Robotic Food Process and Systems: How Ready is Nigeria?

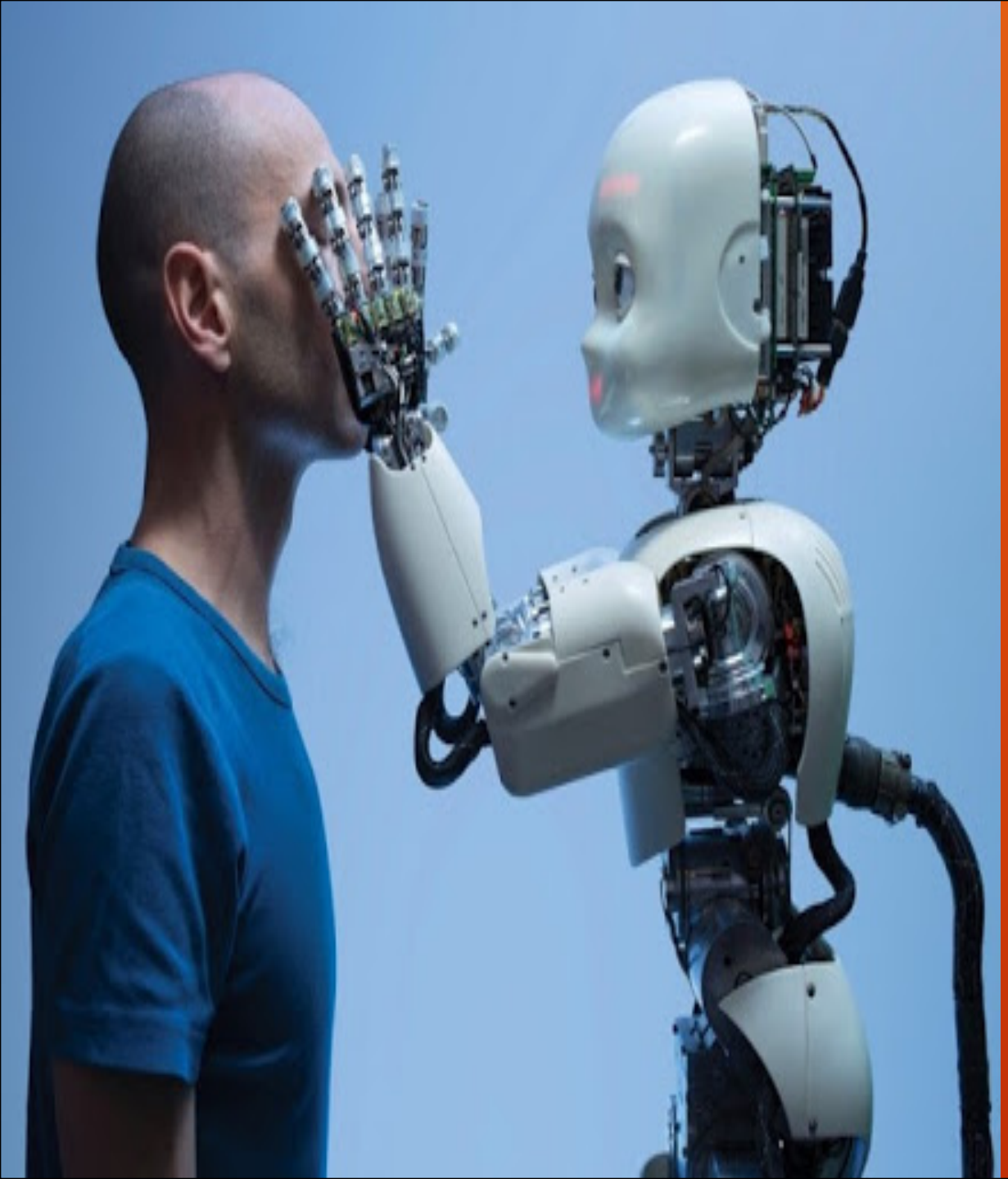
Presented by

Blessing Onojeide
Food Safety & HSE Expert/ISO Mgt. Systems Consultant, Trainer & Auditor

What are Robots?

