bringing order out of chaos, vigorously develop the economy, and improve the living standards of the people. It can be said that without the philosophical guidance that "practice is the sole criterion for testing truth", it is difficult to find theoretical support for China's reform and opening up, and therefore it is difficult to proceed smoothly.

## **2. The Four Main Stages of China's Reform and Opening Up**

### **2.1 Deng Xiaoping Theory Opened up the Exploration of China's Reform and Opening Up**

For China's reform and opening to the outside world, there was no model that could be copied, everything needed to be explored by the CPC and the Chinese government. In this process, Comrade Deng Xiaoping, the chief designer of China's reform and opening up, made use of the wisdom of Marxist philosophy and combined it with China's national conditions to find out a series of unique

theories of China's reform and opening up. Among them, "Cat Theory", "Stone Theory" and "Dare-to-venture Theory" are best known.

### **2.1.1 The "Cat Theory" on the Basis of Reality**

"Cat Theory" is known to every family in China today. The so-called "Cat Theory" is: whether it is a white cat or a black cat, as long as it catches the mouse, it is a good cat. This "Cat Theory", which has been fondly talked about and remembered by people, was not only picked up with Deng Xiaoping, a great man of the times, in 1985 in time magazine, but also, in a sense, became an important theoretical symbol of turning the focus of China's social development to "taking economic construction as the central task" after the Third Plenary Session of the Eleventh Central Committee of CPC.

Deng Xiaoping has repeatedly stressed that to resume agricultural production, it is necessary to make a specific analysis of the specific situation, that is, we must not adopt a "one-size-fits-all approach" in terms of production forms or relations but we should see "which form can arouse the enthusiasm of the masses."

Deng Xiaoping, as the chief architect of China's socialist modernization drive, had always been brave and good at theoretical innovation in the course of reform and opening up. As a result, the socialist theory system with Chinese characteristics was gradually formed, and this innovation originated from his unique dialectical mode of thinking [7]. "Cat Theory" seems to be easy to understand, but in fact, it contains profound philosophical ideas. It expresses the basic spirit of Marxist philosophy in the form that the masses like to see. First, it contains the materialism thought of "we must proceed from reality in everything we do". It is necessary to proceed from the facts of objective existence, to adapt measures to local conditions and times, to formulate realistic and effective routes, principles, policies, and methods, rather than to stick to the rules without any changes. Second, it contains the dialectic thought of "specific analysis to specific problems". It is to analyze the particularity of all kinds of things, to study the new situation, to solve the new problems, to adjust and optimize the means and methods to achieve the goal. Third, it contains the epistemological thought of "practice is the only criterion for testing truth".

Only practice has the characteristics of connecting subjective thinking with objective reality. Without practice, it is impossible to prove whether an idea is correct or not. For this reason, Deng Xiaoping strongly opposed empty talk, and he believed that only practice has the most say and everything has to be tested by practice. In his opinion, there is only one criterion for judging a policy, a measure, a decision, and that is practice. "Cat Theory" not only liberated the people's

thoughts and renewed the people's ideas but also stimulated the people's enthusiasm and creativity, and enabled the subsequent reform and opening up to proceed smoothly, and the socialist market economy system to be preliminarily established. It also makes China's abundance and prosperity today impress the world, and China even plays an important role on the international stage today.

### **2.1.2 The "Stone Theory" on the Basis of Practice Exploration**

The so-called "Stone Theory", which means "crossing the river by feeling the stones", is also referred to as "Feel Theory". The theory of Stone came into being at the beginning of reform and opening up in the 1980s. Although the Chinese society had experienced the discussion of "practice is the only criterion for testing truth", realized bringing order out of chaos from the ideological level, and had also begun the strategic shift of the focus of work in the field of practice, new problems still had arisen. That was how to reform and how to open up? In other words, the reform and opening up that the Chinese people were going to carry out needed to be guided by theory. And it was at this very moment that China had a "theoretical gap". Because some of Mao Zedong's speeches in his later years were obviously unable to meet the needs of the society at that time, new theories (such as Deng Xiaoping Theory), which were in line with China's national conditions, were in the process of being formed, and still needed to be tested and perfected by practice. So what exactly should they do? In Deng Xiaoping's view, since there was no ready-made theory for guidance, and no successful experience to learn from, they could only explore the way forward in practice. This was actually the idea that he had expressed on many occasions that the reform should "cross the river by feeling the stones", and the "Stone Theory" came into being.

In fact, the connotation of "Stone Theory" is very profound. It contains the Marxist philosophy quality of "seeking truth and keeping pace with the times". In a specific historical period, "Stone Theory" and its theoretical expansion had scientifically guided China's reform and opening up, and promoted the healthy and rapid development of China's economy. Reviewing the course of China's reform and opening up, reflecting on some ideas and practices before the reform and opening up, and taking a look at the great achievements made after the reform and opening up, the Chinese people can say that what they are following is a method of "crossing the river by feeling the stones". That is taking one step forward and looking around before taking another, practicing while summing up experience, spreading successful experience from rural areas to urban areas, from coastal cities to inland cities, from one place to the whole country. Step by step, exchange for great development at a small cost by the way of "taking small steps, walking slowly but without stopping". This not only enhances the controllability and adjustability of the process of reform and opening up but also makes them

gradually find out a "good way" and "new way" for socialism with Chinese characteristics, which is suitable for China's national conditions. Deng Xiaoping is an example of combining universal truth with concrete reality. He had always combined the universal laws of Marxism-Leninism with China's special national conditions to achieve the unity of individuality and commonality [8].

As the inheritance and development of Marxist theory under the specific historical conditions of China, "Stone Theory" is bound to be enriched and innovated with the advance of the times and the deepening of practice. The later theories from Deng Xiaoping, such as primary stage of socialism, "theory of 'let some people get rich first'" and "theory of one country, two systems", all extended and deepened the connotation of "Stone Theory" in a certain sense.

### **2.1.3 The "Dare-to-venture Theory" of Daring to Blaze New Trails**

Different from "Cat Theory" and "Stone Theory", "Dare-to-venture Theory" has the most theoretical innovation and practical innovation in Deng Xiaoping Theory, so it has been affirmed and praised by many scholars. The so-called "Dare-to-venture Theory", in Deng Xiaoping's words, means "no arguing, boldly trying, boldly venturing"; "once the argument is complicated, the time is lost and nothing can be done." Therefore, the "Dare-to-venture Theory" is also called "No-argument Theory." In China at that time, although the gross national product of China doubled in the early 1990s compared with the 1980s, and the economic development momentum was good, some problems in the course of reform and opening up still made many people doubt about the reform and opening up. The question of whether the reform and opening-up should be surnamed "Capitalism" or surnamed "Socialism" was asked. China's social development seemed to have faced a difficult choice again. Philosophers are not just concerned with explaining particular empirical phenomena such as the productivity of language or linguistic competence [9]. At this critical moment, Deng Xiaoping resolutely decided to go south in order to remove the doubts, clear away the rigid ideas, get rid of the interference of the question of capitalism or socialism, and liberate people's minds. He personally inspected some places where China had first carried out reform and opening up to let practice speak and prove it with facts. So, in early 1992, Deng Xiaoping visited Wuchang, Shenzhen, Zhuhai and Shanghai, and made the famous "Southern Tour Speeches". That was inseparable from the very special and complex situation of the time.

Each person's apprehension and interpretation of the world is his or her meaning of the world [10]. As two abbreviations of a theoretical achievement, "Dare-to-venture Theory" and "No-argument Theory" are actually two aspects of this theoretical achievement. "Venture" in the "Dare-to-venture Theory" is not the

random and blind one but to stress the venture on the premise of adhering to the Four Basic Principles which are adhering to the socialist road, the people's democratic dictatorship, the leadership of the Communist Party of China, Marxism-Leninism and Mao Zedong thought. The "Dare-to-venture" is a momentum, a drive. "No argument" in "No-argument Theory" is not an indisputable issue, nor is there any theory that is indisputable. Instead, it emphasizes that such issue as its surname "Capitalism" or "Socialism" does not need to take the time to argue. Because the argument won't end up, and it is "squandering all the time", but that doesn't mean it doesn't matter. In Deng Xiaoping's view, it is sufficient to use the value standard of "Three Favorables" (i.e., whether it is favorable to the development of the productive forces of the socialist society, whether it is favorable to strengthen the comprehensive national strength of the socialist country, and whether it is favorable to improve the living standards of the people) to judge. Therefore, "No-argument Theory" is not about ruling out principles but is against abstract and empty arguments that are divorced from reality. However, in the context of Deng Xiaoping's "Southern Tour Speeches", "Dare-to-venture" is mainly venturing in the direction of the socialist market economy, because "planned economy and market economy are both means of economy" and "whether planned economy is more or market economy is more is not the essential difference between socialism and capitalism." "No-argument" mainly means not to argue whether the market economy is surnamed "capitalism" or "socialism", and not to criticize in vain about the practice of socialist market economy but to spare more time to develop the economy and improve the people's livelihood.

