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Editor's Note

The recent development of digital revolution and financial technology is drastically changing the investment environment in the personal wealth management and global asset management industry. It has transformed the traditional way of providing financial planning advisory services to the investors through on-line financial service platform, such as robo-advisory, artificial intelligence and big data analytics.

The first article on this issue is entitled, "*Knowledge wealth management: Investor-Advisor Process*". The concept incorporates the four perspectives of knowledge processes, referred as the "Knowledge 4C" (Tan, 2013) in wealth management. The new process is referred to as the "Investor-Advisor Process", and includes Knowledge Creation (wealth creation), Knowledge Conversion (wealth accumulation), Knowledge Communication (wealth preservation) and Knowledge Change (wealth distribution).

The second article looks into "What is Big Data and Its Impact on Professionals?" The article discussed the importance of data analytics, data science, models and artificial intelligence.

Dr Tan Thai Soon
Editor, *Asian Journal of Knowledge Management*

Knowledge Wealth Management: Investor-Advisor Process

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Abstract

This article looks into the use and application of Knowledge Management Process (KM Process) in wealth management. This concept was first introduced in my book (Tan, 2013), by incorporating the four perspectives of knowledge processes. These were referred to as the “Knowledge 4C”: Knowledge Creation, Knowledge Conversion, Knowledge Communication and Knowledge Change.

In applying the original four perspectives of knowledge processes in knowledge wealth management, the adapted process is referred to as an “Investor-Advisor Process” : these include Knowledge Creation (wealth creation), Knowledge Conversion (wealth accumulation), Knowledge Communication (wealth preservation) and Knowledge Change (wealth distribution). The changed process is set out in figures 2 below.

Keywords: Investor-Advisor Process, Wealth Creation, Wealth Accumulation, Wealth Preservation and Wealth Distribution.

Knowledge wealth management

Knowledge wealth management is *a continuous process of managing wealth by creating, accumulating, preserving and distributing the wealth to the right successor at the right time in the family*. The four perspectives in knowledge wealth management include knowledge creation (wealth creation); knowledge conversion (wealth accumulation); knowledge communication (wealth preservation); and knowledge change (wealth distribution).

2. Investor-advisor process

In the "investor-advisor process", the investor is a function of advisor. The main premise of this concept is about how an investor creating and accumulating *the personal wealth; and preserving the wealth through communicating with his or her advisor, and subsequently distributing his or her wealth to the right successors.*

High value is an important aspect of the "investor-advisor process". The first dimension is how the "investor" creates and accumulates his or her wealth through investment plan such as retirement plan, children's education fund and wealth for the next generation.

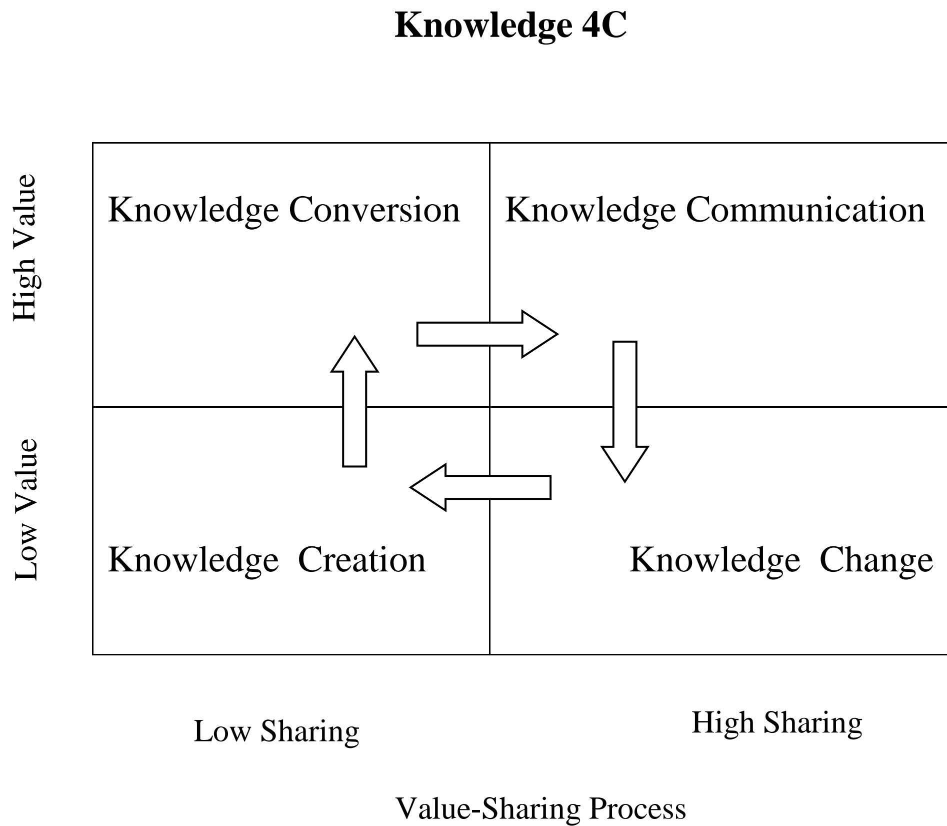
The second dimension is the advisor. This involves how the advisor, such as financial advisor, tax consultant, estate planner; through constant communicating and assisting the investor in preserving and distributing the family wealth to the right successor.