Robot, any automatically operated machine that replaces human effort, though it may not resemble human beings in appearance or perform functions in a humanlike manner.

- Encyclopedia Britannica



What is Robotics?

Robotics, design, construction, and use of machines (robots) to perform tasks done traditionally by human beings.

-Encyclopedia Britanannica

What is Automation?

The definition of automation is the use of machines and technology to make processes run on their own without manpower

- YourDictionary

Briefs History of Robots

- “Robot“- R.U.R (*Rossum's Universal Robots*), written by Czech playwright Karel Capek in 1920
- It is from the Czech word for slave “robota“
- Mechanical men built to work on factory assembly lines and that rebel against their human masters.

Brief History of Robotics

- first use - 1942 by a Russian-born American science-fiction writer Isaac Asimov, in his short story "Runabout."
- He generally characterized the robots in his short stories as helpful servants of man and viewed robots as "a better, cleaner race."

Why Robots in the Food Industry?

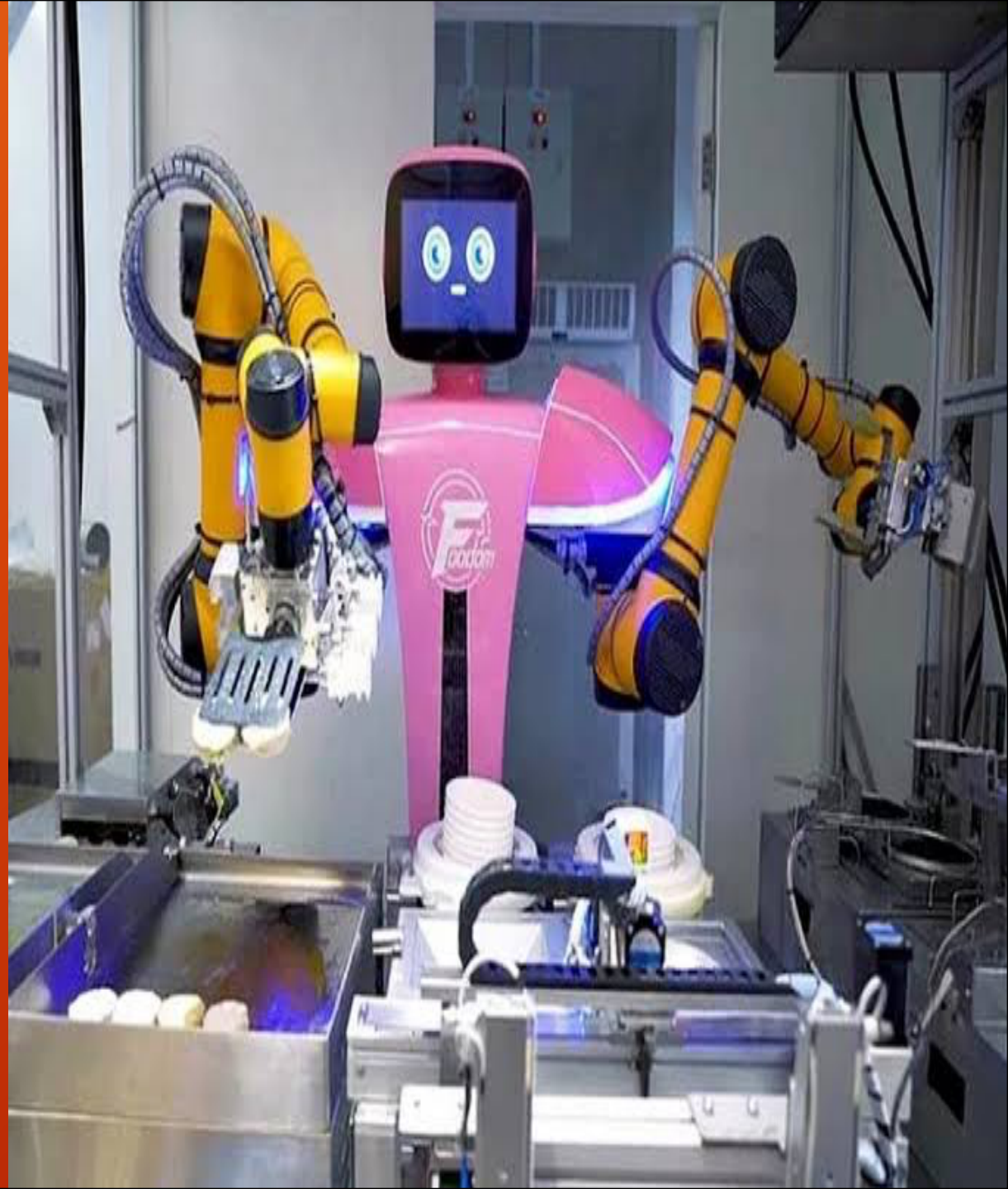
- by Food Handlers in food processing facilities.
- from some other raw food product that a human recently handled.
- from human hair, skin, nails etc