In short, the basic question of "what is socialism and how to build socialism" revolves around "Dare-to-venture Theory" or "No-argument Theory". Many aspects of theoretical innovation have been realized: first, the scientific and complete expression of the essence of socialism; second, classical interpretation of the relationship between socialism and market economy; third, the proposal of the criterion of "Three Favorables"; fourth, the discussion of the thought of socialist development motive force that "reform is also the emancipation of productive forces"; fifth, new understanding of the relationship between socialism and capitalism; sixth, the establishment of the step development strategy of seizing the opportunity to develop itself; and so on. The above theoretical connotation of "Dare-to-venture Theory" greatly enriches the treasure house of Marxism and speeds up the historical process of reform and opening up in China.

The essential attribute of Marxist philosophy which is different from all other old philosophy is practicality [11]. It is precisely because Deng Xiaoping put forward the "Dare-to-venture Theory" that the Chinese people's thoughts are constantly

liberated, the pace of reform and opening up is getting bigger and bigger, the productive forces are developing unprecedentedly, and the people's living standards are constantly improving. It is precisely because Deng Xiaoping invented "No-argument Theory" that it has won precious time for the development of China's economy and society and won a relatively stable domestic environment and a more favorable international environment. Since the "Southern Tour Speeches", as Deng Xiaoping's original theory, "Dare-to-venture Theory" or "No-argument Theory" has not only been deeply rooted in the hearts of the people but has also enabled series of theoretical innovations of the CPC to break through many obstacles and be quickly transformed into practical innovations of the reform and opening up. Thus it has greatly promoted China's economic development, political stability and social progress [12].

## **2.2 Jiang Zemin's Important Thought of "Three Represents" Straightened out the Course of China's Reform and Opening Up**

With the comprehensive development of China's reform and opening up, Chinese society had entered an unprecedented period of profound social transition. This transition was a transition from the traditional planned economy system to the modern market economy model, and the traditional political model, ideology and culture concept, values and life style were influenced by economic globalization, information technology and network, and tended to be democratized, diversified, individualized and so on. The complexity of China's social transition lay in the fact that in just a few decades, it had already completed the economic development process that took hundreds of years to complete in Western countries, and many social problems had been exposed in this short period of time.

In addition, the modernization had not yet been realized, but it was facing the challenge of postmodernism, and the unique situation of coexistence of agricultural civilization, industrial civilization and post-modern civilization appeared. What they reflected in the cultural values were: tradition, modern and even post-modern came up together, competing for discourse; national mainstream culture coexisted, communicated, collided and even divided, integrated with all kinds of non-mainstream cultures and even all kinds of foreign social thoughts. The profound transition of economy, politics and culture would inevitably had a profound impact on people's outlook on life and values. In the period of social transition, on the one hand, people's outlook on life, values and even belief system had undergone profound changes, but on the other hand, various reform measures matched with the market economy had not been established and perfected, and the construction of the rule of law and the reform of the democratic political system were relatively lagging behind. Such social

problems as social corruption, the gap between the rich and the poor, environmental pollution, interpersonal tension and so on had been increasingly exposed.

With the advent of the third scientific and technological revolution, scientific and technological progress and innovation had become more and more decisive factors for the economic and social development of a country or a region. The contribution rate of science and technology to economic growth had risen from 10%-20% in the early 20th century to 60%-80% by the end of 20th century. The ultimate goal of any economic strategy is to establish and maintain over time the efficiency of doing business of all or to the majority of the economic cycle constituents [13].

In particular, the information industry and the level of information had become an important symbol to measure the comprehensive national strength of a country or a region. Facing the challenge of the new science and technology revolution, countries all over the world increased the strength of developing science and technology one after another. Particularly, the western developed countries actively participated in the world high-tech competition and seized the "top of science and technology" in the future international competition. In 1993, the United States took the lead in putting forward the idea of building a national information superhighway, followed by Canada, Japan, Britain, France, Germany, and South Korea. A plan to build a national information superhighway had been drawn up in the face of the rapid development of science and technology in the world. In our contemporary time, we can say that human existence will have meaning if and only if man has a life of purpose, self-transformation and value [14]. China must actively learn from all good foreign experience and do all it could to catch up. Otherwise, the gap would widen further.

On December 26, 1991, the Soviet Union's Supreme Soviet announced its formal dissolution, which marked the complete end of the bipolar political structure of more than 40 years, and the world political structure began to change from bipolar political structure to multipolar political structure. The drastic changes in Eastern Europe, also referred as Revolution of 1989, and the collapse of the Soviet Union caused a great setback to the international communist movement. This series of changes made the thought of Chinese society in the 1990s in general in a low-key state. After the drastic changes in the Soviet Union and Eastern Europe, confusion haunted every thinking Chinese: why would a powerful socialist Soviet Union collapse in an instant? The kind of political enthusiasm and romantic idealism aroused at the beginning of reform and opening up was fading away day by day [15].



Materialistic dialectics holds that the material world is generally connected, and that human society is a huge and complex dynamic system composed of economic, political and social consciousness factors in a certain way. When examining the development of society, we must grasp it from its general connection. It requires that the basic requirements of party building be grasped from the angle of general connection between things. Therefore, proceeding from the realistic situation at home and abroad, the central leadership of the CPC with Jiang Zemin at its core founded the important thought of "Three Represents" on the basis of scientifically judging the historical position of the CPC. The important thought of "Three Represents" came into being under such philosophical thinking. As an important milestone in the process of Marxism's sinicization, the important thought of "Three Represents" inherits the essence of Mao Zedong Thought on theory of practice and Deng Xiaoping Theory on the primary stage of socialism with Chinese characteristics. In order to adapt to the trend of international competition after the end of the Cold War and the specific changes of China's reform and opening up, according to the inherent requirements of the process of Marxism sinicization, the CPC with Jiang Zemin at its core promoted the theoretical metabolism and innovated the core idea to guide China's social development [16].

The important thought of "Three Represents" is that the CPC should always represent the development needs of China's advanced social productive forces, always represent the onward direction of China's advanced culture, and always represent the fundamental interests of the largest member of the Chinese people. The important thought of "Three Represents" expounded the advanced role of the CPC in the construction of socialist economy, politics and culture with Chinese characteristics from the angle of the overall situation, the general connection of things, and pointed out that the party building must be strengthened in ideology, politics, work style, discipline, organization and system, which embodied the Marxist philosophical viewpoint of universal connection. The development needs of China's advanced social productive forces, the onward direction of China's advanced culture, and the fundamental interests of the largest member of the Chinese people are to realize the overall goal of building socialist economy, politics and culture with Chinese characteristics. The important thought of "Three Represents" was not only related to the overall situation of the new great project of promoting party building but also related to the overall situation of reform, opening up and modernization construction. In short, the important thought of "Three Represents" was based on Marxist philosophy and deepened Marxist philosophy. Unaffected by the so-called Revolution of 1989, it continued to straighten out the course of China's reform and opening up and kept China's economy stable and moving forward.

### **2.3 Hu Jintao's Scientific Outlook on Development Achieved the Economic Development by Leaps and Bounds**

The philosophy of socialism with Chinese characteristics is the philosophical form of the theory of socialism with Chinese characteristics. It is the Chinese characteristics, the Chinese style and the Chinese manner of the social science, and it has the distinctive characteristics of times [17]. On the premise of the development of Deng Xiaoping Theory and the important thought of the "Three Represents", the Central Committee of the CPC with Comrade Hu Jintao at its core had drawn extensively on the experience and lessons of the development at home and abroad through the combination of the actual situation of China's development and put forward an important strategic thought which accorded with the law of development of China.

With the further advancement of the reform and opening up, the economy had maintained a high rate of growth, but the environmental problems associated with it were becoming more and more serious. The local governments at all levels only focused on GDP but did not attach importance to the quality of economic growth. The wrong outlook of political achievement was becoming more and more obvious. If Scientific Outlook on Development was not put forward in time, the sustainability of China's economic development would become a prominent problem.

One of the forms of social consciousness--philosophy is the science of the most general laws of development of nature, society and thinking, and in relation to a particular subject reflects methodological principles of formation and a meaningful framework for its development [18]. The Scientific Outlook on Development is the systematic theory of contemporary Chinese communists on the development of the socialist society and the philosophy of the development of contemporary China.

The theoretical innovation with Scientific Outlook on Development as the core is the theoretical interpretation of Marx's historical materialism in contemporary China. The Scientific Outlook on Development was the response of the world outlook to the challenge of globalization and marked the fundamental transformation of the way of thinking in guiding the construction of socialism. Its core is the thought of "people oriented".

In the meantime, the Scientific Outlook on Development is a world outlook system which is united with the outlook about political achievements, the outlook about talents, the outlook about the masses and the outlook about honor and disgrace.

**The Scientific Outlook on Development mainly includes the following aspects:**

First, it is on the basis of the people-oriented principle. The people-oriented principle is the central idea of the Scientific Outlook on Development, and also the key area studied by experts and scholars. The people-oriented principle is the core motive force to promote the Scientific Outlook on Development, and it is also the inevitable requirement of national and social development. In essence, the people-oriented principle and Marxist thought are in common, which is of great significance to promote the development of the Scientific Outlook on Development. Only by adhering to the idea of people-centered development can the party and the people keep the same goal and form a joint force [19].