3. The four modes of the knowledge wealth management process

This concept was first introduced in my book (Tan, 2013), by incorporating the four perspectives of knowledge processes. These were referred to as the "Knowledge 4C": Knowledge Creation, Knowledge Conversion, Knowledge Communication and Knowledge Change, as shown in figure 1 below.

In applying the original four perspectives of knowledge processes in knowledge wealth management, the new process is referred to as the "Investor-Advisor Process". As shown in figure 2 below, these include Knowledge Creation (wealth creation), Knowledge Conversion (wealth accumulation), Knowledge Communication (wealth preservation) and Knowledge Change (wealth distribution).

Figure 1 – The four modes of the knowledge management process



Source: Tan, T.S. (2013) *Strategic Knowledge Management and Innovation – A Process Perspective*, TST Consulting Group

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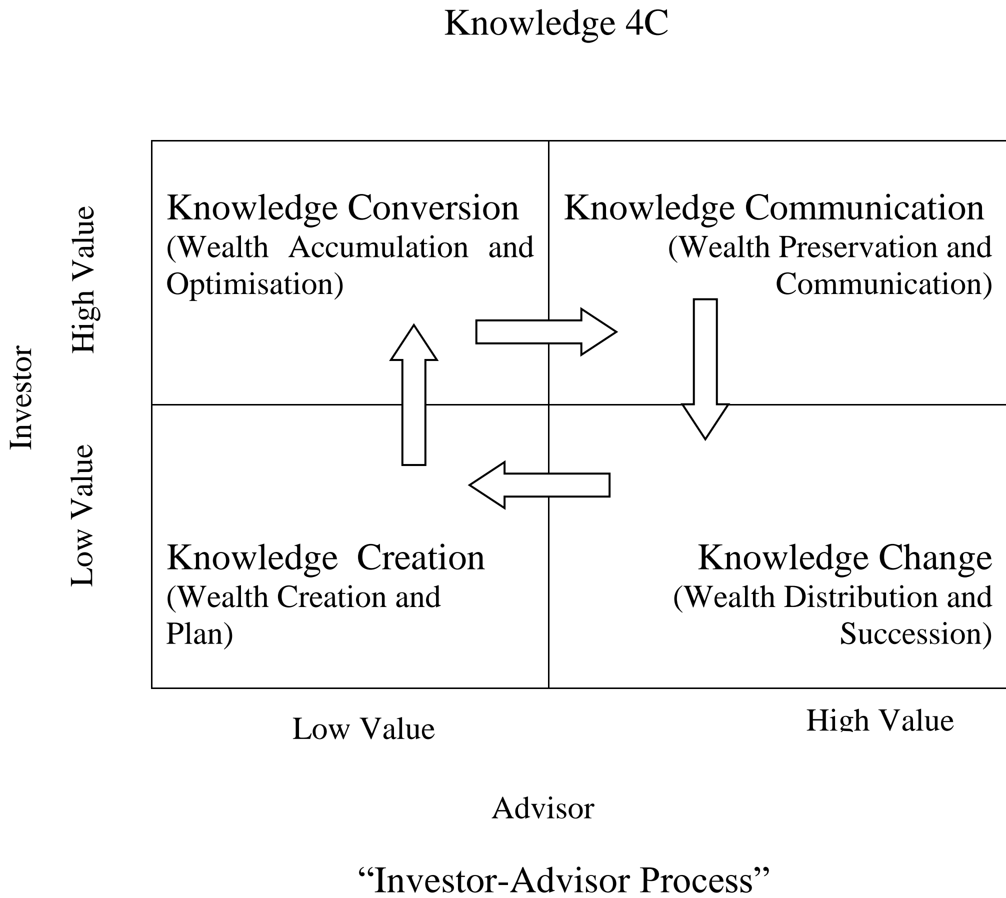
Figure 2 – The four modes of the knowledge wealth management process



3.1. Knowledge creation (wealth creation and plan)

The knowledge creation process in wealth creation identifies the type of investment currently available to the investor in the financial marketplace. The type of investment can be in the form of shares or funds; physical properties or Real Estate Investment Trusts (REIT); in addition, it may in the form of insurance investment schemes. The investor faces many challenges in investment choices and investment objectives; and the amount to invest and the liquidity of cash flow. The following sections looks into the need of wealth creation plan and investment objective.

