元宇宙之数字原理

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元宇宙之数字原理

元宇宙是数字新文明，代表人类的未来。元宇宙中充满着数字，要从数字原理上认知元宇宙，深刻阐明元宇宙之真谛。

一、宇宙是数的

（一）宇宙演化

1、宇宙是由物质、能量、信息构成的三元结构，其中物质为基础，能量为动力，信息为主导，三者关系是能量与物质为一体互相转化，由信息主导其转化。整个宇宙的运动都是由信息主导的有序化，使宇宙不断从低级走向高级，成为更高层次的复杂巨系统。宇宙是硕大无比的信息处理机器，信息观是宇宙观的核心。

2、全息理论认为：在宇宙大爆炸之前，就存在原生宇宙，这个原生宇宙是无限巨大的超级信息盘。宇宙大爆炸是从“0”到“1”的奇点爆炸，超级信息盘即刻分离，与物质能量结合，信息伴随其中，始终永远存在。全息信息的原代码超越时空，无时不在，无处不在，宇宙中最基本的规律都是算法，主宰整个宇

宙的运行。

（二）数字世界

3、老子“道德经”中的“道”是整个宇宙存在之根本，也是宇宙中最基本的规律。“道”是无中生有，所谓“无”并不是一无所有，只是不以物质为形式，“无”中有信息，信息是“道”的载体。“有”是物质形式，信息与物质一体两面，信息起主导作用，决定物质的运动与变化。信息的原代码为“数”,“数”使物质从无序走向有序,进而揭示物质世界的内在法则。宇宙中充满着“数”,“数”成为整个宇宙最底层的“数字原生”，构成超级“数字大脑”，决定物质的转化和优化。从数字世界观察物质世界是从更高维度上认知世界，用数字思维洞察物质世界的真谛。

（三）万物皆数

4、古代大哲人毕达哥拉斯认为“万物皆数”，世间万物的根本属性在于数。量子世界中“弦”为最小物质单位，其振动频率都是数；生物基因中“ACGT”四个密码也是数；中国周易认为“易经之源为数”。世界上许多奇异之数是永恒的，如圆周率为“π”即3.1416；黄金分割率0.618，为宇宙之钥匙。最为核心的数字为“0”与“1”，构成数字世界的一切。总体来

说，万物表示存在方式，数字代表根本属性，数字与万物是一体两面，不可分割，而数为本质。

5、牛顿、爱因斯坦等大科学家到年老时，都认为宇宙中有一种神秘的力量，掌握着整个世界，这种力量就是数学规律。数学是规律的最好表达，数学以数量来计算，最为精准；数学以公式来表达，最为简洁。牛顿的 F=MA，爱因斯坦的 $E=MC^2$，都是应用数学公式总结科学规律。恩格斯认为，唯有数学进入某个学科，才能使学科从经验走向科学，数学是对客观规律最本质的表述。

二、数字范式

（一）数字底座

6、万事万物的底座都是数字，数字底座是从根底上认知万物求解万事。数字有两大本能：一是数字决定一切，数字作为底座决定所有上层，决定各种生存和发展方式；二是数字驱动一切，用数字来驱动万事万物，万事万物通过转化为数字而产生价值，再将数字价值返回万事万物之中，实现价值的闭环。

（二）范式变革

7、万事万物都有发展规律，人类发现规律的范式是不断变革的，大体经历四个阶段，即理论思维范式、实验实证范式，仿真计算范式，数据优化范式，这四种范式是逐步演化的，相互之间并不排斥，而是互补的，前面三种范式各有特色，最后的数据优化范式最具优势。

8、理论思维范式是“抽象+数字”的理论推理。历史上许多科学家都是大哲学家，擅长理论思维，通过抽象的推理，加上数学的计算，形成自成体系的科学理论。如欧几里德、牛顿、爱因斯坦等都是典型的理论思维范式。

9、实验实证范式是“实验+归纳”的实证理论。近代许多科学家都是实验的大家，先提出直觉的假设，后通过实验验证，然后归纳发现科学规律。如达芬奇、法拉第、爱迪生等都是典型的实验实证范式。

10、仿真计算范式是“仿真+计算”的模拟方法。计算机发明后，科学家通过仿真数据，建立专家模型，再应用计算机进行模拟择优，从中发现科学规律。当今许多科学家主要是应用仿真计算的择优范式。

11、数据优化范式是“数据+算法”的数字模型。主要应用海量大数据，通过算法建模来发现新的规律。

新的范式是数字化模式,这是优化模式的最重大变革,“数据+算法”模式，具有巨大的优越性。数字化模式的本质是数据智能，由数据产生智能。所谓智能有两大功能：一是精准，进行优化的匹配；二是适应，对变化的应变。通过试错来不断优化，这是机器学习的方法。

（三）数据

12、数据是数字化的基础。数据的来源主要来自三大方面：一是大自然的数据，二是经济的数据，三是社会的数据,数据呈指数级增长。数据是战略资源，得数据者得天下。数据是生产要素，对土地、劳动力、资本、技术传统生产要素起赋能作用。数据是新的资产，数据的价值在于集中连接和交互，数据在流动中创造价值，成为重要新资产。

（四）算法

13、算法是数字化的核心。算法代表用系统的方法描述解决问题的策略机制，是一系列解决问题的清晰指令。从技术的角度讲，算法是数据处理的系列方法，主要应用数据建立模型，通过运行反馈，不断迭代优化，从而达成目标。算法已应用于百业千行，在各种应用场景中提供智能解法方案，为所有领域赋能

和创新，算法具有极其强大的生命力，已成为科学决策的“万能钥匙”。

三、新科技革命

（一）新科技

14、新科技浪潮势不可挡，为新康波周期，对经济与社会的影响前所未有。新科技的发展具有革命性，已经远远走在经济与社会的前头，经济与科技的位置发生了新的变化，从经济主导科技，转向科技主导经济，科技超越经济与社会的发展速度，这是一个历史性的大转折。

（二）新特征

15、新科技的发展具有两大特征：一是加速度，新科技发展以十倍数十倍的加速度向前推进。由于发展快，带来变化大，变化突飞猛进，导致跟不上快速变化的步伐。二是集成化，以往是单一科技的突破，现在是多元新科技的集成。由于集成发展，带来复杂性，高度的复杂性，导致许多问题难以解决。当今百年未遇的大变革，从根本上讲是新科技革命的巨大挑战。

（三）乌卡时代

16、新科技的加速度发展带来的“快变化”，新科技的集成化融合带来的“复杂性”，集中表现为不确定性。当今不确定性已成为常态，通称“乌卡时代”。解决乌卡时代的不确定性，最有效的就是数字化模式，针对“快变化”，算法具有智能的应变能力；针对“复杂性”，数据具有强大的洞察能力，通过“数据+算法”就能将不确定性化为确定性。

