Modeling Artificial Intelligence in the Creative Industry 4.0: Challenges and Opportunities

By. Prof. Zainal A. Hasibuan, PhD
Chairman of APTIKOM, Member of WANTIKNAS
Universitas Dian Nuswantoro

This material is presented at the 3rd ICOIACT 2020 with the theme “Exploring the Role of Artificial Intelligence for Creative Industry 4.0”. Universitas Amikom Yogyakarta, 24 November, 2020
AGENDA

• What is Creative Industry?
• The Scope of Creative Industry?
• How Artificial Intelligence (AI) Plays Its Role in Creative Industry?
• Modeling Automation System for Creative Industry 4.0 Products
• Challenges and Opportunities in Implementing AI in the Creative Industry
• Conclusions
What is Creative Industry?
Definition of Creative Industry

- The 'creative industries' in a nutshell... The term 'creative industries' describes businesses with creativity at their heart – for example design, music, publishing, architecture, film and video, crafts, visual arts, fashion, TV and radio, advertising, literature, computer games and the performing arts.

- The creative industries sector is also referred to as the ‘creative and cultural industries’ or the ‘creative and digital industries’ or the ‘creative industry’ within the ‘creative economy’. Most recently they have been called the ‘Orange Economy’ (La Economía Naranja) in Latin America and the Caribbean.

- The term ‘creative industries’ refers to a range of economic activities that are concerned with the generation and commercialisation of creativity, ideas, knowledge and information.

- The creative industries definition from the UK Government’s Department for Culture, Media and Sport (DCMS) is: ‘Those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property.’

- In Indonesia, BEKRAF describes the Creative Economy as follows: “The creative economy is creating added value based on creativity that is protected by copyright, and originated from cultural heritage, knowledge and technology.”
Sometime called Creative Economy

• The creative economy is broadly defined as an economic system comprising areas of activity originating in individual creativity, skill and talent that offer cultural significance and have the potential for wealth creation through the generation of intellectual property.

• It encompasses creative endeavours in the fields of music, film and television, gaming, advertising, publishing and literature, as well as architecture, design, art and fashion.

Source: See Newbigin, John, 2014
Characteristics of Creative Industry

• Use human creativity, skill, and talent.
• Primary production input is intellectual capital.
• Innovation
• Place-specificity.
• The output can be characterized as artistic and cultural.
• It is part of economic development of cities, regions, and countries.
Nature of Creative Industry

• Small and relatively lack of development
• Mostly categorized as Micro and Small Enterprise
• Business model inherits from the family business
• Life-cycle product relative short
• Cash flow covers routine activities
• Lack of SCM and CRM applications
• Lack of strategic planning
• Often not consider competitors
Scope of Creative Industry
Scope of Creative Industry
Digital Transformation of Creative industry

Paradigm shift in business model and processes, in supply chain, in customer relationship, etc.
Creative Industry 4.0

Digital Transformation

Government Policy & Business

Mindset & Culture

Creative Industry 4.0

People

Government

Business

Technology

Creative Industry

Video, Film, Photography
Advertising
Antiques
Architecture
Crafts
Comp. Service & Software
Design
Fashion
Interactive Games
Music
Performance Art
Publishing & Printing
R & D
How Artificial Intelligence (AI) Plays Its Role in Creative Industry?
Artificial intelligence (AI) and Machine Learning (ML)

• Artificial intelligence (AI)

“It is the study of how to train the computers so that computers can do things which at present human can do better.”

• Machine Learning (ML)

“The learning in which machine can learn by its own without being explicitly programmed. It is an application”
Implementation Of Artificial Intelligence

AI: Humanoid-Robot

AI-Automation System: Q/A System, Machine Learning...

Zainal A. Hasibuan, 2020
AI Automation System: End-to-End Cycle of Pattern & Meaningful Insights

Zainal A. Hasibuan. IWBIS, 2020
## Roles of AI in Creative Industry 4.0

<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
<th>Output</th>
<th>Creative Industry 4.0</th>
<th>AI Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Capturing Human &amp; Machine Behavior</td>
<td>List of requirements</td>
<td>Adaptive to users preferences</td>
<td>Diagnostics</td>
</tr>
<tr>
<td>2.</td>
<td>Big Dataset</td>
<td>Heterogen Big Dataset</td>
<td>Consider all aspect of life</td>
<td>Detection</td>
</tr>
<tr>
<td>3.</td>
<td>Feature Selection &amp; Formulating Framework</td>
<td>Pattern and Regularities</td>
<td>Provide various ready to use pattern &amp; regularities</td>
<td>Classification &amp; Prediction</td>
</tr>
<tr>
<td>4.</td>
<td>Platform Design</td>
<td>System Design</td>
<td>Modular &amp; agile systems</td>
<td>Reusability</td>
</tr>
<tr>
<td>5.</td>
<td>Portfolio Applications</td>
<td>Applications Needed</td>
<td>SCM, CRM, ERP</td>
<td>Prediction</td>
</tr>
<tr>
<td>6.</td>
<td>Organizations &amp; Managerial</td>
<td>Applications Usage</td>
<td>SCM, CRM, ERP</td>
<td>Prescription</td>
</tr>
<tr>
<td>7.</td>
<td>Visualization</td>
<td>Results and Interpretations</td>
<td>Learned and relearned</td>
<td>New Insights</td>
</tr>
</tbody>
</table>
Modeling Automation System for Creative Industry 4.0 Products
Automation as "the creation and application of technology to monitor and control the production and delivery of products and services."
## Empowering vs. Replacing Human Capability