Second, it is to focus on economic construction. Experts and scholars generally believe that economic construction is the most important purpose of the Scientific Outlook on Development. In terms of the problems exposed in the course of China's development, they can be solved through the development of economic construction. The present prosperity of China has been derived from the continuous development of the economy in the past decades. In addition, economic construction is still an important prerequisite for the realization of people-oriented concept. Therefore, only when the Scientific Outlook on Development regarded economic construction as the main objective could it play an important fundamental role.

Third, it is to focus on issue of coordinated development. The Scientific Outlook on Development holds that in the process of economic development, it is necessary to ensure the coordinated development between urban and rural areas, between regions, between economy and society, between man and nature, and between domestic construction and opening to the outside world. Through the theory of coordinated development, it could effectively solve the problems exposed in the development of China. Therefore, the theory of coordinated development provides a clear way for the development of society and country, and this way of development could promote the long-term development of the Scientific Outlook on Development. The idea of overall planning put forward in the Scientific Outlook on Development was not to restore the traditional government-dominated planned economy mode but to intervene in the market through the use of the principle of economic development in the context of the market economy.

Fourth, it begins to attach importance to the issue of sustainable development. China is the largest country in population in the world. It has abundant labor force, but the per-capita quantity of the resources and per-capita GDP are very

low. Due to the lack of management in the past, the environmental damage and soil erosion had been serious, and the carrying capacity of the environment had been decreasing. With the rapid development of social economy, the contradictions such as the shortage of resources had been becoming more and more acute, and the damage to the environment had been also rising constantly. Therefore, it was necessary to carry out the important thought of sustainable development in the process of development, so as to ensure the long-term development of the country.

Therefore, it can be seen that the Scientific Outlook on Development is based on philosophy. The Scientific Outlook on Development has two important theoretical bases. First, it is the dialectical materialism. The dialectical materialism holds that the whole world has been continuously developed, and this theory has a holistic idea, which brought some inspiration to the Scientific Outlook on Development and promoted the Scientific Outlook on Development to come into being. Second, it is the historical materialism. The historical materialism holds that the development of history is not promoted by great heroes but by the masses of the people. The theory of interrelation between things became an important foundation of Scientific Outlook on Development that is people-oriented principle as the Core.

Since knowledge tends to spontaneously fragment while it grows, philosophy takes existing diversity as a resource and a starting point for a new synthesis [20]. The Scientific Outlook on Development is a major strategic thought put forward by the CPC since the 16<sup>th</sup> Session of National Congress of the CPC from the overall situation of the development of the cause of the CPC and the people in the new century, and it is also the systematic theory about the development of the socialist society of the contemporary Chinese Communists. It is the enrichment and development of Marxist development theory and the philosophy of contemporary Chinese development. Under the guidance of Scientific Outlook on Development, China's economy has maintained a high-speed growth momentum [21].

#### **2.4 The High-Quality Economic Development of Reform and Opening Up under the Guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era**

As we all know, the economic reform and opening to the outside world has promoted the rapid growth of China's economy. But the rapid economic growth also brought some serious environmental problems. The reform and opening up of the new socialist era under Xi Jinping's leadership has made efforts to solve the environmental problems that accompany economic development. That is to say,

while striving to maintain China's rapid economic development, the Chinese Government also ensures that China's environmental problems are constantly improving. In this way, the quality of China's economic development will improve continuously.

In recent years, the global ecological environment has been deteriorating day by day. Ecological problems emerge one after another. Human beings need to rethink the relationship between man and nature [22]. Xi Jinping, the General Secretary of the CPC, has said that mountains, waters, forests, fields, lakes, grass are a community of life. The lifeblood of man is in the field, the lifeblood of the field is in the water, the lifeblood of the water is in the mountain, the lifeblood of the mountain is in the earth, and the lifeblood of the earth is in the tree. It can be seen that the environment is an ecological functional community with internal organic connections. Its protection involves not only the coordinated development of economy and society but also the coordinated development of urban and rural areas, as well as the optimization and integration of space. Therefore, measures should not be isolated or uncoordinated but should be multifaceted and mutually supportive.

However, through the great development of the economy for several decades after the reform and opening-up, on the one hand, the living standards of the Chinese people have generally improved significantly, which has substantially eliminated the problem of poverty throughout the country, and China's international position has improved significantly. In today's economic globalization, China has the responsibility to better share the development achievements of its reform and opening up with the world. China's Belt and Road initiative will play a very beneficial role in promoting the benign development of the world economy, especially in promoting the common development of developing countries. On the other hand, however, with the continuous development of China's economy and the continuous improvement of the people's living standards, the people's demand for good environmental quality is getting higher and higher. China's environmental problems have also been placed in a more and more important position. Building a beautiful China has become the common wish of the whole country, and people are no longer satisfied with the material wealth based on the poor environmental quality. As a means of living better, with the goal of human flourishing, natural philosophy should encompass an ethics and morality grounded in human nature and in nature as a whole [23].

In view of the new changes in the situation at home and abroad, how does the CPC make Marxism develop greatly? On the one hand, it can not leave the realistic requirements of Chinese society; on the other hand, it must combine

Marxism with Chinese traditional culture, especially with Confucianism [24]. The new CPC Central Committee with Xi Jinping at its core, has timely put forward Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, which marks socialism with Chinese characteristics entering a new era. In Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, Xi Jinping's ecological civilization thought and the concept of a Community of Shared Future for Mankind have been widely praised at home and abroad. In order to share the achievements of reform and opening up, promote the development of the world economy and create a better home for mankind, socialism with Chinese characteristics for a new era has been formed on the basis of the practice of 40 years' reform and opening up in China. It has successfully created a new layout of two-way interaction between comprehensive deepening reform and all-round opening to the outside world, and devoted itself to the construction of the community of shared future for the Chinese nation and the community of shared future for mankind. It focuses on promoting the construction of ecological civilization and global ecological governance in order to form a harmonious and symbiotic life community between man and nature [25].

First of all, Xi Jinping pointed out that man and nature are the community of life, and that human beings must respect nature, conform to nature, and protect nature. The modernization we want to build is the modernization of harmony and symbiosis between man and nature, and we must adhere to the principle of giving priority to conservation, protection and recovery of natural resources. This kind of expression, which is both popular and profound, develops the epistemology of the relationship between man and nature and how to deal with the relationship between human production and the protection of nature to a new height, which is a new development of the sinicization of the Marxist world view.

Second, environmental pollution and ecological damage have become the weak link that restricts the sustainable development of China's economy and society, so the ecological environment protection is very important. With regard to the importance of ecological environment, Xi Jinping has repeatedly emphasized the importance of cultivating ecological ethics, and said that people should "protect the ecological environment like protecting their own eyes, and treat the ecological environment like treating their own lives". The report of the 19<sup>th</sup> National Congress of the CPC pointed out that the construction of ecological civilization is a long-term plan for the sustainable development of the Chinese nation, and it is necessary to set up and practice the idea of "clear waters and green mountains are as valuable as mountains of gold and silver", to adhere to the basic national policy of saving resources and protecting the environment, and to treat the ecological environment like the treatment of life. In order to respond to this epistemology in

practice, Xi Jinping put forward two bottom lines: the development bottom line and the environmental quality bottom line. Through the legislation and reform program, the ecological red line should be delimited and strictly observed, and severe punishment should be imposed on environmental pollution and ecological damage.

Third, environmental protection is also a livelihood issue. Xi Jinping has stressed that a good ecological environment is the most general welfare of people's livelihood. The Chinese government should insist on ecological benefits to the people and ecological benefits for the people, focus on solving the outstanding environmental problems that harm the health of the masses, and constantly meet the growing needs of the people for a beautiful ecological environment.

Last but not least, President Xi Jinping not only requires China to make its own contribution to global environmental security but also puts forward the concept of a Community of Shared Future for Mankind to the world based on global climate change, global animal protection, global environmental protection and global common development. It is necessary to implement a national strategy to actively address climate change, to promote and guide the establishment of a fair and reasonable global climate governance system with win-win cooperation, to highlight the image of China as a responsible large country, and to promote the building of a Community of Shared Future for Mankind. The proposal to build a Community of Shared Future for Mankind has received a positive response from the international community. The concept of a Community of Shared Future for Mankind is a new value concept put forward by the Central Committee of the CPC with Xi Jinping at its core in the new situation [26]. This theory not only reflects the harmonious symbiotic relationship between Chinese people and their own environment but also reflects the harmonious symbiosis between human beings and the environment of the earth and the harmonious symbiosis between each country and the environment of the earth. The Belt and Road Initiative, promoted by the concept of a Community of Shared Future for Mankind, will certainly play a very important role in promoting the development of the global economy, and will eventually benefit the countries participating in the Belt and Road Initiative. Currently, the promotion of the construction of a Community of Shared Future for Mankind has been written into the Constitution of the CPC and Constitution of China.

At the 2018 National Conference on the Protection of the Ecological Environment, President Xi Jinping proposed to work together to build a global ecological civilization, take a deep part in global environmental governance, to form a solution for world environmental protection and sustainable development,

and to guide international cooperation on climate change. This reflects the internationalization of the epistemology of Xi Jinping's ecological civilization thought. It can be said that the epistemology of Xi Jinping's thought of ecological civilization is a new breakthrough on the relationship between man and environment in Marxism [27].