（四）数字革命

17、新科技革命的核心是数字革命，在众多新技术中，数字新技术处于主导地位。数字新技术以人工智能为代表，人工智能包括数据、算法和算力，其中算力是关键，计算力已成为当代最强大的动力。新时代要以无限劳动力转向无限计算力，通过无限计算力获得无限创造力。

（五）数字生产力

18、从物质生产力到数字生产力是重大升级。物质生产力主要是生产产品，数字生产力主要是创造内容，通过创造内容来赋能优化生产产品。数字生产力从根本上变革生产方式，其关键是：第一由数据驱动业务，第二由算法指导决策。通过机器人和数字人来

从事生产业务，人重点掌握数据和算法，实现人机共生协作。物质生产力为线性发展，数字生产力为指数发展，数字生产力成为最先进的生产力。

19、数字生产力集中体现是数字经济，数字经济已成为全球经济发展的主导方向。数字经济具有三大特征，一是以数据为关键要素，二是以数字技术为基础技术，三是以智能化为核心目标。数字经济是在具体场景中，专业技术与数字技术交互融合。所有业务能力成为基础能力，而数字化能力成为核心能力。数字化能力赋能业务能力，实现一切业务数字化，一切数字业务化。数字经济的最高形态是元宇宙。

四、元宇宙大生态

（一）人类迁徙

20、元宇宙使人类向高维度迁徙。人类是不断迁徙的，至今已发生四次大迁徙。第一次大迁徙是向地球整个大陆迁徙。10 万年前的智人生活在非洲东部，由于大量森林的毁灭，智人被迫向周边迁徙，开始走出非洲。首先迁徙到地中海地区，以后走向欧洲，然后到亚洲、大洋洲直至美洲，迁徙到整个地球大陆，大大拓展了智人的生存空间。

21、第二次大迁徙从大陆向海洋迁徙，整个地球大陆仅占 30%，70%是海洋。人类为了寻求更大的发展空间，逐步从大陆迁徙海洋，近代以来从东方到西方许多国家在不断探索中纷纷走向海洋发展，开拓了前所未有的新空间。

22、第三次大迁徙是从地球向太空迁徙，人类对太空的向往由来已久，随着科技的不断进步，逐渐具备走向太空的能力，实际已经到达月球进而向火星进军，现在这个过程正在不断加速，将实现人类走向地外星球。

23、第四次迁徙是从物质世界向数字世界迁徙。人类每一次迁徙都是一次大进化，向数字世界迁徙是最伟大的迁徙。数字世界是高维世界，使人类在更高维度上发展，这就是走向元宇宙。元宇宙具有无限的创造力，对人类的进化赋予革命性意义，标志人类走上高级新文明。

（二）全新需求

24、元宇宙是人类的全新需求。按照马斯洛五层需求理论，第一层次是生存需求，第二层次是安全需求，这两层次的需求已逐步满足。当今第三层次的社交需求、第四层次的尊重需求、第五层次的自我实现

需求已成为新的精神需求。相对于物质系统限制较多，障碍不少，数字系统更能适应精神需求，特别是新生代、Z 世代、阿尔法世代对社交、自尊、自我价值的需求甚为迫切，在数字世界自由度高，更能得到充分的满足，元宇宙就此因势而生。

（三）元宇宙定义

25、对元宇宙正确定义十分重要，定义决定意义。元宇宙既非虚拟世界，又非平行宇宙。元宇宙最简洁的定义为：高维数物融合新时空，用公式来表达：元宇宙=数字世界×物质世界。数字世界与物理世界不是并列的相加，而是融合的相乘，两者关系是：“数物相融，以数强物”，即以物质为基础，以数字为主导。元宇宙是新时空，空间越是分散，时间越是跨越，元宇宙的作用就越大，实现价值也越好。

26、元宇宙具有量子效应。量子是能量的最小单元，具有两大效应：其一量子叠加，两个量子“0”和“1”，在原子世界是非“0”即“1”，而在量子世界是亦“0”亦“1”，也可以又“0”又“1”；其二量子纠缠，两个叠加的量子，能超越时空互相作用，具有相同的行为。元宇宙也一样：第一叠加效应，既是数字的，又是物质的；第二纠缠效应，数字与物质不断交

互作用。所以在元宇宙中，数字世界与物质世界既无法分离又相互作用。

（四）元宇宙功能

27、在元宇宙中，数字世界对物质世界呈现两大功能：第一赋能，元宇宙赋能体现在三个方面：数字增强物质，使物质的功能倍增；数字拓展物质，使物质的能力大展；数字创新物质，使物质的价值升级。第二升维，元宇宙是升维，从三维以上更高维度发展。高维与低维的根本区别在于数据量，高维的数据量大，特别是元宇宙中有大量原生数据。元宇宙中由于数据全面，决策科学正确；由于数据精细，匹配精准到位。爱因斯坦曾说：对于复杂问题，在同一个维度上是难以解决的，必须到高维度上去解决。这就是说在物质世界解决不了的复杂问题，应该通过数字世界来帮助解决。

（五）元宇宙生态

28、元宇宙是大生态体系，主要包括元宇宙技术体系、元宇宙经济体系、元宇宙社会体系。这三个体系三位一体，任何一个体系都不是孤立的，其中技术体系为基础，经济体系为主导，社会体系为关键，三个体系相互作用，交互发展，构成一个完整的元宇宙

生态大体系。

五、元宇宙技术体系

（一）大集成

29、元宇宙是新技术的大集成，过往的新技术都是单项新技术的突破，其产生的价值是线性的。元宇宙是新技术的集成应用，多种新技术交互作用，其产生的价值是指数的。元宇宙不仅是各种数字技术的集成应用，同时跨界应用当今各类新技术，成为新技术的集大成者,元宇宙的价值十分巨大,更是与日俱增。

（二）人工智能

30、元宇宙的主体技术是人工智能。人工智能技术无处不在，主要体现在三个方面：一是数字决策，元宇宙中人工智能首先用于科学决策,使决策精准化。二是数字内容，元宇宙中内容产品都是人工智能的应用,特别是数字人为人工智能的制作。三是数字流程，元宇宙中的业务流程，由人工智能帮助不断优化。人工智能是不断迭代的，迭代速度决定优化速度。

（三）区块链

31、元宇宙的技术底座为区块链。区块链是数据

的点对点存储，通过加密数据上链是唯一的。区块链既是信任链，又是价值链，主要来自两大机制：第一共识机制，在数字社区中建立共识机制，通过数字协议形成信任关系，由代码自动执行。第二智能合约，在数字社区中进行数据价值确权，通过数字合约共同分享价值，由代码自动执行。区块链成为元宇宙大协作的技术基石，最为关键的是，解决了协作的标准和协议。