Why Robots in the Food Industry?

- High demand for lean manufacturing within the food industry
- Mitigates workplace accident levels as much as possible.

Robotics in the Food Industry

- Currently common in food processing.
- According to the International Federation of Robots, 240,000 units were sold worldwide in 2015.
- 8% increase in annual growth globally.



Robotics in the Food Industry

- Early uses of Robots in food processing - packaging and palletizing operations.
- current use - approximately 40% of palletizing operations and 26% of food and beverage packaging lines.

Robotics in the Food Industry

- Robots are now being used in many food processing operations from farm to fork.
- Food industry manufacturers have reported a 25% increase in productivity since employing robotics when compared to the work done by humans.

Application of Robotics in the Food Industry

Robotics in Agriculture

An agricultural robot also known as Agribot is used for specific agricultural purposes:

- Harvesting stage
- Monitoring the environment
- Soil analysis
- Gather data on the status of the crop within the external conditions to evaluate the best type of conditions to cultivate for crops.

Robotics in Food Manufacturing

Robotics.org reports that a major advancement in robotic technology within food processing has been the introduction of more advanced grippers. These grippers allow for quick but gentle handling of sensitive food products like fruit and vegetables.

Robotics in Food Packaging and Palletizing

According to BCC Research, the food processing and packaging market will be valued around $31.5 billion by 2020, which shows the clear upward spiral the market is going. Furthermore, 94% of food packaging operators are using robotics already according to a survey by the Association for Packaging and Processing Technologies.

Robotics in Food Packaging and Palletizing (cont.)

For primary & secondary packaging and palletizing. The Robots' tasks include but not limited to the following:

- Open
- Fill
- Pack
- seal, and
- correctly label the package to be sent to the end-user.

Robotics in Cookery

The most recent robot application within the cookery space is the robot chef Flippy designed and developed by Miso Robotics and part-funded by the Cali Group. Flippy is a robotic arm that flips and cooks burgers with ease and fries up to 80 baskets of food per hour, monitor the food to ensure it's cooked and can clean up after itself.
These robots have been designed to be used in restaurants, hotels with chef

Robotics in Cookery (cont.)

automation, and development has started for cooking robots in homes. For example, Moley has created a prototype that is designed for homes and cooks with the skills of a ‘master chef’.

Robotics in Meat Processing

Meat processing involves many operations for which humans are not optimally suited. As a result, the use of robotics

- Cutting
- sorting
- packaging.

Robotics in Dairy Processing

Milking Systems - developed in Europe in the early 1990s and introduced in the United States in 2000. Robotic milking is voluntary, allowing the cows to set their own milking schedules.

Cheese Processing - for stirring curds, slicing cheese, and packaging. Robots can portion up to 12,000 cheese portions per hour.

Robotics in Food Service Applications

Robots can perform a variety of kitchen tasks:

- Mixing
- Choppin
- Cocktail-making
- Robotic Bartenders
- Sushi, pancake, and noodle making robots are also being used in Japan and China.

Robotics in Food Delivery

Starship Technologies launched a robotic delivery service in Washington, D.C. where Robots...