### **3. A New Engine for the Development of the New Era**

Public administration as the manifestation of government is a complex reality itself in its exercise requires a philosophy to support it, encourage and give direction [28]. It is worth mentioning that the CPC and the Chinese government have actively embraced science and technology, advocated science and technology, and actively promoted the development of science and technology at any stage of its development. In his report on the work of the government, Chinese Premier Li Keqiang proposed to formulate an Internet Plus initiative to promote the integration of mobile internet, cloud computing, big data, internet of things with modern manufacturing industry, promote the healthy development of e-commerce, industrial internet and internet finance, and guide internet enterprises to expand their international market. The modern manufacturing industry and the industrial internet of things have been highlighted since then.

When applied sciences and philosophy interact, the latter can act as a useful tool by unravelling unexplored assumptions held in relation to a practice or issue of concern and reason about the implications of our ideas and decisions [29]. The government work report pointed out that C2B (Customer to Business) promotes manufacturing flexibility is one of the important trends of Internet Plus to promote manufacturing transition, which has more connotations. The combination of the internet of things and the manufacturing industry is another important trend in the development of the industrial internet. The combination of the physical world and the network world through sensors to develop the Cyber-Physical Systems (CPS) will open up a new world of industrial internet for intelligent manufacturing and intelligent factories. The software-defined machines will realize the rapid scheduling and reorganization of manufacturing equipment resources and self-organization production to meet the needs of personalized customization.

Summing up centuries of contemplation in science and most crucially its edification, knowledge must synthetically be transformed into insights to advance progressively [30]. By connecting people, big data, smart assets and equipment, the industrial internet forms an open and global industrial network, combining software and big data analysis to improve productivity and efficiency. With the combination of internet and machine equipment, big data analysis of machine



operation is used to improve the efficiency of machine operation and reduce downtime and unplanned malfunction. Its connotation has gone beyond manufacturing processes and manufacturing itself, spanning the entire value chain of product life cycles, including aviation, energy, transportation, healthcare and so on. Industrial internet will play an important role in improving energy efficiency, improving maintenance and maintenance efficiency of industrial system and equipment, optimizing and simplifying operation and improving operation efficiency.

In terms of national development, the development concept of Internet Plus can help China form a new comparative advantage of international division of labor from labor cost advantage to creativity cost advantage. Large population is China's most visible natural endowment, and the average education level of China's population is higher than that of countries such as India. With the increase of income level, the comparative advantage of low labor cost is not sustainable, especially for traditional manufacturing industry. The internet has given China the possibility of developing new comparative advantages based on natural endowment. The ability to collaborate between people is the greatest wealth of human evolution, but the effectiveness of this collaboration is limited by the transaction cost of communication, so it was difficult to realize the network effect of large groups in the past. Passive collaboration, similar to flow-line scale production, has become the main mode of collaboration, while active collaboration, which embodies the promoting role of human network creativity, has just shown great potential with the help of the internet.

A large group of people with a certain level of education and enterprising spirit will burst out world-class group creativity once an effective cooperative mechanism is formed with the help of the internet. This form of creativity is more of a business model or product micro-innovation in the early stages, and as experience and capacity accumulate, it will evolve into groundbreaking innovation, including innovation in science and technology. The Chinese-language Internet is a sufficiently large network, and if future generations can better break through the language barrier, that group's potential for creativity will be greater.

In other words, if the internet and digital technology can be grafted to more traditional industries, it will make the traditional industry more valuable, which will greatly promote the quality of China's economy and thus release more digital dividends. Due to its early development and relatively mature business model, the traditional industry is generally less digitized. Therefore, the future application of digitalization to improve production efficiency will have more room. In particular,

as China's economic growth slows down, the past labor-intensive and resource-intensive development models of traditional enterprises are unsustainable, so new competitive advantages need to be found.

The Internet Plus provides an opportunity for the upgrading of traditional industries. It is no exaggeration to say that, like other general-purpose technologies such as steam engines and electrification, internet technology will revolutionize the genes of traditional industries, leading to new sources of business and revenue growth. In fact, change is taking place in many traditional industries. In the field of payments, in addition to traditional financial services, non-financial services companies such as third-party payment providers provide consumers with flexible and diverse means of payment through mobile devices, social media and other digital technologies. In the field of shopping, many non-traditional retail enterprises directly participate in the retail market with the help of e-commerce, while retailers provide seamless shopping experience through digital technology. In the audiovisual field, both traditional content providers and digital content providers try to reach a target audience via the internet around consumers' habit of watching on multiple screens, which in turn can interact with content providers through social media, breaking the mode of passive acceptance of content in the past. And in the field of transportation, which is closely related to people's lives, is becoming more and more humanized and intelligent. Many new internet companies are focusing on providing more convenient trip service, hoping to get through the links of transportation, accommodation, tourism, etc., to provide customers with more considerate services.

It can be seen that "Internet Plus Traditional Industry" is not simply to subvert the traditional industry but to use new digital means to optimize the operation mode of traditional industry, and to create incremental value for consumers, customers and enterprises themselves. Therefore, for traditional enterprises, they should not be afraid to be subverted by new entrants but should have an open mind to see objectively the new atmosphere that new entrants bring to traditional industries, and they should abandon the traditional zero-sum mentality, set up the concept of competing and establish a wide range of partnerships with new entrants and upstream and downstream enterprises in the industrial chain to create an industrial ecosphere. As China's economy enters the "new normal", the past economic growth momentum gradually weakens, Chinese enterprises urgently need to find a new source of momentum, and the emergence of digital technology represented by the internet is at the right time. In the age of digitization, the world seems to be reducible to a digital computer [31]. If this technology trend can be fully held, both Chinese enterprises and the Chinese economy will unleash new growth potential. In a word, the Chinese Communist Party and the Chinese government

are fully aware of the changing economic development and the new situation, and promote the continuous development of China's economy and society by constantly developing philosophical theory and keeping pace with the times to create new miracles of reform and opening up one after another.

### **Conclusions**

The development of China must be guided by the continuous development of philosophical theory combined with China's national conditions. On the basis of careful analysis of the situation at home and abroad, China must raise it to an advanced philosophical theory and let philosophical theory go first. Marx has been recognized as "the best thinker in the last millennium", which has an inevitable connection with Marx's own "human feelings" and his creation of Marxism and the universal spread of Marxism in the world [32].

However, Marxist philosophy should not stand still and cannot stand still. The theoretical quality of Marxist philosophy that keeps pace with the times will only be deepened but not stand still. China will always combine Marxist philosophy with the excellent quality of Chinese philosophy, combine it with China's national conditions, and will continuously deepen and develop it. Otherwise, without the nourishment of philosophical wisdom in the deepening of theory, China will not move forward. If the development of philosophical theory is stalled, China's reform and opening-up and economic development will also be stalled. Since its founding, the CPC has not only emphasized the importance of theoretical learning on Marxism but also emphasized the importance of learning in practice; it has not only emphasized the theoretical learning of all party members but also paid special attention to the theoretical learning of the cadres of the party; it has not only enriched and perfected the content of learning but also formulated the corresponding learning mechanism. These historical experiences can be used for reference to uphold and develop the Marxist theory [33].

It is worth mentioning that the Communist Party of China holds a plenary session every year, such as the Third Plenary Session of the Eleventh Central Committee, which attaches importance to the study of philosophical theory of cadres of party members and to the ability to apply philosophical theory to practice. By convening the plenary session, the CPC can analyze and judge the domestic and international situation each year scientifically, and raise it to be the philosophical wisdom, and in turn the wisdom of the sublimated philosophical theory will affect the country's economic policy. For example, every five-year plan for each stage is based on the study of the situation at each stage of development. At each stage, philosophical theory is combined with the practice of economic development, together with China's institutional advantages that enable it to mobilize resources

to accomplish large undertakings, so as to make continuous efforts to move forward in a purposeful and directed manner. China has made brilliant economic achievements in its reform and opening up, which is clear to all countries in the world. It will certainly continue to absorb the philosophical wisdom in the further reform and opening-up, and make greater progress.

### **References**

1. Zeng, X. 2018. Philosophical Interpretation of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era: a Standpoint Based on Marx's Epistemology. *Social Science*, 11: 3-9.
2. Zhang, J. 2018. Confucian Culture and Xi Jinping's Diplomatic Thought with Chinese Characteristics. *Advance*, 12: 17-18.
3. Liu, F. 2018. The Discussion about Interaction between the Inheritance of Traditional Chinese Culture and the Theoretical Innovation of the Communist Party of China during the 40 years after the Reform and Opening-up Policy. *Academic Exploration*, 9: 129-133.
4. Mbaegbu, C.C. 2014. Culture as Philosophy of the First Order Activity. *Open Journal of Philosophy*, 4(04): 492-501.
5. Nicholas, M. 2018. We Need to Recreate Natural Philosophy. *Philosophies*, 3(4): 28.
6. Shi, Z. 2018. Deng Xiaoping and the Great Cause of Reform and Opening Up: Commemorating the 40<sup>th</sup> Anniversary of Reform and Opening Up. *Journal of China Executive Leadership Academy Pudong*, 4: 16-33.
7. Zhu, G. 2013. On the Dialectical thinking principle of Deng Xiaoping's theoretical Innovation. *Forward Position*, 19: 59-61.
8. Wang, J. 2015. Philosophical thinking on Deng Xiaoping Theory. *Journal of Changchun Education Institute*, 31: 19-21.
9. Olsen, N.S. 2014. Philosophical Theory-Construction and the Self-Image of Philosophy. *Open Journal of Philosophy*, 4(3): 231-243.
10. Njoku, F.O.C. 2013. A Theoretical Foundation for Understanding Law Subjects and Rights in Igbo Philosophy of Law. *Open Journal of Philosophy*, 3(01): 255-263.