（四）数字孪生

32、数字孪生是元宇宙中的关键技术。数字孪生充分利用物理实体，在 3D 空间中进行数字仿真映射，反映相对应实体的全生命周期过程。在元宇宙中，数字孪生主要应用于产品设计、生产制造、维护保养等场景。通过数字模型与物理实体的交互作用，对实体进行不断优化，从而实现数字孪生的全新价值

（五）数字空间及交互技术

33、数字空间是元宇宙的基础设施。元宇宙需要数字空间作为载体,所有活动都要在 3D 数字空间中进行。物理世界是 3D 的，进入元宇宙就是进入真实的物理世界。进入元宇宙入口需要交互技术，有三个路径进入元宇宙：一是 2D 技术，手机和电脑可以进入元宇

宙，但体验效果不够强；二是 3D 技术，XR 包括 VR（虚拟现实）、AR（增强现实）、MR（混合现实），体验效果强，最关键的是数字眼镜，数字眼镜将代替手机；三是脑机接口技术，人脑与电脑连接，更好地自由进出元宇宙。

（六）Web3.0

34、Web3.0 是元宇宙最重要的基础技术。所谓 Web 是互联网协议，Web1.0 是以公司为中心，所有数据归公司所有；Web2.0 是以平台为中心，所有数据归平台所有；Web3.0 是非中心化，在 Web3.0 中，每个人所产生的数据和数字内容都属于个人所有，实现数字主权。Web3.0 是真正以客户为中心，实施数据价值的等价交换，体现元宇宙的核心价值。

六、元宇宙经济体系

（一）数字内容

35、元宇宙的经济体系，主要包括内容创造、数字资产和经济系统。元宇宙以创造为本，创造驱动一切，内容创造主要来自两大途径：第一用户创造内容，即 UGC，用户既是创造者，又是消费者，也是交易者，自己创造自己，用户创造的数据以及价值归用户所有。

第二人工智能创造内容，即 AIGC，AI 也是内容的创造者，AI 创造的内容是可编辑的，内容将越来越多，所有内容创造都可以在元宇宙中体现其价值。

（二）数字资产

36、元宇宙中全部为数字资产，数字货币是数字资产重要载体，代表性的数字货币有比特币、以太坊等，已成为全球基础性数字货币，世界各国都在探索主权性数字货币。数字资产的主体是各种数据，各类数字产品、各方数字平台等都为数字资产，实体资产也能转化为数字资产。实体资产越用越贬值，数字资产越用越增值，数字资产可以复制，将远远大于实体资产，其价值更为巨大。

（三）经济系统

37、元宇宙由经济系统实现价值。元宇宙中数字通证体现流通价值，数字通证分为两种，一种是同质共识通证，如比特币、以太坊等在公链上发布；一种是非同质通证，主要方式为 NFT，NFT 为数字资产的凭证。NFT 确保数字资产的唯一性和真实性，通过发行 NFT 实施数字资产的确权、收藏、流通和交易，实现资产的价值，在元宇宙中 NFT 就是数字资产的“上市”。

七、元宇宙社会体系

（一）数字化身

38、元宇宙的社会体系，主要包括数字化身，数字社区和数字人。首先是数字化身，每个人进入元宇宙都需要有自己的数字化身，这是元宇宙中的数字身份证。数字化身有两种形式：一种是卡通头像，一种是真人复制。数字化身可以自由进出，参加元宇宙中的各种活动，还可以复制，数字化身都有标志为 DID。

（二）数字社区

39、元宇宙的组织形式是数字社区 DAO，DAO 是按照某种目的组成的自由人联合体，参与者来自全球各地，相互间并不认识，DAO 主要由共识机制和智能合约两大协议作为基础架构。DAO 具有“四共机制”，即自由共生、内容共创、价值共享、社区共治。在 DAO 中每个人都是贡献者，具有充分的创造权、共享权和民主权。每个参与者都有提案权，通过提案表决，不断进行迭代优化。个体在 DAO 中可以自由进出，也可以参与多个 DAO。DAO 实现自主发展、自主进化，成为元宇宙中全新的社会组织。

（三）数字人

40、元宇宙中有两大类“人”，一类是人们的数字化身，一类是数字人，数字人是人工智能生成的，可以大量复制。未来，世界上存在三种“人”：一是机器人，在实体世界代替人类从事体力劳动；二是数字人，在数字世界代替人类从事简单脑力劳动；三是自然人，通过掌握数据和算法，激活数字人，操纵机器人，在元宇宙中实现“人机数”的共生协作，由人提出需求及思想，由数字人和机器人具体运作，共同创造价值。

八、元宇宙能力

（一）核心能力

41、当今，数字化能力已经成为核心能力，无论是国家、地区、企业乃至个体，数字化能力都是至关重要。在元宇宙中，同样重要的是元宇宙能力，未来元宇宙能力是更为重要的核心能力，元宇宙能力的关键在于元宇宙人才。元宇宙为升维能力，主要应用于元宇宙产业、产业元宇宙、企业元宇宙等，通过升维应用，实现数字技术创新实体技术，数字资产创新实体资产，数字产业创新实体产业。

（二）元宇宙产业

42、元宇宙产业是一个生态体系，由硬件、软件、

服务组成：一是硬件产业，包括元宇宙芯片、虚拟现实设备、传感设备等；二是软件产业，包括数字组件、人工智能软件、数字安全等；三是服务产业，包括数据服务业、区块链服务、数字孪生服务、数字人服务等，元宇宙产业的发展将与日俱增。

（三）产业元宇宙

43、元宇宙应用于百业千行，游戏领域是元宇宙应用的启动场景，现在已广泛应用于元宇宙旅游、元宇宙社交、元宇宙文化、元宇宙艺术、元宇宙教学、元宇宙体育、元宇宙医疗等领域。尤为重要的是在实业中的应用，着重发展元宇宙工业、元宇宙农业、元宇宙商业、元宇宙金融、元宇宙房地产、元宇宙城市建设等。在元宇宙中从在线到在场，从静态到互动，在同一时空体验感大大提升。

（四）企业元宇宙

44、元宇宙应用的主体是企业元宇宙，企业的全程产业链都能应用元宇宙：一是研发设计，先建立数据模型试错，通过与客户和实体互动后不断优化；二是生产制造，应用数字孪生技术，实施生产制造的全过程交互优化；三是市场营销，在元宇宙中将产品数字化，通过场景数字化大大增强用户体验，促进产品

营销；四是数字员工，更为重要的是在众多企业工作岗位采用数字员工，将会起到意想不到好效果。人工智能代替人 1 个岗位，将创造 2.6 个新岗位，关键是将劳务员工升级为数字化员工。企业元宇宙对外扩大市场销售,对内降本增效创新,应用元宇宙大有可为。

以工业为例,“未来新工业”的生产经营方式产生大变革，将从工业企业为中心到工业互联网为中心再到工业元宇宙为中心。有专家预测,5 年后，全球将有超过 40%的大企业，其生产经营在元宇宙中完成，并取得意想不到的大成效。