3.1.1 Wealth creation plan and objectives

At the wealth creation and planning stage, the investor must establishes a set of investment objectives and these includes:

- Retirement plan;
- Children’s education fund;
- Wealth for the next generation;
- Property investment for passive income and capital gains;
- Insurance plan for life, term or personal accident; and
- Charity and setting up a foundation.

After determining the plan and objectives, the investor examines the various types of investments currently available in the financial marketplace.

3.1.2. Type of investment

There are many types of investment products available in the financial marketplace and these include:

- Life insurance and investment-linked insurance;
- Children’s education protection plan;
- Share capital in the equity market such as ordinary shares and stock options;
- Preference share capital: cumulative or convertible preference shares;

- Bonds or convertible bonds and other debt securities;
- Unit trust fund;
- Derivative securities, such as options and futures;
- Property investment or real estate investment trust; and
- Investment in start-ups or equity crowd funds

3.1.3. The challenges facing the individual small investor

The small investor faces many challenges when making choices of investment. They include:

- Lack of information to make decision choices;
- Lack of experience and skills at the wealth creation stage;
- Need to decide between saving and spending needs;
- Transaction costs including administration cost are normally higher for smaller investors, due to lack of bargaining power; and
- Small investors are less likely to hire professional advisors due to higher fees; as a result, the smaller investors always have to rely on personal research and costly experience, which will increase their investment risk and mistake.

After identifying the basic need and necessities of life, and formulating the investment plan and objectives, and identifying the challenges; investor needs to evaluating the investment vehicles and select suitable investment products which as will be discussed below.

3.2. Knowledge conversion (wealth accumulation and optimisation)

The knowledge conversion process in wealth accumulation is concerned with how investor converting the initial investment plan into actual investment. Wealth accumulation is *a process of evaluating, selecting the suitable investment, and converting the investment objectives into investment portfolio.* These wealth accumulation processes require an investor to invest the right investment products and manage its budget and cash flow efficiently.

3.2.1. Budgeting and cash flow management

At wealth accumulation stage, budgeting of money is important. There is a need to balance between spending and saving or investing. In general, the more money you save and invest, the more wealth is created and thus your investment objectives.

Similarly, the investor is required to carry out cash flow management efficiently. The main function of the cash flow management is to manage the funds includes:

- to ensure additional fund and resources are available for saving and investment;
- to reinvest the passive income periodically, the more resources reinvested the greater the potential for wealth accumulation, and
- to keeping its solvency with positive cash flow without over leveraging.

In summary, the main aim of the budgeting and cash flow management at this stage is to ensure there is sufficient sources of funds for saving and reinvestment. The next course of action for investor is to select the right investment products and portfolio.

3.2.2 Selecting investment products and portfolio

In selecting the right investment products and portfolio, the investor must decide whether it is a long term or a short-term investment plan. Similarly, the investor must decide on the amount of risk he is prepared to take. In general, the higher the risk the higher the return and vice versa. The following are some of the common investment products and portfolio selection available for investors:

- Life insurance is a common way to save and protect a family. Life insurance provides a long-term savings needs as well as gives protection in any unexpected crisis. It therefore provides a financial freedom and as well as peace of mind to the insurer or investor. The

types of insurance plan available includes term insurance, whole life insurance, and endowment insurance;

- Investment-linked insurance is another way of wealth accumulation through purchase a life insurance policy that participate in investment funds. It gives investor both insurance and investment under a single plan;
- Annuity is an insurance contract that provides periodic payments for a specific period of time such as fixed-sum annuity, variable annuity, immediate annuity or deferred annuity. It is another wealth accumulation plan at the same time provide the investor with financial and regular income over the lifetime of the investor;
- A unit trust is a form of collective investment constituted under a trust deed and managed by a fund manager. The fund may invest in securities such as shares, bonds and gilts. It is a low risk investment compare to other direct investment;
- Investment in share market is another wealth accumulation that carry some market risk. The types of securities include ordinary shares, preference shares, convertible and non-convertible loan stocks, and warrants. The reward in shares investment is capital gains in share price, bonus shares and dividend. On the other hand, the risk in shares investment is the market volatility in a given security or market index. In general, the higher the volatility, the riskier the security;
- Warrants are types of derivatives which draw its value from an existing asset like shares or bonds. It gives the holder the right but not the obligation to buy the asset at a fixed price within a specified period of time. These are speculative vehicles which enables the speculator to time the market based on assumptions as to price and direction of the underlying asset. The profit is good if your assumptions are correct. All you lose is your capital invested in buying the warrants;
- Exchange-traded funds (ETFs). These are funds that are listed on the stock exchange and traded like ordinary shares. These ETFs have a diversified portfolio of stocks, bonds, commodities, money market instruments and offer great diversification to the investor. They have

become very popular of late as they can track a market index, be Islamic centric, is flexible and convenient. An ETF price is determined by the supply and demand for its units and the market price may vary from its Net Asset Value.