11. Su, X. and Cai, Z. 2018. On the Integrity of Logic of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. *Observation and Ponderation* 10: 27-35.
12. Zhang, J. and Li, G. 2015. On the Philosophical Spirit of Deng Xiaoping's Theory from the Perspective of "Three Theories". *Jiangxi Social Sciences*, 11: 35-39.
13. Mostéfaoui Sofiane and Yousfat Ali. 2017. Towards a New Understanding of the Economic Liberalization Philosophy. *Journal of Business and Economic Development*. 2(3): 156-160.
14. Obinyan, V.E. 2014. Nature of human existence in Kierkegaard's ethical philosophy: A step towards self-valuation and transformation in our contemporary world. *International Journal of Philosophy*, 2(1): 1-14.
15. Dou, J. 2013. On the Historical Background of "Three Represents" Thought. *Journal of Human Industry Polytechnic*, 6: 56-59.
16. Wang, J. 2015. Philosophical thinking on Deng Xiaoping Theory. *Journal of Changchun Education Institute*, 31: 19-21.
17. Chang, G. 2018. The Basic Characteristics of the Philosophy of Socialism with Chinese Characteristics. *Journal of Yan'an University (Social Sciences Edition)*, 40(6): 11-20.
18. Tovarovskiy Iosif Grigorevich. 2017. The Philosophy of the Blast Smelting: Cognition and Development of the Technology. *Science Journal of Energy Engineering*, 5(1): 31-39.
19. Qi, W. 2018. Research on Xi Jinping's Adherence to People-centered Thought. *Journal of Yan'an University (Social Sciences Edition)*, 40(6): 26-30.
20. Gordana Dodig-Crnkovic and Marcin J. Schroeder. 2019. Contemporary Natural Philosophy and Philosophies. *Philosophies*, 3: 42.
21. Wang, X. 2018. The Scientific Outlook on Development and the Sinicization of Marxism. *Journal of Heihe University*, 3: 21-22.

- 
22. Liu, S. 2018. Xi Jinping's Thought of Ecological Civilization Construction. *Journal of Harbin University*, 39(10): 4-11.
23. Bruce J. MacLennan. 2018. *Philosophia Naturalis Rediviva: Natural Philosophy for the Twenty-First Century*. *Philosophies*, 3(4): 38.
24. Liu, G. and Zeng, K. 2018. The Sinicization of Marxism is Always on the Way. *Advance*, 12: 21-23.
25. Yang, H. and Zhong, M. 2019. On the Historical Logic of Xi Jinping's Socialist Ideology with Chinese Characteristics in the New Era. *Journal of Liaoning Normal University (Social Science Edition)*, 42(1): 33-39.
26. Liu, G. 2018. A Multi-Dimensional Analysis of Xi Jinping's Thought of Opening to the Outside World. *Journal of Yan'an University (Social Sciences Edition)*, 40(6): 5-10.
27. Chang, J. 2018. The Scientific Connotation and Age Contribution of Xi Jinping's Ecological Civilization Thought. *Chinese Cadres Tribune*, 11: 8-13.
28. Sanchez-Ramos, M.A. 2018. Philosophy for Open Government. *Open Journal of Political Science*, 8: 423-432.
29. Cambareri, G. and Grant-Young, J. 2018. Addressing the Conceptual Controversy of Sustainable Intensification of Agriculture: A Combined Perspective from Environmental Philosophy and Agri-Environmental Sciences. *Philosophies*, 3(4): 37.
30. Nikkhah, A. 2011. Postmodern science edification philosophy. *Open Journal of Philosophy*, 1(01): 37-38.
31. Klaus Mainzer. 2019. The Digital and the Real Universe: Foundations of Natural Philosophy and Computational Physics. *Philosophies*, 4: 3.
32. Xue, X. 2018. The Four Dimensions of the New Realm of Marxism Opened up by the New Thought. *Journal of Yangzhou University (Humanities & Social Sciences)* 22(6): 58-63.
33. Geng, P. 2018. On Xi Jinping's View on Learning Marxist Theory. *Journal of Changchun University of Science and Technology (Social Sciences Edition)*, 31(5): 13-23.
-

# **Zohayr ibn Abi Solma: The Man of Wisdom and Peacemaking**

**Yahya Saleh Hasan Dahami (Associate Professor)**

English Department, Faculty of Science and Arts, Al Baha University  
Al Baha-KSA

E-mail: dahami02@gmail.com; ydahami@bu.edu.sa

<https://orcid.org/0000-0003-0195-7878>

**Abstract:** Zohayr ibn Abi Solma (also it can be written as Sulma) is known as a wise poet as well as a peacemaker. He produced a sort of poetry that is distinguished with superiority. To try proving such notions, appeared the idea of this study which aims to elucidate the poet's talent in producing remarkable poetry as the mouthpiece of the dreams of the poet. The paper also attempts to reveal the contribution of Zohayr ibn Abi Solma in making peace within the warring tribes utilizing an expressive Arabic classical language.

In this paper, the researcher applies the critical-analytical method which opens with an introduction on the importance of Arabic as a medium of poetic language, revealing its prominence, influence and contribution to the tradition and legacy of the Arab people. Then the study moves to the first point that deals with Zohayr as a man and a poet. Thence, the paper shifts to the second part which focuses on the wisdom of our poet, commenting on some verses dealing with the same concern. The study goes ahead to focus on the third point indicating the efforts of the poet in his endeavor to settle peace. The paper concludes with a brief afterword observing the findings of the study.

**Keywords:** Arabic poetry, Arabia, peacemaking, pre-Islamic poetry, wisdom.

## **Introduction**

### **A. Arabic: The Medium of Everlasting Poetic Language**

Readings in the Arabic poetry of pre-Islamic period is a right turning shift to authenticity, truthfulness, genuineness and originality. It is a return to the chief sources and the endless fountains. The Arabic poetry of pre-Islamic period has sparkled like stars in the skies of Arabic literature for ages and still in the eyes of significant numbers of critics and poets as a perfect illustration in the formation and composition of Arabic odes and the availability of their musical elements. The Arabic language, one of the Semitic languages, is rooted in numerous centuries before Islam. It has involved different dialects distinguished with serenity and influence on other tongues.

It was and still a factor in the linguistic unity for Arabs. Commercial travelers, north and south in winter and summer, in addition to the literary festivals and carnivals such as Souk Okath as well as the frequent pilgrimages to the Ka'abah of Mecca has played a significant role in profoundly making the Arabic language firm and forever. "Before the era of the Prophet, poetry had attained some degree of excellence. At the annual festival of Okatz [Okath], the poets met and made public recitations, and competed for prizes" (Arbuthnot, 1890, p. 27).

The Arabic language is described as old innovative poetic language. Those who provide such *wasf* (description) about it meant that the Arabic language is rich with poetry and poets. It is an acceptable language owing to its flexibility in hearing and understanding especially to the chanting verse as well as the rhythmical utterance. The Arabic language has the ability to meet various terminological needs, for instance, the possibility of the encounter of the true real phrases with the allegorical ones smoothly in a way rarely to find in any other language.

The Arab people are split into various tribes in which the young are educated and skilled to be combatants as well as poets. It is said that a significant feature of pre-Islamic poetry is that it depicts and reveals the public and moral situation and state of the culture of the Arabs before the advent of Islam. Certainly "it is the Pre-Islamic Poetry that serves as a gate via which one can envisage the situation, whether, it is ethical or communal, it is political or social, of the society of pre-Islamic epoch" (Dahami, 2018). Because of the poetry of pre-Islam, evaluators and reviewers might ascertain that Arabs, in a genealogical manner, were at times flexible and tolerant and in some other times opinionated without any sovereign government or authority. Additionally, poets are outstanding figures in such an age.

### **B. Zohayr: The Man**

Zohayr ibn (son of) Abi Solma Al Muzni (زهير بن أبي سلمى المُنْزِي), Emro' Al-Gais ibn Hojr, An-Nabigha Ath-Thubyani, are generally considered as the three greatest Arab poets of the pre-Islamic age. Zohayr's father was a great poet and his uncle to his mother, Bashamah ibn Ghadiyr, was also a great poet as similar to Orwa ibn Al-Ward and his uncle to his mother, Al-Mutalamis.

The name of Zohayr is also written as *Zouhair*, *Zuhyair* or *Zuhayir*. He is an eminent poet of the pre-Islamic era who lived from about "530 to 627 AD" (Az-Zawzani, 2011, p. 71). He is depicted as a noble and generous person who liked to make his poems in praise of men who seek peace and reconciliation. According to *Kitab Al-Aghani* (The Book of Songs) for Al-Asfahani (2008), the



name of Abi Solma is Rabia'h ibn Riyah ibn Gurrat ibn Al Harith ibn Mazen ibn Tha'labah ibn Thour ibn Hermat ibn Al-Asam ibn Othman ibn A'mru ibn Odd ibn Tabekhah ibn Eliyas ibn Muthar ibn Nezar (p. 226).