九、元宇宙财富

（一）财富之源

45、元宇宙中全部是数据，数据是财富之源，主要来自两大源头：一是数据增量，数据正在大幅度增长，新的摩尔定律是全球数据总量每 18 个月翻一番，需要开发应用；二是数字原生，宇宙大爆炸前就有数字原生，存在于高维世界中亟待挖掘利用。数据取之不尽，用之不竭。

（二）价值创造

46、元宇宙中创造价值主要有两类“人”，一类是数字化身，一类是数字人。特别是数字人创造价值潜力无限：一是特别优势，数字人效率高，为人的数倍数十倍；数字人成本低，为人的十分之一；数字人质量好，工作质量一丝不苟。二是可复制性，数字人可不断复制，边际成本为零，边际效益递增。元宇宙中财富效应巨大，呈现指数级发展。

（三）数字红利

47、数字化创造全新红利，创造数据大价值。现在有两个价值增长模型：（1）联合国专家对数字经济的价值增长模型进行了研究，当一个系统包括国家、地区、企业的数字化水平超过 75%，以后在不增加投资的基础上，其价值将增长 3 至 5 倍。数字经济增长速度为传统经济增长速度的 3.5 倍。（2）IBM 专家对全球 50 家数字化转型标杆企业进行了长达十年的跟踪研究（2007-2017 年），其结论意见是 50 家企业 10 年间销售额平均增长 12 倍，前 3 年增长一倍，后 7 年增长 11 倍，这是因为数据积累有个过程，一旦过了拐点就会呈现指数级增长。

48、数字红利主要得益于从“四不”到“四优”，传统企业存在“四不”，即不连接、不匹配、不协同和

不及时，严重削弱价值创造能力；数字化企业有“四优”，即精准化、高效化、协同化和预判化，通过“四优”克服“四不”，就能实现价值倍增，对价值创造起到决定性的重大作用。

49、数字化价值的增长机制集中体现在三大数字技术：第一计算机技术，计算机主要解决高效化，计算效率价值：按照摩尔定律，计算速度=18 个月翻一番。第二互联网技术，互联网主要解决协同化，网络协同价值：$V=N^2$，互联网价值与节点总数平方成正比。第三人工智能技术，人工智能主要解决智能化，即精准化和预判化，数字智能价值，以制造业为例：新价值=（生产能力+市场能力+研发能力）×数字化能力，数字化能力提高三大基础能力的智能水平。“计算效率+网络协同+数字智能”是数字化价值的内在增长机制，三大公式是其最好的数学表述。

50、元宇宙是数字化的核心定位，数字红利在元宇宙中得到最充分的体现，随着元宇宙的广泛应用，其数字红利将爆发性增长。有专家研究，到 2030 年全球的新增财富 80%在元宇宙中创造，元宇宙是全新的大金矿，未来十年是元宇宙的黄金十年。

十、元宇宙文明

（一）两次数字化

51、数字化发展要经历两个阶段：数字化 1.0 是从互联网的线下向线上发展，实现线上与线下一体化；数字化 2.0 是从物质世界向数字世界发展，实现物质世界与数字世界相融合。数字化 1.0 是基础，在转型中价值仅占 20%；数字化 2.0 是主导，在转型中价值占到 80%。从第一次转型到第二次转型是决定性一步，数字化第二次转型就是进入数字新世界，走向元宇宙新文明。

物质世界是三维的，互联网的线上是一维和二维的，元宇宙是三维以上的，即回归三维世界，所以元宇宙为更真实的世界。

（二）数字化“三生”

52、人类向元宇宙迁徙，就是全面进入数字世界中生存和发展，实现数字化“三生”，即数字化生活、数字化生产、数字化生命。首先是数字化生活，现在数字化生活已十分普及，通过移动互联网能够实现购物、社交、学习、办公等，在线生活高频率、快方便、低成本，成为全新的生活方式。智能手机是数字化生

活的工具，未来每个人都匹配一个智能助理，享受数字化美好生活。

53、数字化生产是全方位数字化，农业、工业、服务业、城市、乡村、政务等都要数字化。数字化生产的关键是建设好“数字大脑”，大力提高“智商”，全面走向智能化。麦肯锡研究院对智能化与工业化作比较研究，认为智能化的科技发展速度是工业化的数十倍，智能化的经济规模是工业化的 300 倍，智能化的社会影响力是工业化的 3000 倍，智能化威力无穷。

54、数字化生命是人的生命数字化。生命数字化有三大路径：第一数字器官，人体中的器官更换，采用 3D 打印数字技术制作仿生器官，用作人体医疗；第二人机融合，应用脑机接口，实现人脑与电脑的有机连接，进而向人机融合发展；第三数字永生，将人的形体和意识全部数字化，实现数字化永生。生命数字化是碳基生命与硅基生命的大融合。

（三）数字新文明

55、元宇宙将引领人类发展进入数字新文明，集中体现在三大标志：第一数字技术大集成，应用数字技术的集大成者；第二数字经济制高点，成为数字经济的最高形态；第三数字社会新空间，建成数字社会

的全新时空。元宇宙的核心是数字价值观，关键是提高人的“数商”。新的全球化是数字全球化，具有最大的先进性，真正进入人类命运的共同体，走向无限美好的人类数字新文明。

The Digital Principles of the Metaverse

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Catalog

The Digital Principles of the Metaverse

The Metaverse is a new digital civilization, representing the future of the world. In the Metaverse, it is full of digital, and important to cognize the meta-universe from the digital principle.

1. The universe is numbered

(1) Evolution of the universe

1. The matter, energy and information, in which whole of creation is made up of energy, matter and information. matter is the basis, energy represented force, and information is the leading force. The relationship between the three is that energy and matter are transformed into one another, and information leads the transformation. The movement of the entire universe is orderly dominated by information, making the universe continue to move from a low level to a high level and become a complex giant system of a higher level. The universe is an incomparably huge information processing

machine, and the concept of information is the core of the concept of the universe.

2. The holographic theory holds that: before the Big Bang, there is a primordial universe, and this primordial universe is an infinitely huge super information disk. The Big Bang is a singularity explosion from '0' to '1'. The super information disk immediately separated, combined with material energy, and information along with it, always exists forever. The original code of holographic information transcends time and space, and in the everyplace. Algorithm is the most important thing in the universe, and it dominates universal operation.