<table>
<thead>
<tr>
<th>AI—Automation by Application System *)</th>
<th>AI—Automation by Humanoid Robotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identification power of AI-based automation system.</td>
<td>• Replacing human’s routine jobs.</td>
</tr>
<tr>
<td>• Diagnostic power of AI-based automation system.</td>
<td>• Replacing human’s endanger jobs.</td>
</tr>
<tr>
<td>• Classification and categorization power of AI-based automation system.</td>
<td>• Replacing human as an object of experiment.</td>
</tr>
<tr>
<td>• Prediction power of AI-based automation system.</td>
<td>• Replacing human’s repetitive jobs.</td>
</tr>
<tr>
<td>• Prescription power of AI-based automation system.</td>
<td></td>
</tr>
</tbody>
</table>

*) More preferences as to humanoid robotic for creative industry, due to maintain work forces.
# Traditional Creative Industry to Creative Industry 4.0

<table>
<thead>
<tr>
<th>Creative Industry Products</th>
<th>Creative Industry 4.0 Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Music,</td>
<td>• Music 4.0: Making Music Available in the Internet, a completely updated best-selling music editions.</td>
</tr>
<tr>
<td>• Film and television,</td>
<td>• Advertising 4.0: product, price, place, and promotion. Product is often developed based on customers’ needs and wants, captured through market research using big data.</td>
</tr>
<tr>
<td>• Gaming,</td>
<td></td>
</tr>
<tr>
<td>• Advertising,</td>
<td>• Etc.</td>
</tr>
<tr>
<td>• Publishing and literature,</td>
<td></td>
</tr>
<tr>
<td>• Architecture,</td>
<td></td>
</tr>
<tr>
<td>• design,</td>
<td></td>
</tr>
<tr>
<td>• Art and fashion.</td>
<td></td>
</tr>
</tbody>
</table>
AI-Based Creative Industry 4.0: Multi-stakeholder Model

Government Roles:
- Provide infrastructure

Academician Roles:
- Establish Center of Excellence R&D

Business Roles:
- Capital Support

Community Roles:
- Resource Persons for indigenous content creative

Zainal A. Hasibuan, 2020
End-to-End Digital Creative Industry AI-Talent Transformation Framework

**List of Digital Talent**
- Complex problem solving
- Critical thinking
- Creativity
- People management
- Coordinating with others
- Etc….

Solving Problem
Creating Opportunity

**Choose Programming Language**
Write Code

**Formulate Pseudo Code & Algorithm**

**Choose Programming Language**
Write Code

**Formulate Logic Programming**

**Algorithm (Business & Data Analytics)**

**Business Process & Business Rules**

**Business Model & Innovation**

**System Analyst**

**Ideation**

**Coding, Testing, Implementing**

**Business Analyst**

**AI-Digital Talent for Creative Industry 4.0**

Zainal A. Hasibuan, 2019
Increase Productivity

Reduce Cost Production

Ease to Market Access

Big Data Analytic AI-Based Micro and Small Creative Industries

Digital Marketing

Improve Customer Services

Local Product

Adapted from: Hadi Putra & Hasibuan, 2015
Automatic E-Business Application Generating

Profile Assessment

Micro, SMEs

Recommendation

Commonality & Variability Feature Recommendation

Micro, SME Profile

Automatically Configuration

E-Business App 1

E-Business App i

Satvika and Hasibuan, 2019
Big Data in Game DayaBaya: Desa Bali

Hasibuan, et.al 2010
Big Data in Game Based on Culture
Self-Explanation of Tour Guide

Mencari dengan Input Video

Ridwan and Hasibuan, 2016
Portal of E-CHNH

Hasibuan, et.al 2010
Digitalization and Computation of Cultural heritage and natural history system

Hasibuan, et.al 2010

Multimedia processing

Diverse users, the need for information rich

Very rich content and diverse users

Enterprise Resource Planning (ERP)
E-gamelan from Udinus: Cultural Heritage Preservation

• Situs resmi: http://www.egamelanku.com/
E-Angklung From Udinus: Cultural Heritage Preservation
Uncover Ethnic and Sub-Ethnic Relationships Using Deep Learning: Preserving Indonesian Cultural Heritage

Zainal A. Hasibuan, 2018
The Impact of AI-Based Automation Systems to Creative Industry 4.0

- Quick product design
- High reusability of product component
- Customer-oriented product
- Time to market
- Responsive to change and adept
- Higher quality product as more data being collected
- Learn and re-learn of the product making.
- Quick distribution
- After sale service
Challenges and Opportunities in Implementing AI in the Creative Industry
Opportunities of Creative Industry 4.0

• Collaboration among stakeholders: creator creative product, business, and government.
• Supply Chain Management.
• Customer Relationship Management.
• Economic scale development
• Maintaining and developing knowledge and skills in the Era of Industrial Revolution 4.0
• Industrial Revolution 4.0 Technologies: 3D-Printing and Artificial Intelligence.
Challenges of Creative Industry 4.0

• Replacing human skills, hence fading away cultural asset
• 3-D printing can replace human skills that mostly needed in the micro and small enterprises.
• High Productivity versus Hands on Low Productivity
Conclusions

• Indonesia with her rich cultural heritage and natural history has a big potential to develop creative industry.

• Most of the products of creative industries are inherited in the soul of Indonesian.

• With the implementation of big data and artificial intelligence (AI) into creative industry, the opportunity to develop local context creative industry 4.0 becomes even bigger.

• The advancement of industrial revolution technologies and combining with local context creative industry 4.0 will bring Indonesia to a more competitive nation.

• AI-based automation system is able to identify and diagnose, classify and categorize, prediction and prescription in order to improve the performance of local context creative industry 4.0.