Zohayr is a *Mozaniy*, that is to say, he belongs to the tribe of Mozaiyna, collateral of the famous tribe Bano (sons of) Tamim. Al-Mozaiyna are the children of A'mru ibn Odd ibn Tabekhah ibn Eliyas ibn Muthar. They are named after their grandmother Mozaiyna, the daughter of Kalb ibn Wabrah, the wife of Odd and mother of A'mru. As mentioned in *Kitab Al-Aghani*, this tribe domiciled in Al-Hajiz and it was a small limited tribe for which it has played a minor role in the history of Arabia. It has recognized because of the poet Zohayr to be deserved mentioning and because our poet also held by blood ties to Murrah ibn Thubyan who lived in Najd among the people of Ghatafan, and that his relations with several characters such as well-known members of Murrah branch, whose virtues he celebrated in his *Mua'llagah* are almost the merely details identified about his life.

Abo Solma, the father of Zohayr, is ibn Rabiya'h, a descendant of Mozayna by Al-Harith ibn A'uf ibn Abi Harithah Al Murri. Having had some dissatisfaction with the folks of his tribe, Mozayna, Abo Solma left them and came with his family to live with his maternal uncles of Murrah. He, at that juncture, settled with Bano Abdallah ibn Ghatafan, neighbors and lineages of Murrah, in an area called Al-Hajiz of Najd near Al Madinah where his descendants continued to exist in after Islam. Zohayr is engaged early and fruitfully in the adoration of poetry. His great maternal uncle Bashamah ibn Ghadiyr ibn Murrah, brother of the mother of his father Abo Solma, appreciated him very much, kept him close to him, and treasured his poetry.

Bashamah is a poet himself, a rich and is greatly considered among Bano Ghatafan, who has not carried out anything without consulting him but he had no children. Before his death, he made the sharing of what belonged to him between his close kin and the sons of his brothers but did not give Zohayr any. Some of the attendants said to him, 'Will not you give Zohayr something?' 'I donate him, answered Bashamah, 'the most beautiful portion of my legacy; it is my talent for poetry. However, said one of the attendants, 'poetic talent is good that he already possesses.' Do you believe, said Bashamah, what do you think of the Mozayna? No, it cannot be. All Arabia knows that poetic intellect is an appanage of my clan, and particularly of me, and it is from me that he has passed to him. Bashamah, however, added to his will an inheritance in favor of his grandnephew, Zohayr.

The poems of Zohayr ibn Abi Solma are called *Al-Hawliat* (annuals) which means yearly. The poet used to write a poem in four months and to be refined in four months and to be spoken for four months, that is a year.

Zohayr's *Mua'llagah* is composed on the circumstance of the peace that ended the battles of Dahis and Al-Ghabra and in honor of the intermediaries who worked to end the war. According to the opinion of Al-Asfahani (2008), the persons to whom he particularly addresses his applauses are Al-Harith ibn A'uf and Sinan, the father of Harim.

In addition to his *Mua'llagah*, Zohayr has made a significant number of *Qasayd* in praise of Harim, his father Sinan, his brothers as well as all his family. *Qasayd*, a plural of *Qasiydah*, means odes sometimes translated as poems. The benefits of which Harim filled the poet, and the verse lines which gratitude inspired to Zohayr, made the tolerance of Harim proverbial among the Arabs.

Harim had sworn not only to grant Zohayr all his demands, whatever they might be, and to bestow him gifts whenever he would be acclaimed in his verses, but also to bestow him a slave either male or female, or a horse, whenever Zohayr would greet him. Zohayr is shy and confused by the extensive gifts and largesse he receives from Harim; and, to circumvent this excess of openhandedness, he used to say, when he presented himself in a circle where Harim is: 'I salute you all except Harim; and the one I leave out is the greatest of you all' (Al-Hashimi, 2015, p. 465). See also (Ash-Shehristani, 2013, p. 687).

In the sequel, ibn Harim having once recited a *Qasiydah* of Zohayr in honor of his family before the Caliph (Khalifah) Omar ibn Al-Khattab, the Caliph Omar exclaimed: 'He said of you very attractive and gorgeous things! - However, also, said ibn Harim, we made him elegant precious gifts. 'What you gave him,' Omar added, 'has been demolished; what he has given you is everlasting (Ibn Gutaiyah, p. 144).

Umm Aufa, whom our poet calls at the opening of his *Mua'llagah*, is the first wife of the peacemaker poet. All of the children Zohayr had had from her having died either at the time of giving birth or at a young age. He had married a second wife who is the mother of Zohayr's three sons; Ka'b, Bojayir and Salem.

The jealousy that had led Umm A'ufa to dispute with her husband, Zohayr had repudiated her and had subsequently felt bitter regret at having detached her. The second wife is Kabeshah bintu (daughter of) Ammar from Odai ibn Suhaim who belongs to the tribe of Hanifah. Zohayr has all his living sons from Kabeshah.

**C. Zohayr: The Man of Wiseness**

At the time of the termination of the war of Dahis, when Zohayr composed his *Mua'llagah*, he was moving toward his eightieth year, as flashed by the forty-seventh verse of the poem.

المنايا خبط عشواء من نصب رأيتُ  
 تُخطيُ بعمرٍ فيهم ثمته ومن (As-S'adi, 2013, p. 45) (Al-Gaisiy, 2011, p. 294).

I comprehended death is like the lumbering of a blind camel; whom it meets is killed, and he whom it misses lives to become aged.

Zohayr says that from his knowledge and experience of life, he is bored of the weight of life. One must be fatigued of existence when a person counts eighty years. In a sapiential way, the poet from his experience speaks about death saying that death is like a blind camel which kills anyone moves over.

The one who is hit by the camel is demised and the one it misses lives a long life to be aged. In this verse line, the poet gives a valuable lesson for those who possess a thoughtful mind. There is a bit of advice resulted from experience that no one can control demise or keeps him/herself away from doom. A person should not be too much cautious on his life attempting to evade death because death will come only in its labeled time by God.

As a part of Arabian people, the camel is an important accompanied and belonging to them. Several pioneer poets of Arabia have mentioned the camel in their poems presenting their usefulness to people. As an example, Tarafah ibn Al-A'bd Al-Absi says:

وَإِنِّي لَا مُضِيَّ إِلَهُمْ عِنْدَ احْتِضَارِهِ  
 يَعْجَاءُ مِرْقَالُ تَرُوحٍ وَتَعْتَدِي (Az-Zawzani, 2004, p. 75)  
 I dispel sorrow when it displays itself, appreciation to a light and fast camel that goes unfatigued from evening to morning. (Dahami, 2018).

As an essential area of the Arabic poetic language, *wasf* (description) is inevitable in the poetry of Arabia. Tarafah in the above verse enjoys giving sophisticated *wasf* or depiction "of his she-camel. He connotes that if disaster falls upon me and on my area, I expel it away via mounting my camel *A'wja* because it is used to long travels with endurable patience from dawn to dusk" (Dahami, 2018).

Another example of *wasf* the camel is by A'mru ibn Kolthoum who, in his *Mua'llagah*, chants:

ذِرَاعِي عَيْطَلٍ أَدْمَاءَ بَكْرٍ هِجَانُ اللَّوْنِ لَمْ تَقْرَأْ جَنِينًا (Ibn Kolthoum, 1991, p. 68)

My beloved shows two charming arms, fair and bursting as the limbs of a long-necked snow-white fledgling camel, that frolics in the vernal period over the sand-banks and green mounds.

In this verse, our poet describes his beloved's arms as those of the she-camel who has not given birth yet or it well grazed for the period of the best season of spring. The arms are long and fully fledged. It gives an indication of a gorge with soft delineations, which seems to be molded of two ivory boxes inventively rounded, and on which no one put on a reckless hand. As it is the temperament of Arabs in the Arabian Peninsula, they used to be well associated with the camels as caring animals. Arabian camels are of great implication for several reasons; they are used as mounts in confrontations as well as in commerce; they are the fleet of the desert beside affording food specifically milk meat. In addition, Arabs are affectionate of camel race. The best camels who are illustrious by their strength and exquisiteness as A'mru ibn Kolthoum describes it in the above line. The poet equates the arms of the lady in an embroidered way to the those of a sturdy she-camel.

It is believed that about the year 627, approximately a hundred years, Zohayr met Prophet Mohammad, who said, on seeing him, O "God grant me a refuge from his Devil" (Clouston, 1881, p. xliii). Zohayr died soon after, without uttering a single line since that appeal of Prophet Mohammad. His two sons Ka'b and Bojayir, and his grandson Moudharrib ibn Ka'b were distinguished poets too. Bojayir and Ka'b joined Islam almost in the year 630. Solma, sister of Zohayr, had the talent for poetry as well. She is the mother of Al-Khansa, a pioneer lady poet.