(2) Digital world

3. The 'Tao' in Lao Tzu's '*Tao Te Ching*' is the foundation of the existence of the entire universe, and also the most basic law in the universe. 'Tao' is something out of nothing. The so-called 'nothing' does not mean nothing, just not in the form of matter. There is information in 'nothingness', and information is the carrier of 'Tao'. 'Something' is the form of matter. Information and matter are two sides of the same body. Information plays a

leading role and determines the movement and change of matter. The original code of information is 'number', which makes matter from disorder to order, and then reveals the inner laws of the material world. The universe is full of 'numbers', and 'numbers' become the 'digital native' at the bottom of the entire universe, form a super 'digital brain', and determine the transformation and optimization of matter. Observing the physical world from the digital world is to recognize the world from a higher dimension, and use digital thinking to gain insight into the true meaning of the physical world.

(3) Everything is number

4. The ancient great philosopher Pythagoras believed that 'everything is number', and the fundamental attribute of everything in the world lies in number. In the quantum world, 'string' is the smallest unit of matter, and its vibration frequencies are all numbers; the four codes of 'A CGT' in biological genes are also numbers; the Chinese *Zhouyi* believes that 'the source of *I Ching* is number'. Many strange numbers in the world are eternal. For example, the Pi is 'π' or 3.1416; the golden ratio is 0.618, which is the key to the universe. The most core numbers

are '0' and '1', which constitute everything in the digital world. All in all, digital and matter complement each other in the world.

5. Newton, Einstein and other great scientists all believed that there was a mysterious force in the universe that controlled the whole world. This force is the law of mathematics. Mathematics is the best expression of laws. Mathematics is calculated by quantity, which is the most accurate; mathematics is expressed by formulas, which is the most concise. Newton's $F = MA$, Einstein's $E = MC^2$, are the application of mathematical formulas to summarize scientific laws. Engels believed that the only way to make the discipline from experience to science is for mathematics to enter a discipline, and that mathematics is the most essential expression of objective laws.

2. The digital paradigm

(1) Digital base

6. The base of everything is digital, and the digital base is to recognize everything and solve everything from

the foundation. Digital have two instincts: first is digital determines everything, and digital as the base determines all the upper layers, and determines various ways of survival and development; secondly, digital drives everything, uses digital to drive everything, everything generates value by transforming into digital, and then returns digital value to everything, realizing the closed loop of value.

(2) Paradigm change

7. Everything has a law of development, and the paradigm of human discovery of the law is constantly changing, roughly through four stages, namely the theoretical thinking paradigm, the experimental demonstration paradigm, the simulation computing paradigm, and the data optimization paradigm. These four paradigms are gradually evolved, not mutually exclusive, but complementary. The first three paradigms have their own characteristics, and the last data optimization paradigm has the most advantages.

8. The theoretical thinking paradigm is the theoretical reasoning of 'abstract + numbers'. Many scientists in

history are great philosophers, good at theoretical thinking, and formed their own scientific theories through abstract reasoning and mathematical calculations. Euclid, Newton, Einstein, etc. are typical theoretical thinking paradigms.

9. The experimental empirical paradigm is the empirical theory of 'experiment + induction'. Many modern scientists are masters of experiments. They first put forward intuitive hypotheses, then verify them through experiments, and then inductively discover scientific laws. Leonardo da Vinci, Faraday, Edison, etc. are typical experimental paradigms.

10. The simulation computing paradigm is the simulation method of 'simulation + computing'. After the invention of the computer, scientists use simulation data to build expert models, and then use computers to simulate and select the best to discover scientific laws. Many scientists today mainly apply the meritocratic paradigm of simulation computing.

11. The data optimization paradigm is a digital model of 'data + algorithm'. It mainly applies massive big data and discovers new laws through algorithm modeling. The

new paradigm is the digital model, which is the most significant change in the optimization model. The 'data + algorithm' model has huge advantages. The essence of the digital model is data intelligence, which generates intelligence from data. The so-called intelligence has two functions: one is precision, optimizing the matching; the other is adaptation, adapting to changes. Continuous optimization through trial and error is the method of machine learning.

(3) Data

12. Data is the foundation of digitization. The sources of data mainly come from three aspects: one is the data of nature, the second is the data of the economy, and the third is the data of the society, and the data is growing exponentially. Data is a strategic resource, and whoever gets it wins the world. Data is a factor of production, empowering traditional factors of production such as land, labor, capital and technology. Data is a new asset. The value of data lies in centralized connection and interaction. Data creates value in the flow and becomes an important new asset.

(4) Algorithm

13. Algorithms are the core of digitization. Algorithms represent a systematic approach to describing the strategy mechanism for solving problems, and are a series of clear instructions for solving problems. From a technical point of view, algorithms are a series of methods for data processing, mainly applying data to build a model, and continuously iterating and optimizing through running feedback, so as to reach the goal. Algorithms have been applied to hundreds of industries and thousands of industries, providing intelligent solutions in various application scenarios, empowering and innovating in all fields. Algorithms are extremely powerful and have become the 'master key' for scientific decision-making.

3. The new technological revolution

(1) New technology

14. The wave of new technology is unstoppable, and it is the new Kondratiev wave, having an unprecedented impact on the economy and society. The development of new science and technology is revolutionary and has been

far ahead of the economy and society. The position of economy and science and technology has undergone new changes, from the economy to dominate science and technology, to science and technology to dominate the economy, science and technology beyond the speed of development of the economy and society. It's a historic turning point.

(2) New features

15. The development of new technology has two characteristics: one is acceleration, the development of new technology is advancing at an acceleration of ten times and dozens of times. Due to the rapid development, it has brought about great and rapid changes, resulting in the inability to keep up with the pace of rapid changes. The other is integration. In the past, it was a breakthrough of a single technology, but now it is the integration of multiple new technologies. Due to the development of integration, it brings complexity and high complexity, resulting in many problems difficult to solve. Fundamentally speaking, the great changes that have not been encountered in a century are the great challenges of the new scientific and technological revolution.

(3) VUCA

16. The 'rapid changes' brought by the accelerated development of new technologies and the 'complexity' brought by the integration and integration of new technologies are concentrated in the form of uncertainty. Uncertainty has become the norm today, commonly known as the 'VUCA'. The most effective way to solve the uncertainty in the VUCA is the digital model. For 'fast changes', algorithms have intelligent adaptability; for 'complexity', data has powerful insight. The method of 'data + algorithm' can turn uncertainty into certainty.

(4) The digital revolution

17. The core of the new technological revolution is the digital revolution. Among the many new technologies, the digital new technology is in the leading position. New digital technologies are represented by artificial intelligence. Artificial intelligence includes data, algorithms and arithmetic power, of which arithmetic power is the key, and computing power has become the most powerful power in contemporary times. In the new era, it is necessary to turn from infinite labor to infinite

computing power, and to obtain infinite creativity through infinite computing power.

(5) Digital Productivity

18. The transition from material productivity to digital productivity is a major upgrade. Material productivity is mainly to produce products, while digital productivity is mainly to create content, and to empower and optimize the production of products through the creation of content. Digital productivity fundamentally changes the way of production. The key is: firstly, data-driven business, and secondly, algorithm-guided decision-making. Robots and digital humans are used to engage in production business. Humans focus on mastering data and algorithms to achieve symbiotic collaboration between humans and machines. Material productivity develops linearly, digital productivity develops exponentially, and digital productivity becomes the most advanced productivity.