- Real estate investment trusts (REITs). These property trust funds invest primarily in real property which offers rental income. The rental income forms the basis for income distribution. Sometimes there are capital gains distributed from the disposal of real properties by the REIT. REITs have traditionally given higher dividends than ordinary shares and compare favourable to interest from banks. For investors with limited capital it is an easy and convenient way to be invested in the property sector;
- Direct property investment. Real estate investment is a very popular form of investment. Very often in a good property location, it is easy to find tenants, who therefore, enable the owner to pay the bank mortgage from the rent collected. Properties are also a good hedge against inflation. The property price keeps up with inflation and the owner is able to realise a high capital gain from its disposal;
- Money market instruments. Money market instruments are short term debt instruments which are liquid and safe havens. Most investors with excess cash park their monies in these vehicles for its liquidity and safety. In a period where interest rates are rising, many investors shift their portfolio into these markets to derive short term gain; and
- Structured products. These are hybrid products that contain different risk return profile asset classes that suit certain investors who are risk averse but also want the prospect of a higher return. Large financial institutions structure these financial products using some safety feature and also leverage to take advantage of market conditions

In general, the investor faces many types of risks includes business risk, financial risk and economic risk. It follows that, the investor needs an effective wealth preservation plan. In order to preserve the wealth, the investor needs to employ a “wealth-communication mix strategy” to be discussed in the following paragraph.

3.3. Knowledge communication (wealth preservation and communication)

The knowledge communication process in wealth preservation is concerned with how investor communicates with his or her advisors such as insurance advisors, financial advisors, investment advisors and tax advisors. It relates to how an investor can carry out a wealth-communication mix strategy, to ensure the wealth are preserve against the business risk, financial risk and economic risk as will discuss below.

3.3.1. Wealth preservation and communication mix

In order to preserve the wealth against the business risk, financial risk and economic risk, the investor needs to maintain active communication with his or her advisors. This includes:

- Communicates with financial advisors regularly to review existing financial plan;
- Communicates with the private banker regularly to review existing investment portfolio whether to increase or reduce the investment sum;
- Communicates with the insurance advisors on a periodical basis to transfer the personal financial risk to the various insurance companies. For example, a disability income insurance provides monthly benefits to replace lost income in the event of permanent disability is an example of wealth preservation plan;
- Communicates with economic advisors regularly to review the economic conditions such as inflation rate, interest rate and economic cycle and down turn risk; and
- Tax planning is an important aspect of wealth preservation, therefore the advice from tax advisor could maximize tax saving and reduce inheritance taxes in certain jurisdictions such as property in UK.

3.3.2. The importance of wealth preservation and communication mix

It is important for an investor to communicate with the advisors on a regular basis in order to preserve the asset value as follows:

- To be well informed of any changes of law and regulation which may have effect on their investment;
- Obtains up to date economic data which may have effect on the investment environment during good time and during economic downturn;
- To assess the investment strategy during changes of economic downturn and ensure sufficient liquidity during economic crisis; and
- To reassess the investment strategy and family business structure, for example due to a bankruptcy proceeding on any family members.

Although the knowledge in wealth preservation and communication is important, transfer of knowledge on wealth management skills to the next generation is equally important to be discussed in the following paragraph.

3.4. Knowledge change (wealth distribution and succession)

The knowledge change process in wealth distribution examines the process of wealth distribution strategy. A wealth distribution process are concerned with how an investor planning to transfer his or her wealth to the next generation.

The most common wealth distribution and succession planning is estate and trust planning as discussed below.

3.4.1. Estate planning

The main objectives of estate planning are to provide a smooth transitional period for the assets transfer from estate to the beneficiary as follows:

- To minimise estate administrative costs, probate and legal expenses when the investor or an individual has passed away;
- Avoiding disputes amongst beneficiaries and legal fees;
- To reduce the time taken on getting the grant of probate, rather than going through the lengthy process of getting the letter of administration;
- Appointing executor to manage the assets of the deceased before transfer to the beneficiary; and

- Ensure a smooth estate administration on estate income tax and estate duty, if any.

They are various type and instruments used in estate planning as will be discuss in the following paragraphs.

3.4.2. The Will

According to the Wills Act 1959, a Will is " a declaration intended to have legal effect of the intentions of a testator with respect to his property or other matters which he desires to be carried into effect after his death and includes a testament, a codicil and an appointment by Will or by writing in the nature of Will in exercise of a power and also a disposition by Will or testation of the guardianship, custody and tuition of any child".