Wisdom is a very distinct trait of the poet Zohayr ibn Abi Solma. It is said that he is the wisest poet of Mua'llagats' poets. His wisdom prevented him from being attracted or drawn to war and battles, on the contrary, he stood strongly against the voices to urge him using his talent and intellect for war as it was the nature of many distinguished poets of the period preceding Islam. Here is a verse delineates wisdom in a clear and bright *wasf*.

فَلَا تَكْتُمَنَّ اللَّهُ مَا فِي نَفُوسِكُمْ لِيَخْفَى وَمَهْمَا يُكْتَمُ اللَّهُ يَعْلَمُ  
يُؤَخِّرُ فَيُؤْخِرُ فَيُؤْخِرُ فَيُؤْخِرُ لِيَوْمِ الْحِسَابِ أَوْ يَعْجَلُ فَيَنْقَمُ (Zohayr, 1988, p. 4)

Do not hide from Allah what is in your chest that it may be concealed; whatever is concealed, Allah knows all.

If delayed, it is recorded in a book, so that it is postponed to the day of hereafter or to hasten revenge.

Zohayr lived a very long age with prosperity. He gained great wealth from his talented craft of saying amazing imaginative poetry given to him from the leaders and honorable men of his tribe. The above two verse lines indicate that he was a Unitarian and a believer of the hereafter. Zohayr advises his people to be honest, sincere and truthful. According to the poet, good people are those who do not conceal and hide something from others in their hearts. Such doing is the habit of devilish creatures. Any immoral action that is made secret or hid one day it is revealed. In all cases, if a person planned inside his mind to do a harmful hidden task, it shall not be concealed from Allah (God) Who knows everything whatever it is. Such an idea is supported by verses of the Holy Quran in different Surat (Chapters) of the Quran.

(يَقُولُونَ بِأَفْوَاهِهِمْ مَا لَيْسَ فِي قُلُوبِهِمْ وَاللَّهُ أَعْلَمُ بِمَا يَكْتُمُونَ)

“saying with their mouths what was not in their hearts. And Allah has full knowledge of what they conceal” (Al-Hilali, 1419 A. H. p. 100, verse 167).

The second line supports the first but with wider elucidation to the power of Allah even if it is delayed or postponed. Sapiential advice says that do not hide a secret from Allah; God knows your secret; He knows all that is hidden. The wise notion understood here is that ‘suppose the devilish action or intend is successfully concealed in this life, it is just delayed to the eternal day of interrogation (a symbolic connotative expression means the day of hereafter). The poet believes that such action(s) is/are recorded in a book. The recording book is saved, kept and protected by the Omnipotent Allah for that day. It is also true that the doer(s) of such action(s) is/are punished hurriedly as reaction revenge to their unwell intention.

Moving ahead with another picture of wisdom that illustrates the talent of Zohayr:

وما الحربُ إلا ما علمتم وذقتم وما هوَ عنها بالحديثِ المرجم (Al Girshi, 2016, p. 92)

War is simply that you recognized and tasted; it is not talk of suggesting.

وَمَهْمَا تَكُنْ عِنْدَ امْرِئٍ مِنْ خَلِيقَةٍ وَإِنْ خَالَهَا تَخَفَى عَلَى النَّاسِ تُعْلَمُ (Az-Zawzani, 2011, p. 72)

Whatever person has a bad habit; In vain would hope to hide it from people.

One of the most vital points Zohayr shows in the above line is morality or morals. The morals habits of their people measure societies. They are ethical motives.

The poet, here, sheds light on the habits of people and how they should present themselves openly and frankly without any sort of deceit or mischief. Zohayr says that the habits and behaviors of people are discovered even if it is late.

ومن هاب أسباب المنايا ينلنه وإن يرق أسباب السماء بسلم (As-S'adi, 2010, p. 33)

The one who is petrified of deaths; death will reach him/her even if ascending to the sky.

In the above verse, the poet confirms the eternal truth of this temporary life which is death. Whatever a person lives, he/she will one day die. Never for a creature to live forever. Nobody has the ability to flee demise. If there is a person attempts to avoid decease, death will reach him/her even if he/she ascends high to the sky with a ladder. The expression *ladder* here is a metaphorical tool representing a means to avoid demise by ascending to an unreachable place. So do not be afraid of death because it comes; it comes.

فإن الحق مقطعه ثلاث يمين أو نفار أو جلاء (Ibn Gutaiybah, 1423, p. 140)

Truth is no more than three; oath or dispute to a judge or clarity.

Such concise expressions illustrate the in-depth knowledge of our poet. Zohayr summarizes the solution of any conflicting issue in three steps. He, in this verse line, tells us that there are three ways to show and confirm certainty; either oath or intermediation by leaders of the tribes or reliable evidence. "Innocence or guilt was proven either by 'oath or contest or evidence'" (Hoyland, 2002, p. 122).

According to Al Baghdadi (1997), The first can be an oath or the second is going to court for judging or the third is bring proof or witness to make truth clear (p. 334). No doubt that Zohayr, besides his talent, got benefits and experiences from the Arabic society he lived in. We might realize that the society of Zohayr was a society knows certain laws and jurisdictions, a society possesses a group of the basis suitable to establish an accepted system people return to it when a delinquent appears. More can be searched in (Hammour, 2006, pp. 829-830). The Caliph Omar ibn Al-Khattab admired the above line saying that if Zohayr lived in our age, I would make him the chief judge for his great knowledge and the accuracy of his judgment. Pronounced wisdom appears from this simple line which carries deep sense and perception.

To sum up, Zohayr has praised those honorable lords of tribes because of their great efforts, exertions and stabs to settle peace among their people. However, the poet was careful in selecting his words, no prodigality, excessiveness intemperance no extravagance or hyperbole only prudence and moderation in his

wording. Zohayr was honest and humble in producing his poetry. No doubt that he has the ability in controlling his language and gathers the best of it (phrases and expressions). He continued polishing and enhancing the selected verses until they are seen as constellations of pearls.

#### D. Zohayr: The Peacemaker

Zohayr has witnessed the war of Dahis and Al-Ghabra which accrued between the two tribes of Abs and Thubyan. He saw the devastation, destruction, wreckage, damage, impairment and poverty resulted from this war and composed his Mua'llagah calling for welfare and recognition and praising virtues and merits of Harim ibn Sinan and Al-Harith ibn Auf who greatly endeavored for peacemaking between the warring tribes. Both Harim and Al-Harith endured the blood money as a compensation of the killed men. The compensation is estimated with three thousand camels paid in three years.

The following six lines are from Mua'llagat Zohayr which delineate his perspective on peace to be made.

16. فَأَقْسَمْتُ بِالْبَيْتِ الَّذِي طَافَ حَوْلَهُ رَجَالُ بَنُوهُ مِنْ قُرَيْشٍ وَجُرْهُمَ - (Ash-Shibani, 2001, pp. 192-195)

17. يَمِينًا لِنِعْمِ السَّيِّدَانِ وَجِدَّتِمَا

18. نَذَارَكُتُمَا عَيْسًا وَدُبْيَانًا بَعْدَمَا

19. وَقَدْ قُلْتُمَا إِنَّ نَذْرَكَ السَّلَامِ وَاسِعًا

20. فَأَصْبَحْتُمَا مِنْهَا عَلَى خَيْرِ مَوْطِنٍ

25. أَلَا أَلْبِغُ الْأَخْلَافَ عَنِي رِسَالَةً

وَدُبْيَانٍ هَلْ أَقْسَمْتُمْ كُلَّ مَقْسَمٍ (p.197)

16. I swear by the Holy House round which the men go circumnavigating, who constructed it from Quraysh and Jurhum

To make his argument justified and well received, the poet supports his wishes of praising the two peacemakers Harim and Al-Harith, swearing by the sacred place of worship, the house of Allah. This holy house is Al-Ka'ba of Mecca which is served and protected successively by the ancestors Bano Jurhum and those of Quraysh. Quraysh is the name ascribed to the dwellers of Mecca. Arabs, in order to attract the listeners or the attendants, they frequently used, to begin with, the oath by what is worshiped for persuasion. Because the subject matter is of great value for him and the community, Zohayr swears by the most value sacred place for Arabs. It is a commitment, to tell the truth.

17. Swearing that they are verily two exceptional chiefs, who are, in all cases, worthy of honor especially between ease and suffering.

This verse line is supplementary to the previous one. The poet declares and affirms his speech solemnly as true. It is an oath truly said about the two worthy leaders Harim ibn Sinan and Al-Harith ibn Auf. Zohayr says that both of these two are found perfect in their endeavor to reconcile the disputes between the two tribes by word and deed. It is the nature of the poet himself to like, admire and the peacemakers because he is one of them. His poetry makes this event immortal.

18. You overhauled with peace the situation of the tribes of Abs and Thubyan after they had battled for long, and ground up the perfume of Manshim among them.

Zohayr tells about the two heroes who have glory and dignity to sacrifice a considerable part of their property to be paid satisfactorily for the peace settlement. In a fantastic way of using Arabic poetic language, he says that you (Harim ibn Sinan and Al-Harith ibn Auf) have reconciled Abs and Thubyan, whom their wrath had almost eradicated, and whose warriors appeared to have fragrancd their hands with the aroma of Manshim, swearing to fight to the death.