19. The concentrated expression of digital productivity is the digital economy, which has become the dominant direction of global economic development. The

digital economy has three characteristics, one is data as the key element, the second is digital technology as the basic technology, and the third is intelligence as the core goal. The digital economy is the interaction and integration of professional technology and digital technology in specific scenarios. All business capabilities become basic capabilities, and digital capabilities become core capabilities. Digital capabilities empower business capabilities, and realize the digitization of all business and all digital business. The highest form of the digital economy is the metaverse.

4. The Metaverse Large Ecology

(1) Human migration

20. The metaverse makes human beings migrate to higher dimensions. Human beings are constantly migrating, and there have been four great migrations so far. The first great migration was to the entire continent of the earth. Homo sapiens lived in eastern Africa 100,000 years ago. Due to the destruction of a large number of forests, Homo sapiens were forced to migrate to the surrounding areas and began to leave Africa. They first migrated to the

Mediterranean region, then to Europe, then to Asia, Oceania, and even the Americas, and migrated to the entire continent of the earth, greatly expanding the living space of Homo sapiens.

21. The second great migration migrated from the continent to the ocean. The whole earth's continent only accounts for 30%, and 70% is the ocean. In order to seek greater development space, human beings have gradually migrated from the mainland to the ocean. Since modern times, many countries from the East to the West have moved toward the ocean in continuous exploration, opening up unprecedented new space.

22. The third great migration is from the earth to space. Humans have longed for space for a long time. With the continuous progress of science and technology, they gradually have the ability to go to space. In fact, they have reached the moon and then marched to Mars. Now this process is constantly accelerating and will realize human to extraterrestrial planets.

23. The fourth migration is from the material world to the digital world. Every migration of human beings is a

great evolution, and the migration to the digital world is the greatest migration. The digital world is a high-dimensional world, making human beings develop in higher dimensions, which is to go to the metaverse. The Metaverse has infinite creativity, which gives revolutionary significance to the evolution of human beings and marks that human beings have embarked on a new advanced civilization.

(2) Brand-New demands

24. The metaverse is a brand-new need for human beings. According to Maslow's Hierarchy of Needs, the first level is survival needs, the second level is security needs, and these two levels of needs have been gradually satisfied. Today, the third level of social needs, the fourth level of respect needs, and the fifth level of self-actualization needs have become the new spiritual needs. Compared with the material system, which has many restrictions and obstacles, the digital system can better meet the spiritual needs, especially the new generation, the Generation Z, and the Alpha Generation have an urgent need for social interaction, self-esteem, and self-worth. In the digital world, there is a high degree of freedom. The

needs can be fully satisfied, and the metaverse is born because of this.

(3) Definition of the Metaverse

25. The correct definition of the metaverse is very important, and the definition determines the meaning. The metaverse is neither a virtual world nor a parallel universe. The most concise definition of the metaverse is: the fusion of high-dimensional objects with new space-time. The definition of the metaverse can be expressed by the formula: metaverse = digital world × material world. The digital world and the physical world are not a juxtaposition of additions, but a multiplication of fusions. The relationship between the two is: 'the fusion of number and matter, and the strengthening of matter by number', that is, based on matter and dominated by numbers. The metaverse is the new space-time. The more dispersed the space and the more time spanned, the greater the role of the metaverse and the better the realization of value.

26. The metaverse has quantum effects. Quantum is the smallest unit of energy and has two major effects: firstly, quantum superposition, two quantum '0' and '1', in

the atomic world it is either '0' or '1', and in the quantum world, it is also '0' and '1', and can also be '0' and '1'; secondly, quantum entanglement, two superimposed quantum can interact beyond space and time and have the same behavior. The same is true for the metaverse: firstly, superposition effect, both digital and physical; secondly, entanglement effect, the constant interaction of digital and matter. So in the metaverse, the digital world and the physical world are both inseparable and interacting.

(4) Metaverse function

27. In the metaverse, the digital world presents two major functions to the material world: the first is empowerment. The metaverse empowerment is reflected in three aspects: digital enhancement of matter, which multiplies the function of matter; digital expansion of matter, which expands the ability of matter; digital innovation of matter, which upgrades the value of matter. Secondly, the metaverse is ascending, developing from higher dimensions above three dimensions. The fundamental difference between high dimension and low dimension is the amount of data. The amount of data in high dimension is large, especially there is a large amount

of native data in the meta-universe. In the metaverse, due to the comprehensive data, the decision-making is scientifically correct; due to the fine data, the matching is accurate. Einstein once said: For complex problems, it is difficult to solve them in the same dimension, and they must be solved in a higher dimension. This means that complex problems that cannot be solved in the physical world should be solved with the help of the digital world.

(5) Metaverse ecology

28. The metaverse is a large ecological system, mainly including the metaverse technology system, the metaverse economic system, and the metaverse social system. These three systems are a trinity, and none of them is isolated. The technical system is the foundation, the economic system is the leading, and the social system is the key. The three systems interact and develop interactively, forming a complete metaverse ecological system.

5. Metaverse Technology System

(1) Large integration

29. The Metaverse is a large integration of new technologies. The new technologies in the past are breakthroughs in a single new technology, and the value generated is linear. The Metaverse is the integrated application of new technologies, the interaction of multiple new technologies, and the value generated by them is exponential. The Metaverse is not only the integrated application of various digital technologies, but also the cross-border application of various new technologies today, becoming the culmination of new technologies. The value of the Metaverse is enormous and is increasing day by day.

(2) Artificial intelligence

30. The main technology of the metaverse is artificial intelligence. Artificial intelligence technology is ubiquitous, mainly in three aspects: Firstly, digital decision-making. In the metaverse, artificial intelligence is first used for scientific decision-making to make decision-making more precise. Secondly, digital content. The content products in the metaverse are all applications of artificial intelligence, especially the production of digital humans for artificial intelligence. Thirdly, digital

processes. Business processes in the metaverse are continuously optimized with the help of artificial intelligence. Artificial intelligence is iterative, and the speed of iteration determines the speed of optimization.

(3) Blockchain

31. The technical base of the Metaverse is the blockchain. The blockchain is a point-to-point storage of data, which is unique on the chain through encrypted data. Blockchain is both a chain of trust and a chain of value, mainly derived from two mechanisms: firstly, consensus mechanism, which establishes a consensus mechanism in the digital community, forms a trust relationship through digital protocols, and is automatically executed by code. Secondly, smart contract, which confirms the value of data in the digital community, shares value through digital contracts, and is automatically executed by code. Blockchain has become the technical cornerstone of the Metaverse collaboration, and most importantly, it solves the standards and protocols for collaboration.