The Act requires the Will must be in writing, signed or acknowledged by the testator in the presence of at least two witnesses and the two witnesses must sign in the presence of the testator and each other. The testator must be at least 18 years of age (in West Malaysia and Sarawak) and be at least 21 years of age (in Sabah). The testator must be in sound mind.

The Will only come to the effect upon the death of testator. Therefore, it can be revoked, cancelled or varied during the life time of the testator.

3.4.2.1. The issues for not having a Will

Writing a Will is a simple process and quite easily done. However, many fail to do it as the thought of death and planning for things after death is not a savoury subject. People tend to procrastinate on writing their Wills. In financial planning it is important for a person to visualize the consequences of not writing a Will.

A person who dies intestate (without a valid will) leaves a bit of chaos behind. The family usually the bereaving widow has to apply to the courts for a Letter of Administration. The courts have to accept the application and after due deliberation will appoint the Administrator. Already cost and time is involved. The administrator has to post a bond to assure the court that the properties will

be managed well. The distribution order may also not be in accordance with what the deceased would want. Distribution would follow the Distribution (Amendment) Act 1997. For example, the surviving spouse gets only one-third of the estate and the children will get two-thirds. Parents are also provided for and they can get one-third.

There are many more disadvantages to not leaving a will. Time and costs are just one major problem. There are many instances where the beneficiaries fight over the property or assets left behind. The mind-sets of siblings often differ and the surviving spouse is left in the lurch. These bickering can be solved by the deceased leaving a well-crafted will.

The biggest disadvantage is when the deceased has a business. The value of the business asset is quickly diminished upon the death of the business owner. To find a successor who wants to buy the business for fair market value would be difficult as family members may not know how the business is done and valued in the marketplace. A person who is in business relies on this business to be his retirement asset and also a legacy for his family. Buy-sell agreements and fair valuation of price is better established when the owner is alive. After a person’s death all prior agreements and arrangements are lost unless professionally recorded by the business owner. So the urgency for a proper will is especially crucial for a business owner.

Certain family members may need special provisions especially when it involves minors. Guardians need to be appointed to take care of minors.

Debts and liabilities are major problems for a grieving widow to handle if not properly settled by the deceased. Assets may go and the family may be placed in harm’s way if not adequately provided for.

Major expense items like education of young children and the retirement years of the surviving spouse are just some of the factors that need consideration. Needless to say a family is a continuing dynamic thing. Planning for your family upon your demise is a very important discipline.

3.4.3. Trust

The use of trust to manage the distribution of their wealth and for succession planning are viable alternatives for achieving estate objectives. A trust is created when the owner (settlor) of an asset passes the legal title to another (trustee) to hold on trust for the benefit of one or more beneficiaries (MFPC, 2014) as shown in the Figure 3 below.

There are three parties in the trust arrangement as illustrated in the following paragraph:

- The owner or the settlor of an asset is deemed to hold the legal title, he or she transfer the legal title to the trustee;
- The trustee holds the legal title and manages the assets for the benefit of the beneficiaries. The trustee has a fiduciary duty toward both the settlor and beneficiary; and
- Beneficiary is a natural person or other legal entity who receives money or other benefits from a settlor.

3.4.3.1. The type of trusts

There are a variety of trusts but the common ones are:

- Revocable Trusts are trusts that can be revoked during the life-time of the settlor. Therefore, it is not safe against any creditor claim or tax liability;
- Irrevocable Trust are trusts that cannot be revoked and therefore the trust deed, the trustee and beneficiaries are secured. The trust is a separate legal entity. The advantage of an irrevocable trust is the protection it offers to the beneficiaries. Creditors or even tax authorities cannot re-possess the assets against any claim on the settlor unless there was a fraud committed;

- Asset Protection Trust is a vehicle for holding an individual's assets to shield them from creditors. Asset protection trusts allow, if it is difficult for a creditor to seize assets, settle with the debtor on

favourable terms instead of engaging in costly litigation. This vehicle has complex regulatory requirements, such as being irrevocable and contains a spendthrift clause. An asset protection trust does provide for occasional distributions, but those distributions must only occur at an independent trustee's discretion;