- pick orders from restaurants & deliver them to consumers.
- carry up to 20 pounds and go four miles an hour on the sidewalk

Robotics in Food Delivery

- Each robot is equipped with alarms that go off if anyone tries to pick it up and cameras to record these activities
- the lid can only be unlocked by the consumer through an app or code.

Advantages of Robots in the Food Industry

- Reduced requirements for intensive human labor
- Reductions in on-the-job injuries
- The ability to perform operations that are highly undesirable for humans
- Increases in final product quality
- The ability to perform operations that are very difficult to perform manually by humans increases in productivity

Advantages of Robots in the Food Industry (cont)

- Enhancements in flexibility
- improvements in safety
- increases in order fulfillment speed and accuracy
- increases in uptime, and
- reductions in costs.

How ready is Nigeria?

Composition of Nigeria's Business Space

- made up of Micro, Small and Medium Enterprises (MSMEs)
- According to the 2013 report by the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), and the National Bureau of Statistics (NBS), Micro, Small and Medium Enterprises (MSMEs) in Nigeria was 37,067,416 companies and the total number of persons employed by this sector was 59,741,211 which represents 84.02% of the total Nigeria labour force.

Composition of Nigeria's Business Space

- Micro businesses (companies with less than 10 employees and less than N5million in assets excluding land and building) accounted for 36,994,578 of the companies in this sector.

Culture

- Nigerians are sociable, like company
- In a study of B2B and B2C organizations by Uzo and Adigwe (2016), it was evident how cultural norms impact business transactions.

Culture (cont.)

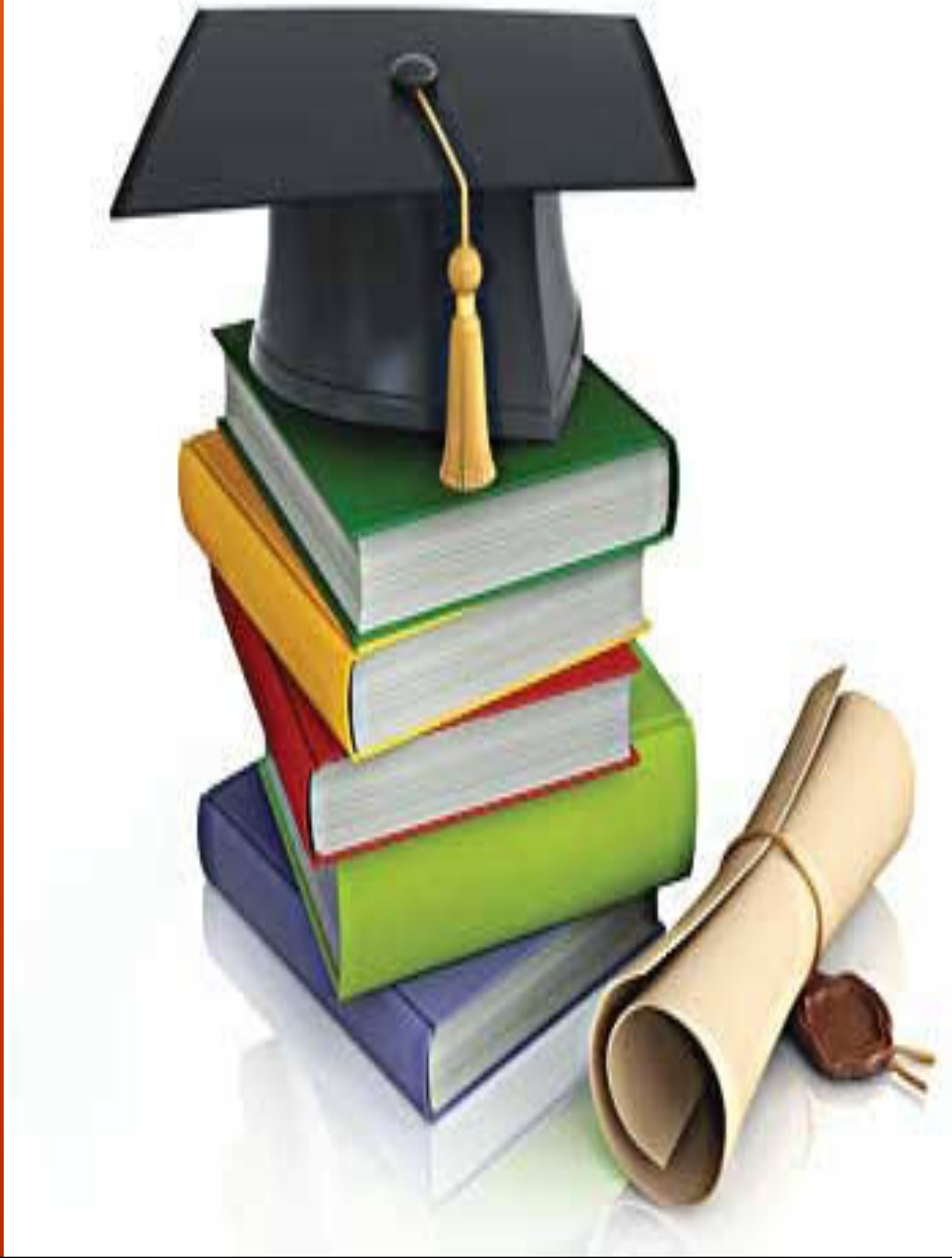
- transactional preference(s) of customers who are embedded in this same cultural context.
- Are we as a people predisposed to transacting with robots (even those with artificial intelligence algorithms)?