(4) Digital twin

32. The digital twin is a key technology in the

metaverse. Digital twins make full use of physical entities, perform digital simulation mapping in 3D space, and reflect the whole life cycle process of corresponding entities. In the metaverse, digital twins are mainly used in product design, manufacturing, maintenance and other scenarios. Through the interaction between the digital model and the physical entity, the entity is continuously optimized to realize the new value of the digital twin.

(5) Digital space and interactive technology

33. The digital space is the infrastructure of the metaverse. The Metaverse needs digital space as a carrier, and all activities take place in 3D digital space. The physical world is 3D, and entering the metaverse is entering the real physical world. Entering the entrance to the metaverse requires interactive technology. There are three ways to enter the metaverse: firstly, ^{2}D technology, mobile phones and computers can enter the metaverse, but the experience effect is not strong enough; secondly, XR including AR (Augmented Reality), MR (Mixed Reality), the experience effect is strong, and the most important thing is the digital glasses, which will replace the mobile

phone; thirdly, the brain-computer interface technology, the connection between the human brain and the computer, better free access to the metaverse.

(6) Web 3.0

34. Web 3.0 is the most important basic technology of the Metaverse. The so-called Web is the Internet Protocol, Web 1.0 is company- centric, and all data is owned by the company; Web 2.0 is platform- centric, and all data is owned by the platform; Web 3.0 is decentralized, in Web 3.0, the data and digital content produced by each individual belongs to the individual, realizing digital sovereignty. Web 3.0 is truly customer-centric and implements the equivalent exchange of data value, reflecting the core value of the Metaverse.

6. The Metaverse Economic System

(1) Digital content

35. The economic system of the metaverse mainly includes content creation, digital assets and economic systems. Metaverse is based on creation, and creation drives everything. Content creation mainly comes from

two ways: firstly, users create content, namely UGC. Users are creators, consumers, and traders, creating themselves, and the data and value created by users belong to users. Secondly, artificial intelligence creates content, namely AIGC. AI is also the creator of content, the content created by AI is editable, the content will be more and more, and all content creation can reflect its value in the metaverse.

(2) Digital assets

36. All the digital assets in the Metaverse are digital assets, and digital currency is an important carrier of digital assets. The representative digital currencies are Bitcoin, Ethereum, etc., which have become the global basic digital currency, and countries around the world are exploring sovereign digital currency. The main body of digital assets is all kinds of data, all kinds of digital products and digital platforms of all parties are digital assets, and physical assets can also be converted into digital assets. The more physical assets are used, the more they depreciate, and the more digital assets are used, the more they appreciate. Digital assets can be copied, which will be far greater than physical assets, and their value will

be even greater.

(3) Economic system

37. Metaverse realizes value by economic system. The digital token in the metaverse reflects the circulation value. There are two types of digital tokens. One is a homogeneous consensus token, such as Bitcoin, Ethereum, etc., which are released on the public chain; the other is a non-homogeneous token, mainly in the form of NFT, which is the credential of digital assets. NFT ensures the uniqueness and authenticity of digital assets, and realizes the value of assets by issuing NFT to confirm the rights, collection, circulation and trading of digital assets. In the metaverse, NFT is the 'listing' of digital assets.

7. The Metaverse Social System

(1) Digital Avatars

38. The social system of the metaverse mainly includes digital avatars, digital communities and digital humans. The first is the digital avatar. Everyone needs to have their own digital avatar to enter the metaverse, which is the digital ID card in the metaverse. Digital avatars

come in two forms: one is a cartoon avatar, and the other is a replica of a real person. Digital avatars can access freely, participate in various activities in the metaverse, and can also copy. The digital avatars are marked with DID.

(2) Digital community

39. The organizational form of the Metaverse is the digital community DAO, which is a free association of people with a certain purpose. The participants come from all over the world and do not know each other. The DAO mainly consists of consensus mechanism and smart contract as the infrastructure. DAO has 'four common mechanisms', namely free symbiosis, content co-creation, value sharing, and community co-governance. In DAO, everyone is a contributor and has full creative rights, sharing rights and democratic rights. Each participant has the right to make proposals, and through proposal voting, the system can be continuously iterated and optimized. Individuals can enter and exit freely in DAO, and can also participate in multiple DAOs. DAO achieves independent development and self-evolution, and becomes a brand-new social organization in the metaverse.

(3) Digital human

40. There are two types of 'people' in the metaverse, one is the digital avatar of people, and the other is the digital human. The digital human is generated by artificial intelligence and can be copied in large quantities. In the future, there will be three kinds of 'people' in the world: firstly, robots, which replace human beings in the physical world to perform physical labor; secondly, the digital human, which replace human beings in the digital world to perform simple mental labor; thirdly, natural people, who, by mastering data and algorithms, activate digital humans and manipulate robots to realize the 'human-machine-digital' symbiotic collaboration in the metaverse. Humans put forward demands and ideas, and digital humans and robots operate concretely to create value together.

8. Metaverse Ability

(1) Core competencies

41. Today, digital capability has become a core capability. Whether it is a country, a region, an enterprise

or even an individual, digital capability is crucial. In the metaverse, what is equally important is the ability of the metaverse. In the future, the ability of the metaverse will be a more important core ability. The key to the ability of the metaverse lies in the talents of the metaverse. Metaverse is the ability to upgrade the dimension, which is mainly used in the metaverse industry, industrial metaverse, enterprise metaverse, etc. Through the application of the upgrade, digital technology can innovate physical technology, digital assets can innovate physical assets, and digital industries can innovate physical industries.

(2) Metaverse Industry

42. The Metaverse industry is an ecosystem consisting of hardware, software and services: firstly, the hardware industry, including metaverse chips, virtual reality devices, sensing devices, etc.; secondly, the software industry, including digital components, artificial intelligence software, digital security, etc.; thirdly, the service industry, including data service industry, blockchain services, digital twin services, digital human services, etc. The development of the metaverse industry

will increase day by day.

(3) Industrial Metaverse

43. Metaverse is applied to thousands of industries, and the game field is the starting scene of Metaverse applications. Now it has been widely used in Metaverse tourism, Metaverse social networking, Metaverse culture, Metaverse art, Metaverse teaching, Metaverse sports, Metaverse medical and other fields. Especially important is the application in industry, focusing on the development of Metaverse Industry, Metaverse Agriculture, Metaverse Commerce, Metaverse Finance, Metaverse Real Estate, and Metaverse City Construction. In the metaverse, from online to presence, from static to interactive, the sense of experience in the same time and space is greatly improved.