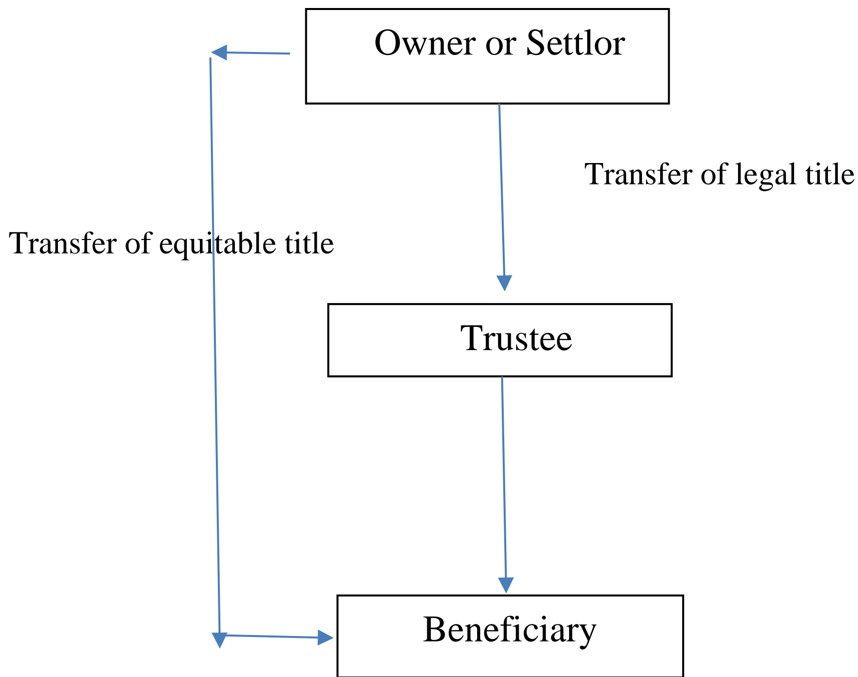
- Charitable Trust are set up to fund charitable goals and objectives. In certain countries these offer tax advantages.

In Malaysia there are other ways to distinguish trusts. Trusts can be set up upon death of the testator in a will and therefore is called testamentary trust. The trust comes alive only upon the death of the testator.

Trusts can also be living Trusts. That is the trusts are set-up during the life-time of the settlor. Living trusts are revocable trusts in that the settlor can revoke the trust any time during his lifetime. However, the popularity of these Living Trusts is based on the fact that upon the death of the settlor the trust becomes irrevocable. Effectively the assets are transferred without having to go to court. In a country like America you save a lot in attorney's fees. In Malaysia, Living Trusts are common for a different purpose. Muslims follow the Syariah principle as regards to estate planning. Their distribution laws are different and follow strictly a certain way of distributing wealth. Therefore, if a Muslim distributes his assets while he is alive the Syariah law will not apply. The Muslim rule follows only upon the death of the Muslim. As a distribution practice Living Trust has taken great prominence.

A third very important type of trust is the statutory trust. As the name implies it is formed by the operation of law. An example is the life insurance policy which has the spouse, children and parents as a nominee. In this case the proceeds do not go through the court probating process. It is directly given to the nominees. It is also safe from creditor claims. The monies from the Employee Provident Fund (EPF) are also an example of statutory trust protected from creditors. However, once withdrawn from the EPF may be exposed creditors claim when the monies go to the beneficiary.

Figure 3. The trust arrangement



3.4.4. The family office

Family offices are essentially private companies or foundation, which have been set up to look after the finances of wealthy families and individuals. A family office is therefore a private wealth management advisory firm dealing with high net-worth individuals and families.

Family offices differ from other traditional wealth management firms regarding the services they provide for affluent individuals or families. These offices will be able to provide management of financial and investment issues for the families, but they also provide other services that are not necessarily connected to the family's finances.

There are essentially two types of family offices: single family offices (SFOs) and multi-family offices (MFOs). SFOs focus on catering for the needs of a single family. Therefore, SFOs often look after other non-financial issues aside from the financial management. SFOs manage for example aspects such as private schooling and household arrangements as well.

On the other hand, MFOs are traditionally mainly focused on operating as a wealth management firm on a commercial basis. MFOs look after a number of clients at the same time and often sell services to interested families. In some occasions, MFOs provide services exclusively for certain families and are not willing to accept other customers.

Taking care of the finances of the wealthy family is the key function of family offices. The different aspects of financial planning include:

- Investment management services-Often at the heart of family office work and mainly aims at preserving and increasing the family's wealth. Includes different aspects of investing, from determining investment goals and allocating assets to actual execution and goal tracking;
- Reporting and record keeping-Family office reports and consolidates all family assets and their performance. The offices typically also provide tax preparations and reporting;

- Managing wealth transfers-Family office can help manage wealth transfers within a family, for example from parents to children.