High rate of unemployment

- unemployment rate of 23.1% as stated by the National Bureau of Statistics (NBS) and reported by The Guardian on 19 December, 2018
- High crime rate from unemployment will impart Organizations

Education

- Skill upgrade required
- Do we have the right Institutions?
- Are existing Institutions adequately equipped and funded?
- Do we have Lecturers trained to deploy Robotics etc



Basic Infrastructures

- Constant electricity?
- Good and adequate water supply?
- Good roads and other means of transportation?

DO YOU THINK NIGERIA IS READY?

Recommendations:

- As an initial move towards the required skill upgrade, Robotics and AI to be introduced into the Curriculum of our higher Institutions in Nigeria. We can start this in the various departments of Food Science & Technology. NIFST has a lot of Professors to make this happen.
- ICT to be introduced into all Schools in Nigeria from the kindergarten stage.

Nigerian Institute of Food Science & Technology

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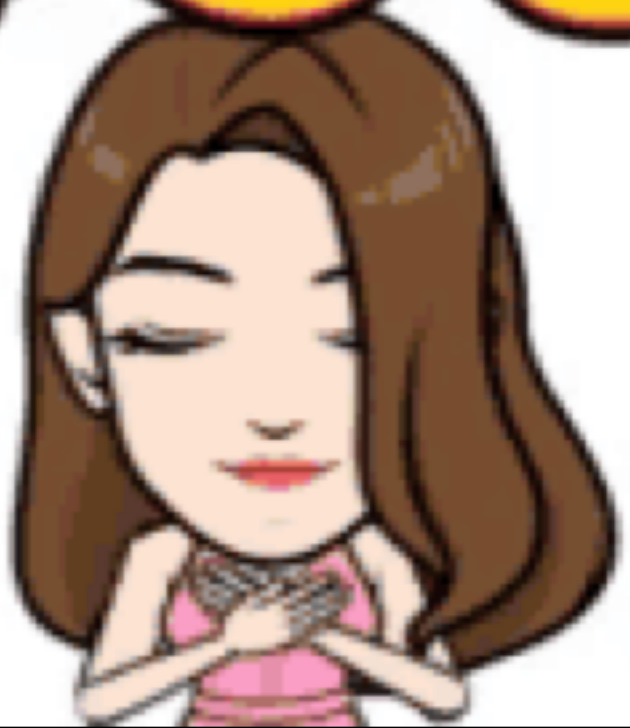
THANK YOU



Get in touch/follow us:

improvementfocus@gmail.com

@Improvement Focus Consultants

@ImprovementFC

@BlessingOnoje

Blessing Onojeide

Blessing Onojeide

+2348062937114
+2348023930672

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