(IV) Enterprise Metaverse

44. The main body of the metaverse application is the enterprise metaverse, and the entire industrial chain of the enterprise can apply the metaverse: firstly, R&D and design, first establish a data model for trial and error, and continuously optimize after interacting with customers and entities; secondly, manufacturing, applying digital

twin technology to implement the interactive optimization of the whole process of production; thirdly, marketing, digitize products in meta-universe, greatly enhance user experience and promote product marketing by digitizing scenes; finally, digital employees, and more importantly, in many enterprise jobs using digital employees, will play an unexpectedly good effect. Artificial intelligence replaces one job for humans and will create 2.6 new jobs. The key is to upgrade labor workers to digital workers. The enterprise Metaverse externally expands market sales, internally reduces costs, increases efficiency and innovates, and the application of Metaverse has great potential.

Taking industry as an example, the production and operation methods of 'new industries in the future' will undergo major changes, from industrial enterprises as the center to the industrial Internet as the center and then to the industrial metaverse as the center. Some experts predict that in five years, more than 40% of the world's large enterprises will complete their production and operation in the metaverse and achieve unexpected results.

9. Metaverse Wealth

(1) The source of wealth

45. The metaverse is full of data, and data is the source of wealth, mainly from two sources: firstly, the increase in data, which is growing substantially, and the new Moore's Law is that the total amount of global data doubles every 18 months, and applications need to be developed. Secondly, digital native, digital native existed before the big bang, which exists in the high-dimensional world and needs to be exploited and utilized. Data is inexhaustible.

(2) Value creation

46. There are mainly two types of 'people' in the Metaverse creating value, one is the digital avatar, and the other is the digital human. In particular, the digital human to create value potential is unlimited: Firstly, they have special advantages. Digital humans have high efficiency and are several times as many as human beings; digital humans have low cost, one tenth of human beings; digital humans are of good quality and meticulous in work quality. Secondly, replicability, digital humans can be replicated

continuously, with zero marginal cost and increasing marginal benefits. The wealth effect in the metaverse is huge, showing exponential growth.

(3) Digital dividend

47. Digitalization creates new dividends and creates great value of data. There are two value growth models: (1) United Nations experts have conducted research on the value growth model of the digital economy. When the digitalization level of a system including countries, regions, and enterprises exceeds 75%, later on the basis of not increasing investment, its value will grow 3 to 5 times. The growth rate of the digital economy is 3.5 times that of the traditional economy. (2) IBM experts conducted a ten-year follow-up study (2007-2017) on 50 global digital transformation benchmarking companies, and their conclusion is that the sales of the 50 companies have increased by an average of 12 times in 10 years, doubled in the first three years, and increased 11 times in the next seven years. This is because there is a process of data accumulation, and once the inflection point is passed, it will show an exponential growth.

48. The digital dividend is mainly due to the change from 'Four No' to 'Four Excellent'. Traditional enterprises have 'Four Nos', that is, no connection, no match, no synergy and not in time, which seriously weakens the ability to create value; digital enterprises have the 'Four Excellent', means precision, high efficiency, synergy and pre-judgment. By overcoming the 'Four No' through the 'Four Excellent', we can achieve value multiplication and play a decisive role in value creation.

49. The growth mechanism of digital value is embodied in three major digital technologies: firstly, computer technology, the computer mainly solves the problem of high efficiency, and computes the value of calculation efficiency: according to Moore's Law, the calculation speed doubles in 18 months. Secondly, Internet technology, the Internet mainly solves synergy, the value of network synergy: $V = N^2$, the Internet value is proportional to the square of the total number of nodes. Thirdly, artificial intelligence technology, artificial intelligence mainly solves intelligence, that is, precision and prediction, and digital intelligence value. Taking manufacturing as an example: new value = (production

capacity + market capacity + R&D capacity) × digital capacity, digital capacity improves the intelligence level of the three basic capabilities. 'Computational efficiency + network collaboration + digital intelligence' is the internal growth mechanism of digital value, and the three major formulas are its best mathematical expression.

50. The metaverse is the core positioning of digitalization, and the digital dividend is most fully reflected in the metaverse. With the extensive application of the metaverse, its digital dividend will grow explosively. According to some expert research, by 2030, 80% of the world's new wealth will be created in the metaverse. The metaverse is a brand new gold mine, and the next ten years will be the golden decade of the metaverse.

10. Metaverse Civilization

(1) Digitization twice

51. The development of digitalization goes through two stages: Digitalization 1.0 is the development from the offline to online of the Internet, realizing the integration of online and offline; Digitalization 2.0 is the development

from the material world to the digital world, realizing the integration of the material world and the digital world. Digitization 1.0 is the foundation, accounting for only 20% of the value in the transformation; Digitalization 2.0 is the dominant, accounting for 80% of the value in the transformation. From the first transformation to the second transformation is a decisive step. The second transformation of digitalization is to enter the new digital world and move towards the new civilization of the metaverse.

The material world is three-dimensional, the Internet line is one-dimensional and two-dimensional, and the metaverse is more than three-dimensional, that is, returning to the three-dimensional world, so the metaverse is a more real world.

(2) Digital 'Three Lives'

52. The migration of human beings to the metaverse is to fully enter the digital world to survive and develop, and realize the digital 'three lives', that is, digital life, digital production, and digital life. The first is digital life. Now digital life is very popular. Shopping, socializing,

learning, office, etc. can be realized through the mobile Internet. Online life is high- frequency, fast, convenient, and low-cost, which has become a new way of life. Smartphones are tools for digital life. In the future, everyone will be matched with an intelligent assistant to enjoy a better digital life.

53. Digital production is an all-round digitalization. Agriculture, industry, service industry, cities, villages, and government affairs must be digitalized. The key to digital production is to build a 'digital brain', vigorously improve 'intelligence', and become intelligent in an all-round way. The McKinsey Institute conducts a comparative study on intelligence and industrialization, and believes that the development speed of intelligent technology is dozens of times that of industrialization, the economic scale of intelligence is 300 times that of industrialization, and the social influence of intelligence is 3,000 times that of industrialization, and the power of intelligence is infinite.

54. Digital life is the digitalization of human life. There are three major paths for the digital life: firstly, digital organs, the replacement of organs in the human body, using 3D printing digital technology to make bionic

organs for human medical treatment; secondly, human-computer fusion, applying brain-computer interface to realize the organic connection of human brain and computer, and then to human-computer fusion; thirdly, digital immortality, digitizes all human body and consciousness, and realizes digital immortality. The digitization of life is a great fusion of carbon-based life and silicon-based life.

(3) New digital civilization

55. Metaverse will lead human development into a new digital civilization, which is embodied in three major signs: firstly, the integration of digital technology, the master of the application of digital technology; secondly, the commanding height of the digital economy, becoming the highest form of the digital economy; thirdly, the new space for the digital society, a new time and space for the digital society. The core of the metaverse is digital values, and the key is to improve the 'digital quotient' of people. The new globalization is digital globalization with the most advanced nature, truly enters the community of human destiny and moves towards a new digital civilization of infinite beauty.