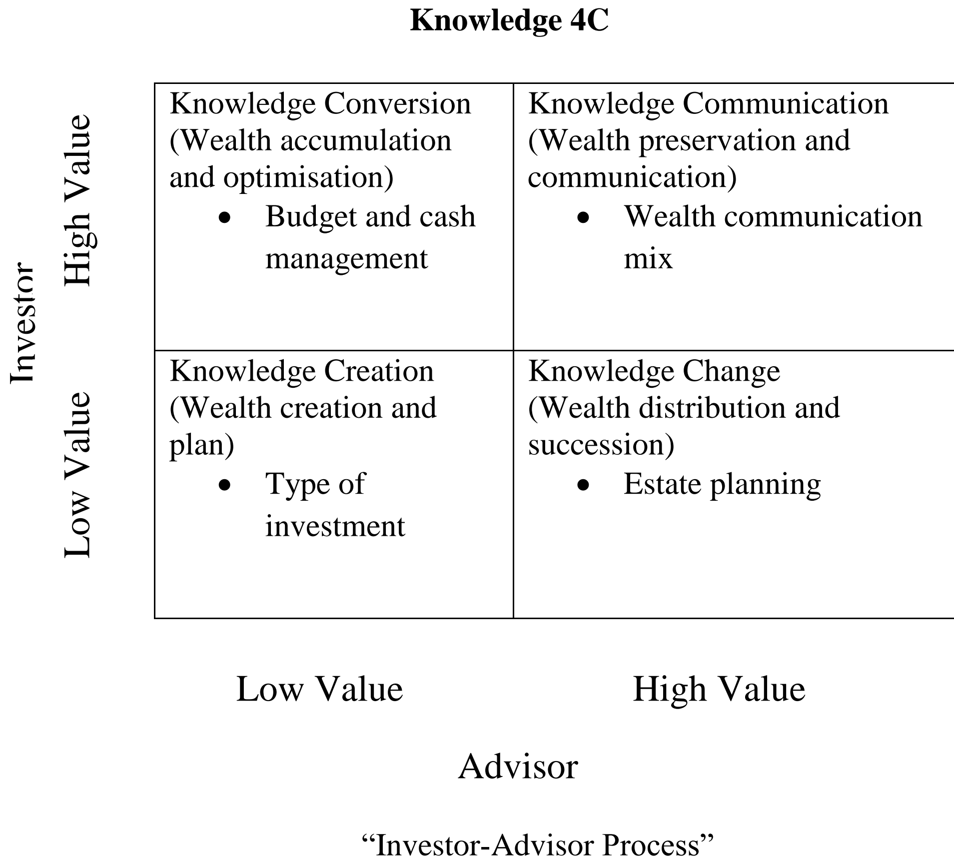
Besides the administrative management of finances, family offices typically offer strategic services as well. These could include things such as:

- Business and finance advice-Provide assistance in strategic planning of finances such as debt management and structured financing. Furthermore, family offices offer guidance on business management including issues such as buyouts or business development;
- Strategic estate planning-If the wealthy family or individual has a number of properties, family offices can provide assistance on the best use of the estate. For example, information on whom to sell or strategic tax planning;
- Succession planning-Family offices can provide advice on succession planning and help with the administrative part of ensuring a smooth transition; and
- Educational planning-Family offices can also help educate the next generation on wealth management.

4. Knowledge wealth management process map

A detailed summary of the above processes is set out in Figure 4 as a Knowledge wealth management process map. The purpose of a knowledge wealth management process map is to highlights the processes from the initial wealth creation to the eventual wealth distribution in a family. It draws on the four modes of the knowledge wealth management process.

Figure 4 – KM Process Map



"Investor-Advisor Process"

5. Conclusion

In summary, the main premises of knowledge wealth management are wealth creation and plan, wealth accumulation and optimisation, wealth preservation and communication, and wealth distribution and succession in a family. An investor must no only create and accumulate their wealth, but ability to preserve and subsequently distribute the wealth to the successor according to he or her wishes.

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What is Big Data and Its Impact on Professionals?

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Abstract

Professionals today, have to be cognizant of the advent of big data that is impacting on the workplace and the way we work be it a big of small company within a supply network. The Internet has of course not only provided us with tonnes of information but being able to mine the data that is useful for the company's objectives is all the more important. However, most companies have internal sources of data too that could be pulled and analyzed. The information from the Net and internal databases provides professional managers with the tools to make inferences, predictions and prescriptions that would change the world of decision making and leadership.

Key Terms

Data Analytics, data science, models, artificial intelligence.

Big Data in General

Big data extracts business value by analyzing large volumes of data for improving analytics and modeling capabilities. Key applications of big data are as follows (Lau 2016)

1. Resource optimisation - Utilising analytics to determine the amount of resource to be allocated given different scenario (e.g. time and location).
2. Exploration and discovery - Using analytic results to identify features of new products, measure costs to expand into new markets.
3. Fraud detection and prevention - building analytical models for machine learning to improve reliability of decision making process.

The industries that use data analytics or big data are as follows (Lau 2016):

- Manufacturing: supply chain management, call centres and CRM;
- Retail: price optimisation, localized arrangement and CRM;
- Banking: fraud detection, compliance and regulatory, and trade surveillance;
- Media: dynamic profile segmentation, social analysis and campaign management;
- Healthcare: clinical trial data analysis, early detection and prevention and R&D; and
- Insurance: catastrophe modeling, claims fraud and reputation management.