In this verse line (18), our poet, with the skill of a master, continues sewing the net of reconciliation between the tribe of Abs and their tribe of Thubyan. He says that by your favor revenging war has come to an end after a long time of fighting and killing each other to the degree that the men of the two tribes are about to be wiped out. Allegorically, the poet delineates the situation as a story of perfume lady-seller known with the name of Manshim once a group of fighters bought a bottle of perfume then they made an oath among them to fight their enemies to the end. The bondage of their oath is ornamenting their hands with that perfume they bought from the lady Manshim. The idea here is that Harim ibn Sinan and Al-Harith ibn Auf, according to Zohayr, could save and protect their clan of Thubyan as well as the rival tribe of Abs to be like those fighters of Manshim.

19. And you have declared, 'if we perfectly attain peace by spending part of properties and the conferring of doles, and by right words, we are going to be secure.

Again we have an elegant *wasf* of Zohayr about the two peacemakers. The poet addresses them: you confirmed to the warring tribes, 'If we accomplish lasting peace by bestowing our wealth and by getting words of alliance and good relationship, we shall be content to buy it at this value. You have succeeded in making peace, you who were unfamiliar to hostilities, to the ferocity of the two tribes from the danger of the two tribes, destroying each other.



Zohayr bears on illustrating the white hands of the two honorable men mentioning that they have said 'if our endeavor succeeded in attaining reconciliation, peace will make all safe. Critics and readers of Arabic poetry before Islam might not forget the significance of the theme of peace for which people need to carry out grand efforts to achieve.

20. You occupied by reason of this the best of positions and became far from the reproach of being undutiful and sinful.

You–Harim and Al-Harith–from such good deed have become blessed; they are too far from blame, from disobedience and too far from sin. Great meaningful expressions are celebrating the success and thrive of their endeavor. Now peace is settled by the favor of great men such as the above mentioned two. Zohayr remarkably demonstrates the glory of defeating war neither by a sword nor by a spear but by the tongue.

25. Convey my message to the allying tribes, and Thubyan verily have you sworn by all sorts of oath to keep the peace.

The poet is a peacemaker who wants to make sure that what has been achieved is fixed forever. He addresses all listeners and readers of his Mua'llagah to be a witness on the achievement being done.

Poetry is indeed 'the record of the Arabs.' A good deal of what has been preserved of the heritage of the past consists of what can be termed occasional poetry.

We learn, for example, through the famous Mu'allagah of Zuhayr ibn Abi Sulma (d. c. 607) of the means by which tribal conflicts in pre-Islamic Arabia could be resolved (Allen, 2000, p. 66).

His poetry is estimated as a peace message of gratitude to the two peacemakers, and to the leaders of the two tribes and their allies who accepted the offer of concord. Furthermore, the poem is a message of commitment for all those engaged to keep their word.

Another picture of Zohayr in his endeavor and support of peacemaking:

سعى ساعياً غيظ بن مرة بعدما      تَبَزَّلَ ما بين العَشِيرَةِ بالدَّمِ (Abo Rahamah, 2012, p. 19)

This verse line is similar to other verses mentioned by Zohayr on different occasions, but the purpose is one.

It is a praise of Al Harith ibn Auf and Harim ibn Sinan who have made great efforts to stop the catastrophic war between the two mentioned tribes.

تداركتما الأحلافَ قد ثلَّ عرشُها      وذُبيانَ إذ زَلَّتْ بأقدامِها النُّعلُ  
(Ath-Thahabi, 2003, p. 273)  
Add to her throne and may represent alliances Thubyan was still on the sole.

When the two parties were formed, their throne was represented, and the beasts were still with their feet.

## Conclusion

Zohayr ibn Abi Solma is no doubt a peacemaker although he did not carry a weapon in his hands however he had a very crucial weapon to succeed in his battle against war; it is the word. He struggled all his life long with his peaceful weapon. Zohayr is the wisest poet of the eminent poets during the period prior to Islam.

This celebrated hanging poem of Zohayr, as all his poetry, is actually prodigious for several reasons among which his poetry bears prodigious issues such as peacemaking. His poetry is a spacious edifice composed with wisdom, perception, desirability, judgment, good sense and the desire for peace settlement using an elegant language. I confess that my attempt of translating, commenting on and interpreting the Arabic verse lines of Zohayr in this paper is lacking. The main reason is dealing with a beautiful classical tongue seldom used in this age of the twenty-first century.

As the assessing analysis elucidates, the study tracked a reasonable manner aligned on the most major sources. The studied verse lines of Zohayr are shards of Arabic poetry which portrays original Arab standards, models and consciences against the catastrophic revenging wars among tribes in pre-Islamic age. Such lines made acute effects in Zohayr society and other societies.

## References

### Arabic

1. Abo Rahamah, K.S. 2012. Lahab Al-Ma'rifah min Gathayia Al-Adab wa Al-Fikr fi At-Turath Al-Arabi (Flames of Knowledge from Issues of Literature and Thought in the Arabic Patrimony). Dar Alketab Althaqafee for Publishing.
2. Ibn Gutaiybah, A.M. 1423. Ash-Shi'r wa Ash-Shua'ra (Poetry and Poets). Cairo: Dar Al Hadith.

3. Ibn Gutaiybah, A. M. (n.d). Ash-Shi'r wa Ash-Shua'ra (Poetry and Poets) Vol. 2. Cairo: Dar Al Ma'arif.
4. Ibn Kolthoum, A. 1991. Diwan A'mru ibn Kolthoum. Beirut: Dar Al-Kitab Al-Arabi.
5. Al-Asfahani, A. 2008. Kitab Al-Aghani (The Book of Songs), Vol. (10) 3<sup>rd</sup> Edition. Beirut: Dar Sader Publishers.
6. Al-Baghdadi, A.O. 1997. Khizanat Al-Adab wa Lub Lubab Lisan Al-Arab. Vol 2. Interpretation by Abdusalam M. Haroun. Cairo: Maktabat Al-Khanji.
7. Al-Hashimi. A. 2015. Jawahir Al-Adab fi Adbiat wa Insha Lughat Al-Arab (Jewelry of Literature in Literatures and Growth of the Language of Arabs). Beirut: Dar Al-Marefah.
8. Al-Hilali, M.T. and Khan, M.M. 1419 A.H. The Noble Qur'an: English Translation of the Meanings and Commentary, Madinah: King Fahd Complex for the Printing of the Holy Qur'an.
9. Al-Gaisiy, K. 2010. Al Wajeez fi Mustawaiyat Al-Lughah Al-A'rabia (The Concise in the Levels of the Arabic Language). Amman: Dar Yafa Al-Elmiah.
10. Al Qirshi, M. 2016. Jamharat Asha'r Al-Arab. Beirut: Dar Al Argam.
11. Ash-Shibani, 2001. Sharh Al-Mua'llagat At-Tesa' (Interpretation of the Nine Mua'llagat). Beirut: Al A'lami Corporation for Printing.
12. Ash-Shehristani, M.A. 2013. Al-Milal wa An-Nehal (part 1). Beirut: Dar Al Kotob Al Ilmiyah.
13. As-S'adi, E. E. 2013. Wahat Ash-Sh'ir Al-Arabi: Lughatn wa Balaghah wa Nahw (Oasis of Arabic Poetry: Language, Rhetoric and Grammar). Amman: Amwaj Publications. Amman: Dar Al Muotaz for Publication.
14. As-S'adi, E.E. 2010. Zohayr ibn Abi Solam: Sha'ir Al Hawliat (the Poet of Yearly Poems).
15. Ath-Thahabi, S.M.A. 2003. Kitab Al A'rsh (The Book of Throne) Part 1. Al Medina: Deanship of Scientific Research Al Islamiyah University.

16. Az-Zawzani, Abo Abdullah Al Husien ibn Ahmad. 2004. Sharh Al-Mua'llaqat As-Saba', (Interpretation of the Seven Hanging Poems of Arabs) Beirut: Dar El-Ma'refah.
17. Az-Zawzani, Abo Abdullah Al Husien ibn Ahmad. 2011. Al-Mua'llaqat As-Saba', (the Seven Hanging Poems of Arabs) Beirut: Dar El-Ma'refah.
18. Hammour, I.M. 2006. Mawasim Al-Arab: Arab's Ancient Seasons and Festivals. Beirut: Dar Al-Kotob Al-Ilmiyah.
19. Zohayr, ibn Abi Solma. 1988. Diwan Zohayr ibn Abi Solma, (with an introduction and interpretation by Ali Hasan Fa'our). Beirut: Dar Al Kutub Al-Elmiah.

### **English**

20. Allen, R. 2000. An Introduction to Arabic Literature. Cambridge: Cambridge University Press.
21. Arbuthnot, F.F. 1890. Arabic Authors: A Manual of Arabian History and Literature. London: William Heinemann.
22. Clouston, W.A. 1881. Arabian Poetry for English Readers. Glasgow: Prively Printed.
23. Dahami, Y.S.H. 2018. Tarafah ibn Al-A'bd and his Outstanding Arabic Mua'llagah. International Journal of English Literature and Social Sciences, 3(6): 939-947.
24. Hoyland, R.G. 2002. Arabia and the Arabs: from the Bronze Age to the Coming of Islam. London & NY: Taylor & Francis e-Library.