Many companies store data internally in the form of databases. A database is simply an organized collection of data and one often discusses it in the form of relational database in the guise of a table. A bank may have a table of customers, branches and credit card transactions (Amitabh 2015).

From a table of bank loans one can connect to the table of customers via the customer ID. This is what is known as relational databases. With data here one must qualify whether it is quantitative (integer) or qualitative (string) in terms of data type. Databases are acted upon using a Structured Query Language (SQL) which is a common language for working with databases such as querying, manipulating and managing (Amitabh 2015).

Big data can occur in raw form and thus have volume, it can change over time thus have velocity, there are different data types and varieties, the quality or veracity of data can alter and finally the value whereby whether it can be used for decision making is questionable.

Data science is the science which uses computer science, statistics and machine learning, visualization and human-computer interactions to collect, clean, integrate, analyze, visualize, interact with data to create data products. It often requires hacking skills, maths and statistics knowledge and substantive

experience on the subject being studied in order to make valid and real observations, judgments and analysis for decision making.

The beauty of data science is that it just does not query just the past as is business intelligence, but also queries the present and future. It explores many models, builds and tune hybrid models which could be in diagrams, equations or words. It helps researchers in understanding empirical data in models and yet can handle massive data sets.

For professionals especially those in the audit stream, big data results in better experience for the client, better experience for the auditor and more valuable insights. It also means improving corporate compliance. As for advisory services big data identifies questions, improves business performance and allows managers to build models. For tax issues, big data analyze tax efficiency for business units, identifies tax opportunities, and global avenues.

Very often managers often know what has happened but do not know why an event had happened to impact operations of the organization. Data which showed what has happened would be provided by automated systems which would replace the need for human intervention, but explaining what the data is really telling management and how to act upon it is still within the realm of management expertise as artificial intelligence has yet to be programmed with subjectivity. In other words, models can be analyzed from different perspectives depending on the interest, objectivity and aims of the stakeholders of the organization.

Today, managers would need to know how to code, construct experiments, handle unstructured data, have business expertise and lastly be able to communicate visual and non visual quantitative and qualitative data. The staff that make up the strategic business unit of the firm must be able to identify issues and develop questions, determine appropriate analyses and interpret results. Professionals must be data literate, know what data is store, how is it stored, where it is stored and how to access it. Professionals must be able to bridge the gap between data science and business knowledge. Finally, they

should be able to present these findings in a logical, consistent and meaningful manner to the board of directors.

The nascent formation of the Data Science Association of Malaysia in the year 2017, meant that the profession be categorized into different levels depending on technicalities, starting from data scientists, data engineers and data analysts.

The Analytics Cycle

A project manager applies the business analytics cycle by:-

1) Formulating the question(s). The manager must be able to ask the right questions for example as follows:
   - What is the optimal product/service pricing to maximize revenue/profit margin?
   - What is the predicted profit margins for a product?
   - What is the optimum investment strategy?
   - How do we optimise the supply chain?
   - How do we minimise production waste?
   - How do we optimise delivery routes?

2) Identifying, gathering and collecting data by scraping data from the system.

   - The types of data could be structured POS data, financial data and customer data.
   - Data could also be unstructured like text files, photos and images.
   - Data could also be semi structured which has tags but does not have columns and structures e.g. XML, tagged documents.

   In getting the data, the facts could be internal e.g. transaction data, sales and customer data or it could be external, where the information is from social media and government statistics.

3) Performing the analytics.

4)Testing the hypotheses by assessing reliability, validity and generalizability.

5) Implementation of insights and making support in decision making.

Managers could display insights by using dashboards, data visualization software, and charts. Dashboards are visual representations of a set of business metrics, and provides key business information to help management.

The whole process loops again from step 5 to step 1.

In predictive analytics one can predict from the causal, consensus business model that with better selection and staffing, more employee satisfaction, higher value add will lead to results of greater customer satisfaction and positive buying behavior. For the company, it means sustained growth and improved shareholder value. In this model management is making high levels of profit but were also suffering from high labour turnover. However, by cutting levels of turnover to compensate for bonuses to high performing employees, labour retention would be show a marked improvement. Thus, this is one model where anaytics can be used for not only predictive metrics but also prescriptive metrics (Bushee & Ittner 2016).

Conclusion

Big data in all its virtual representations is carefully gathered, screened, filtered, and collated, compared and contrasted to see how data relates to each other. A model is either deductively and inductively built from data collected which is then tested for validity and reliability. The analysis and observations made will allow management to make predictions and prescriptions how and why an organization is performing as it is. At the moment we see applications of analytics in management and more research must be done in the field of how analytics will impact on internal audit, strategic management and whether the advent of artificial intelligence will change the general complexion of management science.

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